ANATOMISCHE GESELLSCHAFT

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Authors (alphabetical order)

Poster 1:

Titel: The challenge of learning histology – an eye tracking and „think-aloud“ observational longitudinal study

Autoren/Adressen: Alan Brecht (Goethe-Universität Frankfurt, Fachbereich Medizin), Gertrud Klauer (Goethe-Universität Frankfurt, Fachbereich Medizin); klauer@em.uni-frankfurt.de

Abstract:
Inexperienced students starting to acquire microscopic anatomy are lost in the vastness of completely new visual impressions. We were interested in the early processes of perceptual learning because microscopic anatomy is the first step to develop a “good diagnostic eye”.

Eye movements were recorded with a screen-based Tobii R T120 eye tracker in 34 students. Displayed items (32) were digital images from selected tissue slices used in the Frankfurt histology lab. All items could be observed without any time limit and also without any addressed task. Also, verbal reports about what may be seen were recorded. Think aloud protocols were transcribed, categorized and evaluated. The procedure was repeated six times at the beginning and the end of each of the three histology classes taught in Frankfurt. Data were statistically described and analyzed with two-way variance analysis (ANOVA) and correlated according to Pearson.

Initially, participants used narrative terms to describe the unfamiliar structures. Narrative terms altered significantly to scientific terms toward run 6, but especially after the first histology lab. However, incorrectly used terms as well incorrect diagnoses persisted on a high level of about ±50 % during the repeated sessions. Eye tracking data show no significant changes.

Students learn terms and taxonomies and histological details– but these are weakly tied to visual structures. Thus, training to select visual structures and to categorize them correctly is not effective with Frankfurt teacher-centered teaching. Rapid Feedback is needed to stabilize the learned categories and to correct also false categorization.

Poster 2:

Titel: Big data in electron microscopy; improved examination of kidney tissue using large-scale two dimensional datasets

Autoren/Adressen: Carsten Dittmayer (Charite Berlin), Eckhard Völcker (Penard Labs), Irene Wacker (University Heidelberg), Rasmus Schröder (University Heidelberg), Rasmus Schröder (University Hospital Heidelberg), Marcus Mildner (Charite Berlin), Sebastian Bachmann (Charite Berlin);
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Abstract:
In kidney research and pathology, electron microscopy facilitates the evaluation of structural features that reveal aspects in the cause and progression of disease. Preparation and examination modes currently undergo innovation to improve and simplify workflows and to handle "big data" information sets. Developments in scanning electron microscopy (SEM) and improved computer technology have facilitated high-throughput preparation and examination. Here, we evaluated the potential of new techniques for SEM and transmission electron microscopy (TEM) to improve quality of kidney ultrastructural investigation.

Perfusion fixation and embedding of rodent kidney samples was routinely performed. Thin sections were placed on grids for TEM and on conductive substrate for SEM. Imaging for TEM was performed using a FEI TecnaiG2. Imaging for SEM was performed using single-beam (sb) Zeiss Sigma and Ultra. High-throughput imaging for SEM was performed at the Zeiss laboratory in Oberkochen using a multi-beam (mb) MultiSEM505.

Using TEM, sbSEM and mbSEM, sectional tissue areas of 100x100 to 1000x2000µm were digitized. TEM provided a faster digitization (1-2h) compared to sbSEM (more than 3-10h) but was limited by preparation artifacts. With mbSEM we digitized entire sections within 20min; here, charging and preparation artifacts were limitations, but subcellular details were resolved.

Digitization of thin sections allows examination of large-scale datasets, permitting nanotomy practice compatible with a "Google earth"-like mode, "big data" handling, and preserves micro-ultra correlation. Each of the three approaches has its specific advantages. In the future, preparation and general technology will have to be adapted for SEM to further improve image generation and quality.

Poster 3:

Titel: Step-by-step virtual surgical anatomy training systems database for the most common surgical interventions.

Autoren/Adressen: Sergey Dydykin (Sechenov First Moscow State Medical University), Dmitry Zhuravlev (LLC MOLNET), Aleksandr Scherbyuk (Sechenov First Moscow State Medical University), Tatiana Bogoyavlenskaya (Sechenov First Moscow State Medical University); dydykin_ss@mail.ru

Abstract:
There is creation of the training complex during the implementation of the joint project of the Department of operative surgery and topographical anatomy to First MSMU n. a. I. M. Sechenov and LLC MOLNET. The training complex can be used by students not only during teaching at the University, but also as the stage of interactive distance education, as well as in home training.

Training complexes will greatly improve the quality of student learning, giving them the opportunity to experience themself in the modern operating room and observe the stages of surgical interventions "in the eyes of the operating surgeon".
Each step of one type of surgical intervention simulation training complex include the following main components.

• Clinico-pathological features of the diseases in which it is necessary to conduct a specific surgical intervention.
• Unit diagnostic information containing a set of diagnostic studies (x-rays, ultrasound data, MRI) results.
• The surgical intervention step-by-step animation with the use of three-dimensional visualization and animation during which will be considered the optimal process of surgery.
• A test unit comprising a testing for checking the assimilation of educational material on specific surgery.

Thus, based on the functional, technical and consumer characteristics of step-by-step virtual surgical anatomy training complex, it can be concluded that the high-tech product with high consumer properties is developed by the results of our development to meet modern trends in education and information technology.

Poster 4:

Titel: Semspace.org: an integrated and scalable open-access repository to advance sem research

Autoren/Adressen: Mona Eulitz (University Witten/Herdecke), Ahmad Pahlavan Tafti (University of Wisconsin-Milwaukee), Gebhard Reiss (University Witten/Herdecke), Zeyun Yu (University of Wisconsin-Milwaukee); mona.eulitz@uni-wh.de

Abstract:
Advances in the diverse fields of scanning electron microscopy (SEM) methods lead to increased needs for a joint network to share SEM data along with the underlying concepts. For this reason, we have initiated an open-access platform for storage and easy access of SEM datasets. This platform is planned to be public and freely available for the research community worldwide. In this project, we are engaged in a long-term project with the goal of developing an integrated and scalable interrogative framework to share very large scale SEM images.

SEM is currently undergoing a revival. Development of new methods has led to a dramatic expansion of know-how in the diverse fields of SEM methods. However, there is a crucial problem in storage of vast amounts of image datasets and easy availability of these datasets for subsequent analysis. Additionally, for each method and each sample type an individual laborious and time-consuming preparation protocol has to be established.
For this reason, there is an increasing demand for an open access SEM data repository, so we have created semspace.org to allow SEM scientists and researchers for better cooperation.

At present the launch of the web platform is being prepared and first successful experiences with an available and comparable 3D microscopy repository have already been made.

Scientific work hinges on publicly and free exchange of data, and our new established repository of high quality SEM datasets will be an invaluable resource for researchers and scientists from many areas of interest.

Poster 5:

Titel: Enhancing anatomy learning in an undergraduate medical program by combining various teaching approaches, including body painting, ultrasound, clinical investigation and peer-teaching: a feasibility study.

Autoren/Adressen: Luis Filgueira (University of Fribourg), Elisabeth Eppler (University of Basel); luis.filgueira@unifr.ch

Abstract:
Traditional anatomy teaching to medical students is based on lectures combined with practical courses, with delivery of content as a one-way procedure from teachers to students. Anatomy teaching is often based on images, models and prosections of dead bodies, neglecting the dynamic live and functional aspect of anatomical structures. Anatomy is usually taught at the early stage of medical programs and the acquired knowledge is only occasionally enhanced and applied later in a clinical setting. The aim of our study was to enhance knowledge of anatomy, translate traditional first acquired knowledge into a more clinical setting focusing on functional/live anatomy, as well as teaching the students the tools and providing the opportunity to enhance self-directed learning, literature research, team-learning, oral communication/peer teaching, peer-evaluation, writing skills and self-reflection.

The study was done with 20 students. The content focused on the locomotion system, including some major conditions. The students had learnt the basics of the locomotion system one year earlier through a dissection course.

New knowledge was elaborated in small groups and delivered through peer-teaching. Applied/clinical anatomy was enhanced through practical sessions using body painting, ultrasound and clinical investigation, supervised by an experienced anatomist and clinical teachers. The students reported on their learning experience through a reflective diary and by answering a questionnaire.

The aims of the study were well achieved. The students enhanced their knowledge in anatomy and were highly satisfied with this new course and especially with the student-focused activities in a clinically-oriented setting.

Poster 6:

Titel: High resolution episcopic microscopy (hrem) as a tool for imaging mouse skin in a wound-healing model

Autoren/Adressen: Johannes Günther (Medical University of Vienna), Stefan Geyer (Medical University of Vienna), Ingrid Lang-Olip (Medical University of Graz), Jakob Fuchs (Medical University of Graz), Melanie Pichlsberger (Medical University of Graz), Daryousch Parvizi (Medical University of Graz), Lars Kamolz (Medical University of Graz), Wolfgang Weninger (Medical University of Vienna); stefan.geyer@meduniwien.ac.at

Abstract:
We aimed at testing whether the High Resolution Episcopic Microscopy (HREM) method fits for visualizing the tissue architecture and blood vessel topology of the skin of mice serving as models for wound healing.

In the skin of NMRI-Foxn1nu/Foxn1nu mice (Harlan Laboratories) two circular punch biopsy wounds (8 mm diameter) were created under anaesthesia and covered with skin replacement material. The mice were sacrificed after 8 days and biopsies of the borders of the wound regions were harvested and subjected to High resolution episcopic microscopy (HREM) imaging. The biopsies contained both, native skin, as well as newly generated skin. The 3D volume data were analysed with the Amira® software.

HREM data permitted visualisation of all tissues and layers composing the skin. Especially the connective tissue fibre bundles of the dermis could be visualised using simple volume rendering algorithms. The topology and branching patterns of the dermal blood vessels could be visualised with the aid of surface rendered three-dimensional (3D) models. Blood vessel counts were possible.

While traditional microscopic explorations only give a fragmentary impression of the 3D arrangement of the dermal connective tissue fibres and blood vessels, HREM data permit precise 3D visualisation of these components of the mouse skin. This is true for native skin, as well as for newly generated skin of mice used as models for researching wound healing.

Poster 7:

Titel: Study preferences in anatomy: preliminary evaluation

Autoren/Adressen: Ekremcan Karaer (Bahcesehir University School of Medicine), Cagatay Barut (Bahcesehir University School of Medicine); cagbarut@yahoo.com

Abstract:
There is a lack of consensus about the best or most efficient method used in anatomical education. In addition the learning style of students varies. Unfortunately we do not know much about the medical students' preferences for learning anatomy. Thus we aimed to identify the study preferences of medical students in Turkey.

96 medical students aged between 19-26 years participated in the study. Participants were asked 9 questions related with the education system of their school in general and in terms of anatomy. They were also asked 7 questions related with their way of anatomy studying including time spent for anatomy studying, preference for a group study or alone, study materials, study methods.

88.7% respondents indicated that integrated medical education was the education system used in their schools. Systematic anatomy was the main method (93.8%) chosen for anatomy. Plastic models were the most frequent preference for lab studies (90.7%) followed by prosections (58.8%), specimens (30.9%) and cadaver dissections (21.6%). Majority of the respondents preferred studying anatomy alone (86.6%). But this was not the only preference, 29.9% of the students indicated that they also preferred studying in pairs. The distribution of study methods were as follows: correlation of structures with relations (53.6%), functions (52.6%), clinical situations (30.9%), memorizing with mnemonics (53.6%) or tables and lists (45.4%), flash cards (7.2%), regular repetitions (40.2%). The students may prefer one or more of these methods at the same time.

Study preferences may lead changes in anatomy curricula in the future.

Poster 8:

Titel: Comparative study in gross anatomy education: Differences in learning spatial anatomy using 3d-models of body-donor-CT-scans or a traditional atlas

Autoren/Adressen: Alexandra Kohrmann (Otto-von-Guericke Universität Magdeburg), Wolfgang D'Hanis (Otto-von-Guericke Universität Magdeburg), Patrick Saalfeld (Otto-von-Guericke Universität Magdeburg), Kerstin Kellermann (Dornheim Medical Images GmbH), Thomas Roskoden (Otto-von-Guericke Universität Magdeburg), Annika Rathmann (Otto-von-Guericke Universität Magdeburg), Lars Dornheim (Dornheim Medical Images GmbH), Philipp Pohlenz (Otto-von-Guericke Universität), Bernhard Preim (Otto-von-Guericke Universität Magdeburg), Hermann-Josef Rothkötter (Otto-von-Guericke Universität Magdeburg);
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Abstract:
Previous research shows that students with poor visual-spatial ability perform inferior to students with high visual-spatial ability in exams. The introduction of virtual 3D-models to improve students' spatial understanding of gross anatomy has shown promise.

This study compares 21 medical students' performance in gross anatomy examination after learning with a segmented 3D-body-donor-model (interventional group) or an atlas (control group). It features a sequential cross-over design, meaning every student participated both in the interventional and in the control group.

After solving a mental rotation test to ascertain their primary spatial ability, each student answered a questionnaire to determine their learning style. To eliminate learning bias, we changed the region from the knee to the ankle. After studying and remodeling structures of each area for two hours, the students were tested in practical exams. First, they had to identify five structures on a body donor and their second task was to solve a puzzle, requiring spatial understanding of the region. The knee region puzzle consisted of a cross-section, the ankle region contained tarsal bones. Taken time and mistakes were recorded for all exams. At the end of each test, the students evaluated the learning method.

Results of the t-test show that there are no significant differences between the groups regarding taken time and error count, indicating the 3D-models to be as valuable as the atlas. Trends suggest a better orientation at the body donor of the interventional group.

Further research needs to be done to verify these differences.

Poster 9:

Titel: Postgraduate anatomy training at the level of m.sc. degree in the department of anatomy, college of mdcine and health sciences, university of gondar, ethiopia

Autoren/Adressen: Abebe Muchie (University of Gondar, College of Medcine and Health Sciences), Assegedech Bekele (University of Gondar, College of Medcine and Health Sciences), Sabine Löffler (University of Leipzig), Dieter Reissig (University of Leipzig); reiiggo@yahoo.de

Abstract:
The department of Human Anatomy, at College of Medicine and Health Sciences (CMHS) University of Gondar was founded in 1979 with support of the Institute of Anatomy, University of Leipzig, Germany and the then Gondar Public Health College of Addis Ababa University, Ethiopia. It has taught medical students in the same way as in Leipzig University using unclaimed cadavers in the dissection course for gross anatomy. The acting cooperation is by agreement between Medical Faculty Leipzig and College of Medicine and Health Sciences of Gondar University since 2002. To address the scarcity of anatomists in Ethiopia, department of Human Anatomy has launched a new postgraduate program for Master of Science degree in Anatomy with thesis as of 2006.
Objective: To produce competent instructors, practitioners and researchers in human gross anatomy, histology and embryology.

Admission Requirements: Candidates have to meet the academic and non academic requirements of University of Gondar and prove any one of the following degrees: MD (medicine), BDS (dentistry), bachelor degree in Health Officer, Biology, Anesthesia, Nursing, Midwifery, Physiotherapy and Psychiatry Nurse to get training as further Master of Anatomy.

Graduates and current enrolment: From 2006 till July, 2015, 22 M.Sc. candidates successfully completed their study. Currently, the department has 14 MSc students in the pipeline.

Conclusion: With the support of German anatomists and DAAD the department has designed a successful and exemplary curriculum for Human Anatomy MSc program with thesis in Ethiopia.

Poster 10:

Titel: Integrating radiological images into a dissection-based gross anatomy curriculum - first experiences with a new form of anatomy teaching at goethe-university, frankfurt/main

Autoren/Adressen: Michael Rietsche (Goethe University Frankfurt/ Frankfurt a. Main), Tassilo Jungenitz (Goethe University Frankfurt/ Frankfurt a. Main), Olaf Bahlmann (Goethe University Frankfurt/ Frankfurt a. Main), Stephan W. Schwarzacher (Goethe University Frankfurt/ Frankfurt a. Main), Estifanos Ghebremedhin (Goethe University Frankfurt/ Frankfurt a. Main), Kathrin Eichler (Goethe University Frankfurt/ Frankfurt a. Main), Thomas Deller (Goethe University Frankfurt/ Frankfurt a. Main); rietsche@med.uni-frankfurt.de

Abstract:
Anatomical knowledge is essential for the interpretation of radiological images. Conversely, ”reading” clinically relevant radiological images strongly motivates preclinical medical students during their anatomy courses. Anatomists have long been aware of this interdependency and have integrated conventional X-ray images as well as CT or MRT images into their teaching.

We have begun with the systematic integration of radiological images into our gross anatomy course. A task force of anatomists and radiologists decided on the essential radiological images, obtained permission from the ethics commission, and defined a curriculum that was synchronized with the gross anatomy course. Colleagues teaching the course were regularly informed to ensure their support. To implement radiological images into the course, the task force (1) programmed an online module, which includes an annotated viewer for CT and MRT-series. This was designed to empower self-directed learning. (2) Made a "toolbox" for each tutor which contained the most important images as laminated A3-prints. The toolbox also contains a smaller A4 folder with the same images in annotated form for quick reference. (3) Tested the knowledge of the students and evaluated the radiology module of the course.

The feedback of the students was very positive and encouraged the task force to continue with the project.

In sum, this form of integrated teaching resulted in a higher motivation of students and teachers, good results in anatomy and, potentially, medical students who are well-prepared for the clinical part of their education.
(Funding: Fachbereich Medizin, Goethe-Universität)

Poster 11:

Titel: Leaving one's comfort zone - how examiners implement questionnaires in oral exams.

Autoren/Adressen: Jana Scherer (Universität des Saarlandes), Sandra Reichrath (Universität des Saarlandes), Tschernig Thomas (Universität des Saarlandes), Stephan Maxeiner (Universität des Saarlandes); maxeinerstephan@gmail.com

Abstract:
Questionnaire-based strategies to assess students' performance have been reported extensively leaving, however, the question unaddressed how examiners themselves handle them. Here, we focus on how examiners dealt with the implementation of a questionnaire to different anatomy exams potentially being in conflict with their individual style.

Prior to the beginning of an anatomy class 293 students had been offered a voluntary tutorial by older peers to prepare for the dissection course and five oral exams. To evaluate whether participants of the tutorial perform differently, the examiners were instructed to implement a questionnaire to assess the students' performance and to collect certain stats (participation in the tutorial, etc.). The questionnaires shared a common design for each exam (stats, tutorial and selected, new questions). Students were divided into groups and randomly assigned to an examiner. Twelve examiners self-reported duration, number of students per group and time spent using the questionnaire. At the end of the semester the examiners were interviewed, key answers extracted and an evaluation sheet using a Likert scale distributed to categorize previous interview statements.

Exams of experienced (seniors) or male examiners were significantly shorter. Seniors characterized their examination style as associative and spent less time implementing the questionnaire compared to new examiners (juniors). Juniors reported that the implementation became easier over the course of the different exams.

Experience levels had a major impact on the way examiners were implementing a questionnaire in oral exams. A general collection of questions can be a useful basis for inexperienced examiners to structure exams.

Poster 12:

Titel: Digital 3-d tissue reconstruction of histological serial sections from two human embryos

Autoren/Adressen: Michael Scholz (FAU Erlangen-Nürnberg), Simone Gaffling (FAU Erlangen-Nürnberg), Samir Jabari (FAU Erlangen-Nürnberg), Friedrich Paulsen (FAU Erlangen-Nürnberg), Bernhard Tillmann (CAU Kiel); michael.scholz@fau.de

Abstract:
Today, still the most common way to gain more knowledge about the morphology of tissues in the sub-millimeter range is the use of histologically prepared tissue slices and a subsequent investigation under a microscope. A better understanding of the specific tissue situation could be reached, when volumetric data out of histological serial sections would be analyzed. In these cases, a 3-D reconstruction of the original tissue from a digitized histological image sequence can immensely facilitate the perception of the morphology and the spatial tissue structure. An important requirement is, however, that the final reconstruction should restore the anatomy in a way that ideally matches to the original in vivo tissue situation before it was histologically processed.

Histological serial sections of two human embryos (pw5/pw11) were digitally scanned and virtually reconstructed with a newly established software application to demonstrate and determine the state of the art progress in virtual tissue reconstruction.

Rigid and non-rigid Registration of digitized histological data of the whole embryonic body as well as the segmentation of single organs of the specimens are shown as reconstructed volumes to visualize and investigate the original tissue structure.

In the next future, we expect a broad range of interest arising for 3-D tissue reconstructions not only for the purpose of biomedical research, but also as a powerful tool for teaching microscopic anatomy and embryology.

Poster 13:

Absage

Poster 14:

Titel: Max Clara and Innsbruck – Origin of German National and National Socialist career

Autoren/Adressen: Erich Brenner (Medical University of Innsbruck); erich.brenner@i-med.ac.at

Abstract:
Enlighten Max Claras relation with and influence on members of the Institute of Histology and Embryology in Innsbruck.

Research in literature and newspaper databases, personal files and secondary literature.

Initially, Clara began his academic career at the Institute of Histology and Embryology in Innsbruck as demonstrator, and in 1923 as an assistant. In December 1923 left Clara Innsbruck to take over the medical practice of his father who had passed away unexpectedly. His relations with Innsbruck and especially to Jürg Mathis have apparently never ceased.
Since the start of his studies he was a member of the dueling fraternity Corps Gothia and became socialized as German nationalist. it is very likely that Clara thus came in contact with Max de Crinis who supported Clara in his appointments to Leipzig and later to Munich.

1) Max Clara had tight relations with the Innsbruck Histologists.
2) Max Clara was sozialised as German Nationalist and later National Sozialist in Innsbruck.

Poster 15:

Titel: Interrelationship of spinal scoliosis and muscular activity within the oro-facio-cervical system

Autoren/Adressen: Jochen Fanghänel (University Medical Hospital Regensburg), Martin Grabowski (University Medical Hospital Regensburg), Stefanie Immler (University Medical Hospital Regensburg), Helmut Hösl (University Medical Hospital Regensburg), Peter Proff (University Medical Hospital Regensburg), Jan Matussek (University Medical Hospital Regensburg), Joachim Grifka (University Medical Hospital Regensburg), Christian Kirschneck (University Medical Hospital Regensburg); jochen.fanghaenel@ukr.de

Abstract:
Idiopathic scoliosis as three-dimensional deformity of the spinal column is a frequent orthopaedic pathological condition (prevalence 1-2%). Since the oro-facio-cervical system is morpho-functionally connected to the trunk by a variety of muscular and fascial chains as well as the skeletal system, possible effects of scoliosis on the activity of the oro-facio-cervical musculature were investigated.

This epidemiological cross-sectional study comprised 100 juvenile patients (8-18 years of age, 50 orthopedically healthy and 50 with idiopathic scoliosis). For each patient the mean muscular tension (Relax, Bite) or its amplitude change (Fatigue) of the Mm. masseteres, temporales, sternocleidomastoidei and trapezii was recorded bilaterally by electromyography in a standardized manner both in a relaxed state (Relax), during maximum masticatory force in occlusion (2s, Bite) and during relaxation after continuous tension (10s, Fatigue).

Patients with scoliosis in general presented an elevated muscular tension during maximum masticatory force in occlusion (Bite), whereas the muscle tension at rest (Relax) was only increased for both Mm. temporales and sternocleidomastoidei. Except for the right Mm. temporalis (Relax, Bite) and trapezius (Relax), significant differences were observed for all muscles evaluated (Bite/Relax). Significant discrepancies in amplitude change (Fatigue) were only observed for both Mm. masseterici and the right M. trapezius. All muscles of patients with scoliosis, however, showed an increased degree of fatigue.

The activity pattern of the oro-facio-cervical muscles seems to be significantly influenced by idiopathic spinal scoliosis, presumably due to functional-muscular adaptation via morphological and functional connections between the trunk and the stomatognathic system.

Poster 16:

Titel: Anatomical factors in cardiac surgery iatrogenesis: a systematic review and meta-analysis

Autoren/Adressen: Cristina Furnica (University of Medicine and Pharmacy, Iasi, Romania), Alexandra Cristina Rusu (University of Medicine and Pharmacy, Tirgu Mures, Romania), Raluca Ozana Chistol (University of Medicine and Pharmacy, Iasi, Romania), Grigore Tinica (University of Medicine and Pharmacy, Iasi, Romania); cristinafurnica@yahoo.com

Abstract:
Iatrogenic lesions represent a small percentage of cardiac surgery associated complications. Mostly are unique, related to specific surgical maneuvers, and potentially explained by non anatomical approaches. The authors performed a systematic search for published series and case reports on Medline database on iatrogenic lesions in cardiac surgery. The aim was to investigate the role of anatomic knowledge in cardiac surgery, to summarize reported errors according to involved structures, with emphasis on pathophysiology and how they could have been avoided.

Of the 706 articles found, in press or published between 1st January 2010 and 22nd April 2016, 65 were considered relevant for the current topic. There were identified 374 patients aged 18 days – 91 years (107 infants and children average 1,83 months, 267 adults average 63,25 years), that underwent various cardiac surgical procedures resulting in several iatrogenic lesions categories.

The most frequent (43.05%) were type A aortic dissection that occurred secondary to cannulation or aortotomy incidents, followed by nervous lesions (29,95% in children), valve perforations (8,29%), coronary lesions (6,68%), intracardiac shunts (1,60%) and left internal mammary artery – great cardiac vein fistulas (1,06%). Other iatrogenic lesions could be explained by incorrect identification of anatomical structures (great cardiac vein, Eustachian valve), anatomical variants, and morphological inaccurate assessment (coronary arteries and left recurrent laryngeal nerve relations, aortic - mitral valve proximity, aortic arch situation).

In conclusion, a thorough knowledge of anatomical structures and their relationships is mandatory to avoid cardiac surgery iatrogenic lesions.

Poster 17:

Titel: Sources of human bodies in anatomy departments – a global overview of the current situation

Autoren/Adressen: Juri Habicht (Medizinische Hochschule Brandenburg), Andreas Winkelmann (Medizinische Hochschule Brandenburg); juri.habicht@mhb-fontane.de

Abstract:
The usage of human bodies for medical training has a long history and is common today at medical faculties all over the world. Thus there is a global need for cadavers at anatomical institutes. The sources of human tissue used for medical education and research depend on local legislation, cultural and religious customs. They include body donation programs, unclaimed bodies, or other sources. To implement the recommendations of the International Federation of Association of Anatomists (IFAA), which favour body donation over other, ethically controversial practices, on a global scale, an initial overview about the current procedures at anatomical institutes is needed.

We performed a broad research of the literature.

Acquired data remain limited as we found relevant literature for only about one third of countries worldwide. Out of these, only about 15% use donated bodies as their exclusive source of cadavers. Whereas most "Western" and several Asian countries (especially those in which Buddhism is the predominant religion) have established body donation programs, a huge number of anatomical institutes worldwide still depend on other sources, particularly on unclaimed bodies. This is true for most of the surveyed African and Arabic countries.

Conclusions: In order to get a more complete picture of the global situation of the sources of human cadavers at anatomical institutes, research will have to include surveys or direct contact. Our preliminary data show that the IFAA recommendations still have to go a long way to spread body donation as the preferred, ethically respectable practice.

Poster 18:

Titel: Development of a new vascular and tissue casting solution

Autoren/Adressen: Romed Hörmann (Medical University of Innsbruck), Bernhard Moriggl (Medical University of Innsbruck), Erich Brenner (Medical University of Innsbruck); romed.hoermann@i-med.ac.at

Abstract:
Introduction: Injection of arteries and veins with curing substances facilitates the study of sustenance areas. Among the substances used hitherto belong waxes, amalgam, acrylic paints, latex, gelatin, silicone, or epoxy or acrylic resins. These substances have several weak points – to different extents – such as poor penetration, leakages, the requirement or development of heat during the curing process, health hazards or extensive costs.

Material & Methods: We tried different concotions based on an impression material, which is commonly used in dentistry. Permanently soft, liquid- lasting and curing mixtures were investigated. Cold- cured polymers, latex, acrylates, acrylic esters, alcohols and different dyes are the basic individual mixed ingredients. Viscosity is controlled by adding alcohols and/or changing the mixing ratio. The solutions were administered by various syringe sizes in fresh and differently conserved bodies. First the depots of the injections were controlled and documented by ultrasound and afterwards the injection areas were dissected.

Results: Injections of the vascular system with this casting solution reveal excellent penetration down to smallest vessels with low pressure and almost no leakages. Curing passes in acceptable times with [almost] no development of heat. Depending on need there can be put isolated depots that do not leave the space between for example a muscle and its fascia.

Conclusion: The newly developed casting solution is quite cheap, produces almost no hazardous vapors and heat, and allows for adjustable viscosity and therefore controllable penetration.

Poster 19:

Titel: Asymmetric omphalopagus; a rare case of conjoined twinning: a case report

Autoren/Adressen: Samir Jabari (Institute of Anatomy), Michael Scholz (Institute of Anatomy), Manuel Besendörfer (Department of Paediatric Surgery), Roman Carbon (Department of Paediatric Surgery), Oliver Rompel (Department of Pediatric Radiology), Andre Hörning (Department of Pediatrics), Arndt Hartmann (Institute for Pathology), Stephan Söder (Institute for Pathology); samir.jabari@fau.de

Abstract:
Asymmetric omphalopagus is a rare situation of conjoined twinning, in which a grossly defective twin (the parasite) is attached to the thorax and upper abdomen of the main twin (the autosite). We describe a case of an omphalopagus and tried to analyze the inner and outer aspects of the twins, in order to further characterize and describe the asymmetric twinning.

Pre- as well as postoperative diagnostic imaging was carried out and analyzed followed by an autopsy to evaluate the outer and inner aspects of the parasite. Furthermore conventional histological examination of the organ systems found accompanied by immunhistochemical staining was performed.

The parasite had well developed lower extremities and pelvis as well as upper extremities with a cleft hand syndrome and syndactyly. From the outer aspect, the sex was non-determinable and we couldn’t find any testis or ovaries. There was no sign of any axial skeleton or central nervous system. We found a rudimentary rectum with a non-pervious anus, a kidney, ureter, urinary bladder and a blind ending urethra. The blood supply of the parasite was connected to the vessel system of the autosite, which on the other side had an associated omphalocele and an atretic duodenum.

To our knowledge, only 52 cases of parasitic omphalopagus have been described to date, most of the parasites, as in our case, were successfully separated from the autosite.

Poster 20:

Titel: Chemosensitivity of cholinergic urethral brush cells beyond bitter and umami perception

Autoren/Adressen: Chrissy Kandel (Justus-Liebig-Universität Giessen), Klaus Deckmann (Justus-Liebig-Universität Giessen), Wolfgang Kummer (Justus-Liebig-Universität Giessen); Ch.Kandel@t-online.de

Abstract:
Recently, we identified a cholinergic chemosensory cell in the mammalian urethra (urethral brush cell = UBC) functionally expressing the canonical bitter and umami taste transduction signaling cascade (α-gustducin, PLCβ2, TRPM5). Here, we aimed to determine whether UBC are functionally equipped for salty, fatty and sour detection.

UBC were isolated from ChAT-eGFP reporter mice (ChAT=cholineacetyltransferase) and intracellular [Ca2+] was recorded by CLSM. Stimuli were sodium chloride (1-150 mM), mannitol (1-150 mM), ATP (0.5 mM) and amiloride (0.1 mM) as an ENaC-inhibitor (ENaC=epithelial Na channel). Expression of potential sour and fatty acid receptors was investigated by immunohistochemistry (sour: PKD1L3; long-chain fatty acids: GPR120) and utilizing appropriate reporter mouse strains (short-chain fatty acids: GPR41, GPR43).

UBC responded to sodium chloride (50-150 mM) with an increase in [Ca2+]i. Mannitol in comparable concentrations used as osmolarity control had no impact on [Ca2+]i. Sodium chloride responsive UBC did not react to ATP and vice versa. The increase of [Ca2+]i was blocked by amiloride. Immunofluorescence showed neither PKD1L3- nor GPR120-immunolabeling of UBC and other urethral epithelia cells. Likewise, expression of GPR41 and GPR43 was detected in positive controls (intestine), but not in the urethral epithelium.

These data show that a subgroup of UBC reacts to salty stimuli with an increasing in intracellular [Ca2+] caused by ENaC. These cells seem to represent a different subpopulation than those reacting to ATP. So far, there is no evidence for sour and fatty acid detection by UBC.

Poster 21:

Titel: Microsurgical anatomy of human carotid body (glomus caroticum): features of its detailed topography, syntopy and morphology

Autoren/Adressen: Sissy-Amelie Schulz (University of Cologne), Aliona Woehler (University of Cologne), Dirk Beutner (University of Cologne), Doychin Angelov (University of Cologne); angelov.anatomie@uni-koeln.de

Abstract:
The human glomus caroticum (GC) is not readily accessible during ordinary anatomical teaching courses because of insufficient time and difficulties encountered in the preparation. Accordingly, most anatomical descriptions of its location, relation with neighboring structures, size and shape are supported only by drawings, but not by photographs. The aim of this study is to present the GC with all associated roots and branches.

Following microscope-assisted dissection and precise photo-documentation, a detailed analysis on location, syntopy and morphology was performed. We carried out this study in 46 bifurcations of the common carotid artery (CCA) into an external (ECA) and an internal (ICA) carotid artery and identified the GC in 40 (91%) of them.

We found significant variations regarding the location of the GC and its syntopy: GC was associated with CCA (42%), ECA (28%) and ICA (30%) lying on the medial or lateral surface (82% or 13% respectively) or exactly in the middle (5%) of the bifurcation. The short and long diameter of its oval form varied from 1.0 × 2.0 to 5.0 × 5.0 mm. Connections with the sympathetic trunk (100%), glossopharyngeal (93%), vagus (79%) and hypoglossal nerve (10%) could be established in 29 cadavers.

We conclude that precise knowledge on this enormous variety might be very helpful not only to students in medicine and dentistry during anatomical dissection courses, but also to surgeons working in this field.

Poster 22:

Titel: Morphometric compliance of flexion segments of fingers human's hand to their osseous phalanx

Autoren/Adressen: Radik Khayrullin (Ulyanovsk Statet University), Galchin Andrey (Ulyanovsk State University); prof.khayrullin@gmail.com

Abstract:
When carrying out diagnostic and chirurgical operations on human hand primarily using robotic technology important to know anatomical points (landmarks) corresponding on the skin surface of the palm or back of the hand to anatomical structures located underneath. This allows you to develop an automation of procedures of surgical robot for making operations. The purpose of study is the definition of the accordance of sizes of the external form of fingers and their functional flexion’s segments to sizes of their phalanges.

Hands of healthy individuals of both sexes at the age of completion of growth (young people), using the original method dactylometry were studied and the data were compared with the X-ray image of the same hands. Standard methods of X-ray-osteometry of phalanges were used.

According to the results at men was found correlation for middle phalanges of II-IV fingers and distal phalanges of III-V fingers of the right hand, and for middle phalanges of fingers III and of III, V fingers on the left hands. At women correlation was found for middle phalanges of II-IV right fingers and for IV-V phalanges of fingers on the left, and for distal phalanges of IV-V right fingers and of I, V left fingers.

The data obtained can be used for the development of computer graphics programs for the promote of robotic operations on the hand and for the development of bio-mechatronic analogues of hands and fingers based on the functional biomechanical regularities, which determined relations of anatomical components of fingers of hand.

Poster 23:

Titel: Human gross anatomy in 3d - macroscopic anatomy combined with cadaver-specific imaging data sets for a better preclinical training of undergraduate medical students

Autoren/Adressen: Kerstin Klopries (Ruprecht-Karls Universität Heidelberg, Anatomy and Cell Biology), Daniel Paech (German Cancer Research Center / Heidelberg); Kerstin.Klopries@gmx.de

Abstract:
The purpose of this project was to combine human gross anatomy education with cadaver-specific imaging data sets available at the dissection table for improving anatomic knowledge of undergraduate medical students.

Full body post mortem computer tomography (CT) scans of willed body donors were generated using a 16 line multi detector computer tomography scanner with optimized scanning parameters immediately before starting the embalming procedure. The imaging data was processed and visualized using AnatomyMap installed on computers next to the dissection table and Anatomage tables available in the dissection hall.

A cohort of undergraduate medical students was separated into groups of 10 students per dissection table and taught how to analyze the acquired cadaver-specific imaging scans using different computer tools. AnatomyMap is a computer program specifically developed for the visualization of radiological imaging data in the context of gross anatomy education. It features simple operation and high quality 3D renderings. Anatomage is a lifesize anatomy visualization system embedding 3D gross body content, 3D high resolution regional anatomy and 3D imaging software and modeling tools. In addition to their normal anatomy dissection course, the students underwent a special tutor-guided virtual anatomy training once a week using both tools for dedicated education in how to identify anatomic structures and to learn and understand their relation to each other.

Combining physical dissection with post mortem CT scans of willed body donors allows for a novel integrated teaching approach in gross human anatomy.

Poster 24:

Titel: Acellularization-induced changes in tensile properties are organ specific

Autoren/Adressen: Stefan Schleifenbaum (University of Leipzig), Torsten Prietzel (University of Leipzig), Gabriela Aust (University of Leipzig), Andreas Boldt (University of Leipzig), Isabel Keil (University of Leipzig), Robert Möbius (University of Leipzig), Niels Hammer (Department of Anatomy); nlshammer@googlemail.com

Abstract:
Though xenogeneic acellular scaffolds are frequently used for surgical reconstruction, knowledge of their mechanical properties is lacking. This study compared the mechanical, histological and ultrastructural properties of various native and acellular specimens.

Porcine esophagi, ureters and skin were tested mechanically in a native or acellular condition. The native and acellular tissues were compared at the microscopic and ultrastructural level with a focus on type I collagens.

Increased elastic modulus and ultimate tensile stress values were quantified in acellular esophagi and ureters compared to the native condition. In contrast, these values were strongly decreased in the skin after acellularization. Acellularization-related decreases in maximum strain were found in all tissues. Type I collagens were well-preserved in these samples, however, clotting and a loss of cross-linking type I collagens was observed ultrastructurally. Elastins and fibronectins were preserved in the esophagi and ureters. A loss of the epidermal layer and decreased fibronectin content was present in the skin.

Acellularization induces changes in the tensile properties of soft tissues. Some of these changes appear to be organ specific. Loss of cross-linking type I collagen may indicate increased mechanical strength due to decreasing transverse forces acting upon the scaffolds, whereas fibronectin loss may be related to decreased load-bearing capacity. Potentially, the alterations in tissue mechanics are linked to organ function and to the interplay of cells and the extracellular matrix, which is different in hollow organs when compared to skin.

Poster 25:

Titel: Anatomical study of ultrasound-guided intermediate cervical plexus block in regional anaesthesia

Autoren/Adressen: Marko Schulze (Universitätsmedizin Rostock), Andreas Wree (Universitätsmedizin Rostock), Ronald Seidel (HELIOS-Kliniken Schwerin); marko.schulze@med.uni-rostock.de

Abstract:
We undertook this cadaver anatomic study to demonstrate the dissemination of ultrasound-guided injected dye solution by anatomical preparation to define a suitable target compartment for a cervical plexus regional anaesthetics block technique.

In three fresh adult human cadavers six intermediate ultrasound-guided blocks of the cervical plexus were carried out, followed by preparation and photographic documentation of the stained cervical plexus. The focus is on clinically relevant conclusions for performing cervical plexus blocks for example for carotid endoarterectomy.

In five cases the target compartment was correctly identified. In these cases, a cranio-caudal spread of the injectate within the double layer between superficial and deep cervical fasciae was observed. In addition, the superficial layer was permeable to the injected methylene blue. The injection solution disseminated with the sensitive terminal branches of the cervical plexus below the platysma. In all cases an anastomosis (superficial cervical ansa) between the facial nerve and the cervical plexus could be demonstrated. The prevertebral lamina proved to be impermeable to injected methylene blue and no evidence of a porous structure of the prevertebral lamina was found.

The compartment is a suitable target for cervical plexus blocks. The cranio-caudal spread of the injectate allows lateromedial needle guidance in the horizontal plane. The prevertebral lamina proved to be impermeable to injected methylene blue. Whether phrenic nerve blocks are preventable with more distal intermediate cervical plexus blocks must be investigated in clinical trials. The permanent anastomosis (superficial cervical ansa) provides an anatomically reasonable explanation for inadequate cervical plexus blocks.

Poster 26:

Titel: Comparative knee joint anatomy of a novel german miniature pig

Autoren/Adressen: Gundula Schulze-Tanzil (Paracelsus Medical University Salzburg and Nuremberg); gundula.schulze@pmu.ac.at

Abstract:
The pig is often used as a large animal model since pigs share anatomical and physiological similarities with humans. For orthopedic studies, adult animals and therefore, minipigs are required. To gain reproducible results and to estimate transferability of them to human conditions pig lines should be carefully characterized. Therefore, we analyzed the topographical anatomical pecularities of the knee joint of a novel minipig line breaded for experimental conditions the “Aachener minipig”.

Eight knee joints of four mature Aachener minipigs were carefully dissected measuring the dimensions of typical landmarks using a digital caliper. Three hybrid pig knee joints (8-10 month) and three human knee joints served as controls. In addition, cartilage samples of the Aachener minipig (trochlear groove, medial and lateral femoral condyles, menisci) were assessed histologically.

In comparison to human conditions some peculiarities of the pig and the Aachener minipig: were delineated: the lateral meniscus and the tibial joint surface were significantly larger than the medial counterparts. The fibula head was covered by fibrocartilage and completely integrated into the lateral lower joint surface. The cartilage thickness at the joint areas usually used for cartilage repair studies were in average 0.77±0.08 thick and might allow chondral defect models. The porcine anterior cruciate ligament (ACL) attached with two bundles at the tibial plateau separated from each other by the lateral anterior meniscotibial ligament differing from human conditions. Articular cartilage presented the expected zonality.

Despite the overall knee dimension allow many surgeries, porcine peculiarities should be considered in meniscus and ACL reconstruction.

Poster 27:

Titel: A preliminary dissection based study of the dimensions of larynx in anatolian population

Autoren/Adressen: Arya Sesen (Bahcesehir University School of Medicine), Alpen Ortug (Istanbul Medipol University School of Medicine), Gursel Ortug (Bahcesehir University School of Medicine); alpenortug@gmail.com

Abstract:
Accurate knowledge of the dimension, shape and morphology of larynx and its complex anatomy is a prerequisite necessity in performing surgical procedures for laryngeal operations.Populational differences are also important not only in planning the surgical interventions but also performing the operation. Previous morphometrical studies on larynx had shown variable results obtained from different populations, including Western and Eastern yet information about larynx morphometry in Anatolian population is limited. The purpose of this study is to make more statistical data available among Anatolian population and help clinicians for surgical approaches related to this area.

10 parameters from anterior and lateral views were measured on 18 thyroid cartilages taken from autopsy specimens (14 male, 3 female and 1 unknown). Specimens were removed and dissected under stereomicroscope (Leica S6D) after routine fixation procedure. Those with visible deformations were eliminated during dissections. Software programs were used beside the standard measurement methods.

Statistical evaluations and comparisons were done for a comprehensive description. Significant sexual differences were observed. Mean values for all parameters were higher in males compared to females. These results were compared with already existing anatomical data of other populations.

This study on larynx specimens from different regions of Anatolia provides a general knowledge about thyroid cartilage dimensions. Obtained results would have great clinical influence in surgical approaches to the related area. Also the results might give information for anthropomorphic studies.

Keywords: anatomy, morphometry, larynx, thyroid cartilage, Anatolian population

Poster 28:

Titel: The lateral margin of the thoracolumbal fascia is innervated

Autoren/Adressen: Hanno Steinke (Universität Leipzig), Robert Schleip (Universität Ulm), Toshiyuki Saito (Tokyo Medical University), Anna Katharina Rowedder (Universität Leipzig), Andry Vleeming (Medical Osteopathic College of the University of New England, Maine USA); steinke@medizin.uni-leipzig.de

Abstract:
Because several extremity muscles attach to the thoracolumbar fascia (TLF), as well as hypaxial and epaxial muscles, knowledge on the construction of this complex myofascial junction is fundamental to biomechanical analysis and implementation of effective rehabilitation in individuals with low back and pelvic girdle pain.
The detailed anatomy of the lateral margin of the TLF was described to create a previously described lumbar interfascial triangle (LIFT) situated along the lateral border of the paraspinal muscles from the 12th rib to the iliac crest.
We hypnotized the triangular LIFT could be innerved.

We used serial sheet- and stained block-plastination additionally to manual dissection, combined with several histology with immuno-staining of the LIFT.

Histology and immune staining displayed nerves within and around the LIFT. Nerves have been identified within the LIFT using different antibodies. Smaller and larger branches of the Ramus posterior of the spinal nerves reach the area of the LIFT. However, morphological signs of proprioception were not observed.

A distortion of the lateral border of the LIFT may generate sensory information to the passing nerves.
Bias
We used probes of old people. To confirm the idea that within the LIFT, sensory data are obtained, a proof for morphological signs for proprioception is still due.

Poster 29:

Titel: The augmented reality system 'magic mirror' as additive teaching device for gross anatomy

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Abstract:
To ideally dispose young medical students for their clinical work, it is indispensable to acquaint them with anatomical section images in order to prepare them for the clinical application of imaging methods. To ascertain the benefit of the augmented reality system ‘Magic Mirror’ (MM) for this purpose, it was tested and evaluated by 748 first and second semester medical students, as part of the macroscopic anatomy course in 2015/16 at LMU Munich.

A “Microsoft Kinect”- camera and real-time tracking enable the MM to link a deposited section image to the projection of the proband`s body. The user controls a circular shaped domain on the screen to determine a zone, where one can slide between different section images in the anatomical intersection planes.
Presented to groups of at most 12 students, a tutorial was designed to give them an understanding of the system.

After using the MM, every participant was asked to assess the value by filling in a Likert scale questionnaire. All statements that implied a gainful use of the MM for anatomical education were answered with great approval by the respondents. Especially active learning, three-dimensional understanding and better comprehension of the course of structures were outlined here.

Through additional amendments and expansions, we are convinced, that an augmented reality system like the MM can beneficially be installed into anatomical education in order to prepare medical students more effectively for the clinical standards respectively the clinical application of imaging methods.

Poster 30:

Titel: The study of the effects of the delta-sleeping inducting peptide and Semax at lymphoid structures of some peripheral immune system organs

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Abstract:
On the experiment with 104 Wistar male rats, there were studied the effect of the delta-sleep inducting peptide (DSIP) and a synthetic analogue of AKTH (4-10) Semax. It was found that Semax had anti-stress effect on lymphoid structures of spleen and inguinal lymph nodes and lymphoid patches of the small intestine.
In predisposed to stress rats in the germinal centers (GC) at infusion of DSIP and under one hour stress exposure there was found an increase of number of blast cells up to 5.5% (control – 3.6%), large lymphocytes up to 6.3% (control 4.6%), medium-sized lymphocytes – up to 38% (control 28%) and small lymphocytes – up to 46% (control - 28%). In predisposed to stress rats in the (GC) of inguinal lymph nodes at the infusion of Semax after stress influence there was found that a part of blasts was equal to 4.5% (control – 3.6) large lymphocytes 5.8% (in control – 4.6%) medium-sized lymphocytes 32.3% (in control 28%) and small lymphocytes 42.2% (in control 38%). In resistant to stress rats in the GC of inguinal lymph nodes after the influence of stress the number of blast cells was equal 5.5% (control 6.4%) large lymphocytes 2.9% (control – 3.4%)

Poster 31:

Titel: Cell composition of agregated lymphoid nodules in the wall of small intestine and mesenteric lymph nodes under the influence of polioxidonium

Autoren/Adressen: S.V. Klochkova (Department of Human Anatomy I.M.Sechenov First Medical University), A.A. Bakhmet (Department of Human Anatomy I.M.Sechenov First Medical University), D.B. Nikitjuk (Department of Human Anatomy I.M.Sechenov First Medical University), T.N. Alexeeva (Department of Human Anatomy I.M.Sechenov First Medical University), W.Kuehnel (Department of Anatomy of Luebeck Medical University); swetlana.chava@yandex.ru

Abstract:
For the experimental study 100 male mice were selected at the age of 2 months weighing 18-22 g, which were influenced by polyoxidonium in therapeutic doses (500 mg, i.p.). There were studied aggregated lymphoid nodules in the wall of the small intestine in the study of histological series. It was found that the infusion of polyoxidonium in the germinal centers of lymphoid nodules leaded to a decrease in the number of young cells of the lymphoid order already on the 4-th day (in 1.4-1.7 times compared to the control). The number of these cells continued to decrease till the 14-th day, and on the 21-st day their number increased, while, on the 30-th day remained below the control. The number of mitotically dividing cells is 4.7 times lesser than in the control group. In the germinal centers of lymphoid nodules of mesenteric lymph nodes the number of lymphoblasts decreased 1.7-4.0 times, and after 21-st day they increased (but remained below the control). Number of destructively altered cells on the 21 day 2.0 times higher compaired with the control, on the 30-th day corresponded to the control. The brain strands plasmacytes content at first decreased relatively to the control, and increased by 1.2 times on the 30-th day, at the same time, the number of destructively altered cells on the 30-th day increased in 1.9 times, in comparison to the control group. In paracortical zone the number of lymphoid cells decreased at beginning and after 7-14 days gradually corresponded to the control level.

Poster 32:

Titel: Localization of the gap junctional protein, connexin 43, in the kidney

Autoren/Adressen: Anna Neugebauer (Institute of Anatomy), Sebastian Bachmann (Institute of Anatomy), Aljona Borschewski (Institute of Anatomy); anna.neugebauer@charite.de

Abstract:
The gap junctional protein Cx43 is a major nexus-forming protein in heart intercalated discs (ID) and central nervous system components. Via interaction with tubulin, Cx43 may recruit other membrane channels. Cx43 membrane topology and association with cellular junctions depends on multiple phosphorylation steps and is related with hypertension and ischemic stress conditions. In the kidney, little is known about Cx43 localization and function. We therefore reevaluated its distribution in the mammalian kidney.

We investigated the localization of Cx 43 in perfusion-fixed rat and mouse kidneys using immunhistochemical staining with double-staining approaches. Polyclonal anti Cx43 antibody specificity was confirmed by Western blotting and staining of established sites such as cardiomyocyte ID. For double labeling we used anti-claudin-5, -ZO-1 and -NO-Synthase 3 antibodies. High-resolution labeling was achieved by immunogold labeling.

Reliable, significant Cx43 staining was so far detected exclusively in vascular endothelial and lymphatic vessel walls. In glomerular endothelia a punctuated labeling pattern was encountered in all capillary profiles. Endothelia of renal arteries and arterioles displayed continuous staining of the junctional zone, which was confirmed by co-localization with tight-junctional components. Lymphatic vessels revealed strong, continuous Cx43 along their walls. Other, previously reported vascular smooth muscle or mesangial signals were not confirmed.

Kidney Cx43 localization appears to be restricted chiefly to endothelial cell junctions. Future analysis of its local protein interaction, molecular topology, and phosphorylation patterns under cardiovascular stress condition will contribute to clarify its role in the endothelium.

Poster 33:

Titel: Ageing-associated ultrastructural changes of the mouse myocardium

Autoren/Adressen: Alexandros Rahn (Hannover Medical School), Julia Schipke (Hannover Medical School), Simon Sedej (Medical University of Graz), Tobias Eisenberg (University of Graz), Frank Madeo (University of Graz), Christian Mühlfeld (Hannover Medical School); rahnalex@gmail.com

Abstract:
Ageing is associated with a decline of cardiac function and structural alterations of the heart. The ultrastructural changes accompanying the decrease in function, however, have been described only poorly. The aim of the current study was to provide a thorough, quantitative analysis of the composition of the left ventricular myocardium and cardiomyocytes of aged mice.

The left ventricles of young adult (4-month-old, N=10) and aged (24-month-old, N=15) C57BL/6JRj male mice were prepared for transmission electron microscopy and analysed by design-based stereology. Specifically, the volume fractions and total volumes of myocardial components (blood vessels, collagen, interstitium, cardiomyocytes) and cardiomyocyte organelles (myofibrils, mitochondria, nuclei, sarcoplasm and lipofuscin granules) were estimated.

The weight of the left ventricles was higher in old compared with young mice indicating left ventricular hypertrophy. This was characterized both by an increase in the total volume of collagen and cardiomyocytes, however, the increase in collagen volume was more pronounced than that of cardiomyocytes. The volume of free sarcoplasm was enlarged in old cardiomyocytes, whereas the volume fraction of myofibrils and mitochondria decreased, thus leading to unchanged total volumes of myofibrils and mitochondria. Lipofuscin granules were hardly present in young but occurred frequently in old mice.

Ageing is accompanied by profound changes in the ultrastructure of myocardium and cardiomyocytes. The observed changes indicate a profibrotic metabolism and an unfavorable composition of cardiomyocytes, which may lead to decreased oxidative and contractile capacity in relation to total heart size.

Poster 34:

Titel: A transmural gradient of collagen deposition in early-stage heart failure with preserved ejection fraction in the pig: a stereological study

Autoren/Adressen: Alexandra Rajces (Hannover Medical School), Julia Schipke (Hannover Medical School), Ursula Reiter (Medical University of Graz), Gert Reiter (Siemens Healthcare), Martin Manninger (Medical University of Graz), Daniel Scherr (Medical University of Graz), Heiner Post (Campus Virchow-Klinikum Charite Universitätsmedizin), Burkert Pieske (Campus Virchow-Klinikum Charite Universitätsmedizin), Christian Mühlfeld (Hannover Medical School); a.rajces@gmx.de

Abstract:
Heart failure with preserved ejection fraction (HFpEF) goes along with mild clinical symptoms. This study aimed at analyzing whether HFpEF is already associated with ultrastructural alterations and whether they differ quantitatively among the layers of the left ventricular wall.

An established model of HFPEF by deoxy-corticosterone acetate (DOCA) treatment along with a high-salt/high lipid diet over 3 months was used. 5 DOCA and 5 weight-matched normal pigs were analyzed. Cardiac magnetic resonance imaging demonstrated LV hypertrophy and LV filling abnormalities in DOCA. Samples of the left ventricle were taken and processed for light and electron microscopy. Interstitial fibrosis and subcellular composition of cardiomyocytes in subendocardial, midmyocardial and subepicardial regions were evaluated by stereology.

Left ventricular weight was significantly enhanced in DOCA pigs. This was characterized by an increase in cardiomyocyte volume but not in whole interstitial volume. The volume of collagen between cardiomyocytes was increased in DOCA pigs whereas no change was observed for collagen at other localizations. This was caused by collagen increase in inner myocardial layers. Upon DOCA treatment, the proportion of cardiomyocyte organelles remained the same in all three layers of the left ventricle. This was accompanied by higher total volumes of myofibrils and mitochondria.

DOCA-induced HFpEF was characterized by fibrotic and hypertrophic changes of the left ventricular free wall. Cardiomyocyte hypertrophy was similar in all layers, but collagen deposition occurred mainly in subendocardial and the midmyocardial layers. These data imply that LV remodeling in HFPEF starts in the subendocardial layer.

Poster 35:

Titel: Influence of prenatal hypoxia and / or postnatal hyperoxia on morphologic lung maturation in mice

Autoren/Adressen: Torge Roolfs (Institute of Functional and Applied Anatomy, Hannover Medical School, Hannover, Germany), Andreas Schmiedl (Medizinische Hochschule Hannover), Erol Tutdibi (Department of Pediatrics and Neonatology, Saarland University, Homburg/Saar, Germany), Ludwig Gortner ((Department of Pediatrics and Neonatology, Saarland University, Homburg/Saar, Germany), Dominik Monz (Department of Pediatrics and Neonatology, Saarland University, Homburg/Saar, Germany); Schmiedl.Andreas@mh-hannover.de

Abstract:
Oxygen supply as lifesaving intervention is frequently used for treatment of preterm infants suffering additionally on possible prenatal or perinatal pathogen features. The impact of oxygen and or lung injury may influence the morphological lung development leading to a chronic postnatal lung disease called bronchopulmonary dysplasia (BPD). Different experimental BPD models are used. However, there are no systematic comparative studies regarding different influences of oxygen on morphological lung maturation.

Pregnant dams were exposed to normoxia, the offspring to normoxia (No/No,) or to hyperoxia (No/Hyper). Furthermore, pregnant dams were exposed to hypoxia and the offspring to normoxia (Hypo/No) or to hyperoxia (Hypo/Hyper). Stereological investigations were performed from all pups 14 days after birth.

Compared to controls 1) the lung volume was significantly reduced after postnatal hyperoxia, 2) the volume weighted mean volume of the acinar airspaces was significantly higher in the Hypo/Hyper group, 3) the total septal volume was significantly lower in the No/Hyper and Hypo/Hyper group, 4) the total septal surface showed significantly lower values in the No/Hyper and Hypo/Hyper group, 5) the septal barrier thickness had a tendency to significant higher values in the Hypo/Hyper group, 6) the volume density and the volume weighted mean volume of lamellar bodies in pneumocytes type II exhibited significantly lower values in the Hypo/Hyper group.

Hyperoxia and/or hypoxia differentially influence morphological maturation. A significant retardation of morphological lung development leading to BPD like alterations indicated by different parameters was only seen after prenatal hypoxia and postnatal hyperoxia.

Poster 36:

Titel: The effect of spermidine on obesity-associated pathological changes of the lung

Autoren/Adressen: Julia Schipke (Hannover Medical School), Elena Lopez-Rodriguez (Hannover Medical School), Christian Mühlfeld (Hannover Medical School); schipke.julia@mh-hannover.de

Abstract:
Obesity is a pandemic health problem and linked to a wide range of respiratory conditions. The polyamine spermidine promotes longevity by induction of autophagy, which is also involved in lipid breakdown. An enhanced polyamine flux results in reduced fat accumulation and enhanced energy expenditure resulting in a lean phenotype. We hypothesize that in obese mice spermidine reduces the body weight, improves the lung function and diminishes pulmonary structural changes.

C57BL/6N mice were kept on control diet (CD) or high fat diet (HFD) and either received no or 3 mM spermidine (Spd) via the drinking water resulting in the experimental groups CD, CD-Spd, HFD, HFD-Spd.

Spermidine had no effect on the weight gain or the food consumption. In HFD mice, left lung volumes as well as the functional pulmonary parameters tissue elastance and tissue damping were significantly enhanced in comparison to CD, whereas the static compliance was decreased. This indicates a lower expandability and increased stiffness of obese lungs. However, in HFD-Spd animals, left lung volumes, tissue elastance and static compliance were shifted to control levels, whereas tissue damping was even reduced below CD and CD-Spd lungs.

We conclude that in alimentary obese mice, spermidine does not affect body weight or food consumption, but has a beneficial effect on lung function indicating an impact on obesity-related structural changes or surfactant composition in the lung.

Poster 37:

Titel: Lung architecture in the aging sp-d deficient mouse

Autoren/Adressen: Jan Philipp Schneider (Hannover Medical School), Martina Arkenau (Hannover Medical School), Dirk Wedekind (Hannover Medical School), Lars Knudsen (Hannover Medical School), Matthias Ochs (Hannover Medical School); schneider.jan@mh-hannover.de

Abstract:
Pulmonary surfactant, a mixture of lipids and proteins at the air-liquid interface of alveoli, prevents the lungs from collapsing due to surface tension. One constituent is surfactant-associated protein-D (SP-D), a protein involved in surfactant homeostasis and innate immunity. Mice deficient in SP-D (SP-D(-/-)) develop a characteristic phenotype which affects the surfactant system (accumulation of intracellular and –alveolar surfactant, alveolar epithelial type II cell hypertrophy and hyperplasia, increase, enlargement and foamy transformation of alveolar macrophages) and lung architecture and its inflammatory state (development of an emphysema-like pathology, inflammatory cell infiltration). Furthermore, it has been described that these mice develop subpleural fibrosis and that they show a thickening of alveolar septal walls. The aim of the present study is to investigate the long term progression of this phenotype with special focus on parenchymal remodeling, whether there is a progress of emphysematous changes and whether there is a progressive septal wall thickening which might indicate the development of pulmonary fibrosis.

By means of stereology and light microscopy lungs of wildtype and SP-D(-/-) mice of four age groups (3, 6, 12 and roughly 18 months) have been investigated.

Current data suggest an increase in number-weighted mean alveolar volume in aging SP-D(-/-) mice without loss of alveoli per lung, alveolar epithelial surface area per lung and septal wall thickening.

The increase in alveolar size might reflect overdistension due to altered mechanical properties of alveoli. The current data, however, do not suggest a relevant spontaneous pro-fibrotic remodeling or a destructive process in the aging SP-D(-/-) mice.

Poster 38:

Titel: Effect of vasopressin (avp) on the adaptation of potassium channels and calcium sensing receptor in thick ascending limb (tal) of henle's loop

Autoren/Adressen: Alina Smorodchenko (Charite Universitätsmedizin), Yuliya Sharkovska (Charite Universitätsmedizin), Carsten Dittmayer (Charite Universitätsmedizin), Alejandro Cornejo-Müller (Charite Universitätsmedizin), Kerim Mutig (Charite Universitätsmedizin), Sebastian Bachmann (Charite Universitätsmedizin); alina.smorodchenko@charite.de

Abstract:
NaCl absorption by NKCC2 in TAL is controlled by potassium (luminal ROMK and basolateral Kir4.1) and by basolateral calcium sensing receptor (CaSR). Discontinuous pattern of ROMK- and Kir4.1-positive and -negative cells along TAL have been shown, little is known about their relationship to CaSR expression in TAL.

AVP increases TAL function via V2 receptors (V2R). Physiological doses of AVP were tested for cellular adaptation of ROMK, Kir4.1 and CaSR within TAL using AVP-deficient Brattleboro rat kidneys (BB). V2R agonist (dDAVP) or saline were administrated to BB rats for 7h and 72h. NKCC2, ROMK, Kir4.1, and CaSR signals were analyzed using immunohistochemistry, in situ hybridization (ISH), EM and Western blot (WB).

In normal rats NKCC2 was expressed in all TAL cells throughout the medullary and cortical portions, ROMK and Kir4.1 showed often mutually exclusive pattern. CaSR was detected in every TAL cell with variable intensities: ROMK-negative cells displayed high signal for CaSR, whereas ROMK-positive cells demonstrated moderate expression of CaSR in outer mTAL. dDAVP treatment for 72h led to significant upregulation of both potassium channels and induced an overlapping expression in most TAL cells. WB detected a protein increase of 220% for ROMK, 25% for Kir4.1, but 40% down-regulation for CaSR. All changes were restricted to mTAL. ISH revealed no differences in mRNA abundances. No significant changes were detected after 7h.

These results demonstrate expressional cell heterogeneity in TAL with respect to ROMK, Kir4.1 and CaSR signals and reflect an adaptive mechanism in potassium and calcium handling to maintain electrolyte homeostasis.

Poster 39:

Titel: Surfactant replacement therapy (srt) in the bleomycin model of lung injury and fibrosis: effects on alveolar microarchitecture

Autoren/Adressen: Lilian Steffen (Hannover Medical School, Hannover, Germany), Elena Lopez-Rodriguez (Hannover Medical School, Hannover, Germany), Heinz-Gerd Hoymann (Fraunhofer Institute, Hannover, Germany), Matthias Ochs (Hannover Medical School, Hannover, Germany), Clemens Ruppert (Justus-Liebig-University Giessen, Giessen, Germany), Lars Knudsen (Hannover Medical School, Hannover, Germany); lilian.m.steffen@stud.mh-hannover.de

Abstract:
Bleomycin-induced lung injury leads to surfactant dysfunction and fibrosis with permanent loss of alveoli in a process called collapse induration. Surfactant dysfunction with intra-tidal alveolar recruitment and de-recruitment (R/D) and heterogeneous ventilation results in dynamic mechanical stress (atelectrauma), representing a potential trigger of disease progression.
To test the hypothesis that reduction of surface tension by exogenous surfactant replacement therapy reduces lung injury and pulmonary fibrosis in bleomycin-induced rat lung injury.

Rats (n=5-8 per group) received bleomycin to induce lung injury and either intratracheal dose of surfactant (100 mg Curosurf/kg BW = Curo group)) or placebo (0.9% NaCl). Three (D3) or seven (D7) days after induction of lung injury, invasive pulmonary function tests to determine tissue elastance (H) at PEEP levels between 3 and 6 cmH2O were performed, broncho-alveolar lavage (BAL) was taken for surfactant function and inflammatory markers and lung tissue was harvested for design-based stereology.

SRT led to a significant decrease of IL-1□□at D3. Both static compliance and tissue elastance were improved in the Curo groups at D3 and D7 compared to placebo but did not reach the level of healthy animals. On a structural level lung mechanical improvement highly correlated with the number of open alveoli and septal wall thickness at an airway opening pressure of 5cmH2O. The volume of alveolar edema per lung, however, did not differ between experimental groups.

Exogenous surfactant reduced alveolar R/D and mechanical stress in this model of acute lung injury but failed to reduce intra-alveolar edema.

Poster 40:

Titel: The intermediate filament protein vimentin is essential for neurotrophic effects of clostridium botulinum c3 exoenzyme

Autoren/Adressen: Andrej Adolf (Charité-University Medicine Berlin), George Leondaritis (Medical School, University of Ioannina, Ioannina, Greece), Astrid Rohrbeck (Hannover Medical School (MHH)), Ingo Just (Hannover Medical School (MHH)), Gudrun Ahnert-Hilger (Charité-University Medicine Berlin), Markus Höltje (Charité-University Medicine Berlin); markus.hoeltje@charite.de

Abstract:
To investigate the impact of the type III intermediate filament protein vimentin on the cellular uptake and neurotrophic effects elicited by the clostridial exoenzyme C3bot.

Using primary neocortical/hippocampal neuronal cultures obtained from vimentin knock out mice we investigated the effects of extracellular application of C3bot on axonal and dendritic outgrowth. Moreover, we analysed the effects of vimentin depletion on internalisation of C3bot into neurons by means of a novel antibody specifically recognizing ADP-ribosylated RhoA and B. Additionally, we applied purified embryonic stem cell-derived motor neuron cultures and tested for the morphological effects of C3bot on these neuron culture devoid of glial contaminations.

Medium application of C3bot to cultured neurons from vimentin knock out mice was no longer effective to foster axonal and dendritic outgrowth as observed in wildtype neurons. Axonotrophic effects mediated by C3bot could be rescued by the additional incubation with extracellularly added vimentin.
Also, vimentin knock out neurons exhibited a reduced cellular uptake of C3bot compared to the wild type. ADP-ribosylation of RhoA/B was used as read-out system. The additional application of vimentin improved internlisation into knock out neurons. Purified embryonic stem cell-derived motor neurons were sensitive to C3bot and indicate that neuronal vimentin might serve as binding and internalisation partner of C3bot.

Extracellular vimentin serves as binding and internalisation partner for clostridial C3bot in primary neurons.

Poster 41:

Titel: Correlative microscopy approaches to study secretory organelles in neurons

Autoren/Adressen: Areej Albariri (University of Heidelberg), Heinz Horstmann (University of Heidelberg), Thomas Kuner (University of Heidelberg), Markus Grabenbauer (University of Heidelberg); albariri@ana.uni-heidelberg.de

Abstract:
To understand the spatial organization and function of secretory organelles in neurons, we are developing novel methodologies for correlative light and electron microscopy, which combines fluorescence microscopy of in vivo dynamics with the superior resolution of electron microscopes. Correlative microscopy approaches allow for the direct ultrastructural visualization of genetically encoded markers like green fluorescent proteins (GFPs) through photo-oxidation. Oxygen radicals generated during bleaching of GFPs polymerize diaminobenzidine (DAB) into an electron dense precipitate that can be visualized at electron microscopy resolution and subsequently analyzed in three dimensions (3D). However, most pre-embedding electron microscopic preparations including photo-oxidation or cytochemical labeling techniques rely on biological samples pre-processed by chemical fixation. The superior morphological quality of high-pressure freeze fixation and freeze substitution is most evident on highly dynamic organelles and membrane systems of the secretory pathway.

Therefore, we optimize the chemical fixation conditions for cultured hippocampal neurons to compare and approach the morphologic quality of secretory organelles as fixed by high-pressure freezing.

This will improve the 3D correlative approaches on detection of GFPs in sub-compartments of secretory organelles in neurons.

Poster 42:

Titel: Two-photon in vivo imaging of histon-gfp for cell detection and classification in large cortical volumes

Autoren/Adressen: Livia Asan (Heidelberg University), Thomas Kuner (Heidelberg University), Johannes Knabbe (Heidelberg University); knabbe@ana.uni-heidelberg.de

Abstract:
Morphometric MRI studies have revealed local gray matter volume (GMV) alterations in brains of patients and rodents in the context of various CNS diseases or other conditions. The cellular mechanisms accounting for these signal changes still remain largely unknown. Two photon in-vivo microscopy (2P-M) allows investigation of large cortical volumes longitudinally and thus presents a powerful tool to observe the dynamics underlying GMV changes on a cellular level. Here, we tested a mouse line ubiquitously expressing Histon2B-fused eGFP (H-GFP) for automated detection, definition of internuclear distances and classification of cell nuclei in large 3-dimensional 2P-M datasets.

Efficacy of H-GFP expression for complete cell detection was defined by confocal analysis of DAPI stained fixed brain slices. Cortical volumes of 625x625x750µm were recorded in the somatomotor area by 2P-M through a chronic cranial window in H-GFP- mice. Different methods for 3D-segmentation of nuclei were tested and compared. After tamoxifen-mediated induction of tdTomato in either neuronal, endothelial, astro-, oligodendro- or microglial cells, the same volume was imaged again. This way nuclei could be classified as belonging to one of the aforementioned categories. 3D object features of identified nuclei were extracted and used for cell-type classification in mice only expressing Histon-GFP.

H-GFP labeled all DAPI stained nuclei. Nuclei of Neurons, Glia and Endothelium showed significant differences in shape, volume and fluorescence intensity.

Longitudinal studies using the H-GFP mouse line have a high potential for correlating MRI morphometry with 2P-M to reveal the contribution of cortical cell populations as a basis of GMV changes.

Poster 43:

Titel: Neopterin mediated anti-inflammatory effects on microglia

Autoren/Adressen: Antje Aßmann (Christian-Albrechts-University), Uta Rickert (Christian-Albrechts-University), Ralph Lucius (Christian-Albrechts-University); antje.aszmann@googlemail.com

Abstract:
Recent studies indicate that microglial activation contributes to neuronal damage in neurodegenerative diseases. Activated microglia secretes a variety of proinflammatory and neurotoxic factors that are believed to induce and exacerbate degenerative neurological diseases, including Alzheimer's- and Parkinson's disease. Neopterin (NEO), a useful marker for immune system activation and of central nervous system infection and inflammation in adult neurology, is produced by human monocyte-derived macrophages and dendritic cells on stimulation by interferon-gamma. In the normal brain the main source of NEO is not shown explicitly but microglia and astroglia are discussed. We therefore investigated the direct influence of possible astroglial-derived NEO on activated microglia in vitro.

We used an in vitro-model of brain inflammation, consisting of activated primary microglia, which had been activated with lipopolysaccharide (LPS) in the presence or absence of NEO. We measured the nitric oxide-release (NO, Griess reagent), investigated proinflammatory cytokine and enzyme gene expression (qPCR) as well as protein secretion of proinflammatory cytokines (ELISA) and detected intracellular signalling mechanisms (Western blotting, immunofluorescence staining).

We here could show, that NEO [10 µM] has a significant inhibitory effect on gene expression and secretion of proinflammatory cytokines and metabolites in activated microglia, probably triggered by MAP kinase signalling pathways.

The results indicate that activated microglia decrease pro-inflammatory mediators and cytokine synthesis in the presence of NEO. However, further investigations are needed to determine the true cellular source of NEO in the CNS before one can speculate about a benefit using NEO for the therapy of neurodegenerative diseases.

Poster 44:

Titel: Impairment of the gdnf system in asymptomatic diverticulosis and diverticular disease

Autoren/Adressen: Martina Barrenschee (Kiel University), Thilo Wedel (Kiel University), Christina Lange (Kiel University), Ines Hellwig (Kiel University), François Cossais (Kiel University), Michael Ebsen (Städtisches Krankenhaus Kiel), Ilka Vogel (Städtisches Krankenhaus Kiel), Martina Böttner (Kiel University); m.barrenschee@anat.uni-kiel.de

Abstract:
Glial cell line-derived neurotrophic factor (GDNF) is a potent neurotrophic factor known to promote the survival and maintenance of neurons not only in developing but also in the adult enteric nervous system. As diverticular disease (DD) is associated with reduced myenteric neurons, alterations of the GDNF system were studied in both asymptomatic diverticulosis and DD.

Morphometric analysis for quantifying myenteric ganglia and neurons were assessed in colonic full-thickness sections of patients with diverticulosis and controls. Samples of tunica muscularis (TM) and laser-microdissected myenteric ganglia from patients with diverticulosis, DD and controls were analyzed for mRNA expression levels of GDNF, GFRα1 and RET by RT-qPCR. Myenteric protein expression of both receptors was quantified by fluorescence-immunohistochemistry of patients with diverticulosis, DD, and controls.

Although no myenteric morphometric alterations were found in patients with diverticulosis, GDNF, GFRα1 and RET mRNA expression was down-regulated in the TM of patients with diverticulosis as well as DD when compared to controls. Also GFRα1 and RET myenteric plexus mRNA expression of patients with diverticulosis and DD was down-regulated, whereas GDNF remains unaltered. Myenteric immunoreactivity of the receptors GFRα1 and
RET was decreased in both asymptomatic diverticulosis and DD patients.

Our data provide evidence for an impaired GDNF-system at gene and protein expression level not only in DD but also during early stages of diverticula formation. Thus, the results strengthen the idea of a disturbed GDNF-responsiveness as contributive factor for a primary enteric neuropathy involved in the pathogenesis and disturbed intestinal motility observed in diverticular disease

Poster 45:

Titel: Site-specific expression of the transcription factor phox2b in the human adult colon.

Autoren/Adressen: Francois Cossais (Christian-Albrechts University of Kiel), Christina Lange (Christian-Albrechts University of Kiel), Martina Barrenschee (Christian-Albrechts University of Kiel), Dimitri Zorenkov (University Hospital Schleswig-Holstein, Campus Kiel), Jan-Hendrik Egberts (University Hospital Schleswig-Holstein, Campus Kiel), Thomas Becker (University Hospital Schleswig-Holstein, Campus Kiel), Thilo Wedel (Christian-Albrechts University of Kiel), Martina Böttner (Christian-Albrechts University of Kiel); : f.cossais@anat.uni-kiel.de

Abstract:
The transcription factor Paired-like homeobox 2b (Phox2b) is an essential regulator of the development of the enteric nervous system (ENS). Mutations of Phox2b lead to colonic hypoganglionosis in mice and Phox2b has been associated with gastro-intestinal disorders, such as Hirschsprung's disease in humans. However, a detailed analysis of the expression of Phox2b in the adult human ENS has not been performed yet.

Expression of Phox2b was assessed in human colonic samples by real-time-qPCR analysis on mRNA samples extracted from the mucosa, submucosa, tunica muscularis and myenteric ganglia harvested by laser microdissection. The localization of Phox2b was analyzed by immunohistochemistry on human colonic tissue.

Phox2b mRNA expression was highest in isolated myenteric ganglia. Expression of Phox2b protein was found in most neuronal somata and nuclear expression was observed in a neuronal subpopulation. Phox2b further localized within the nuclei of a subset of cells stained for the glial marker SoxE.

Our data show the first detailed characterization of the expression of Phox2b in the human adult ENS. In line with its known functions in the ENS, cytoplasmic expression of Phox2b was observed in most enteric neurons, whereas nuclear expression was only observed in a subpopulation, suggesting that nuclear shuttling might be involved in the regulation of its activity. Further studies are needed to determine the functions of Phox2b in adult enteric neurons and in SoxE-positive cells. However, the described expression indicates that Phox2b might be an important regulator of ENS functions in adult humans.

Poster 46:

Titel: Effect of medial longitudinal myelotomy (mlm) plus whole body vibration (wbv) on motor functions recovery in spinal cord-injured (sci) rats

Autoren/Adressen: Robin Gensch (University of Cologne), Rober Seitz (University of Cologne), Ramona Jansen (University of Cologne), Zeynep Isik (University of Cologne), Gregor Stein (University of Cologne), Carolin Meyer (University of Cologne), Srebrina Angelova (University of Cologne), Marilena Manthou (Aristotle University of Thessaloniki), Huseyin Erdem (Cukurova University of Adana), Jörg Semler (University of Cologne), Eckhard Schoenau (University of Cologne), Levent Sarikcioglu (Akdeniz University Antalya), Doychin Angelov (University of Cologne); robgen88@hotmail.de

Abstract:
Recently we showed in rats that WBV after SCI improved body weight support, increased the density of synaptic terminals in the lumbar spinal cord and restored bladder function. In the present study we combined WBV with MLM which should reduce secondary injury by removal of neural debris from the lesion site.

Severe compression SCI at low-thoracic level (Th10) was followed by MLM 48 h later. All rats were subjected to daily WBV over a 12-week post-injury period. Recovery of locomotion was analyzed at 1, 3, 6, 9, and 12 weeks after SCI. We determined : (i) BBB-locomotor score, (ii) foot-stepping angle (FSA), (iii) rump-height index (RHI), (iv) number of correct ladder steps (CLS) and (v) bladder score. Lesion volume and intensity of immunofluorescence for astrogliosis (GFAP), microglia (IBA1) and synaptic vesicles (synaptophysin, SYN) below the lesion (segment L2) were determined after perfusion fixation.

Compared to rats treated only with WBV, the combination of WBV+MLM did not improve any functional parameter during the 12-week period. Accordingly, WBV+MLM reduced neither the lesion volume, nor intensity of the glial reaction (astro- and microglia). The amount of synapses in the ventral horn below the lesion did not differ from that in rats with only WBV.

Summarizing we may conclude that MLM does not improve functional and morphological parameters after SCI. At the same time however, it did worsen the values, which in turn may be a prerequisete for future studies with direct intramedullar appilcation of drugs at the lesion site after SCI.

Poster 47:

Titel: Densities of adenosine and adrenergic receptors in hemiparkinsonian rat following botulinum neurotoxin-a injection

Autoren/Adressen: Anne Hellfritsch (Rostock University Medical Center), Sara Van Bonn (Rostock University Medical Center), Teresa Mann (Rostock University Medical Center), Oliver Schmitt (Rostock University Medical Center), Alexander Hawlitschka (Rostock University Medical Center), Markus Cremer (Research Center Jülich), Karl Zilles (Jülich-Aachen Resarch Alliance), Andreas Wree (Rostock University Medical Center); teresa.mann@uni-rostock.de

Abstract:
The unilateral lesion of dopaminergic neurons by injection of 6-hydroxydopamine (6-OHDA) into the medial forebrain bundle of rats constitutes a widespread animal model for hemiparkinsonism. In former studies we have already demonstrated that intrastriatal application of Botulinum neurotoxin-A (BoNT-A) significantly ameliorates apomorphine-induced contralateral rotations in 6-OHDA rats for a period exceeding 3 months. The exact mechanisms leading to an improvement of motoric functions after treatment with BoNT-A are still unknown.

Adenosine receptors are highly expressed in the striatum and are considered key factors in the regulation of dopaminergic neurotransmission by forming heteroreceptor-complexes with D1/D2. Also adrenergic receptors are associated with PD, especially the noradrenergic system is affected, which might contribute to cognitive deficits.
We disclosed the role of adenosine (A1, A2) and adrenergic (alpha1, alpha2) receptor densities, performing in vitro quantitative receptor autoradiography.

Dopaminergic deafferentation causes an increase in alpha2-receptor density in the striatum, while striatal alpha1 density is not elevated. A2 receptors were not altered in the striatum but, interestingly, massively reduced in the olfactory tubercle. 6-OHDA lesion caused significant increase of striatal A1 density. For all analyzed A1, A2, alpha1 and alpha2 receptors BoNT-A treatment had no significant effects.

This study revealed an upregulation of striatal adrenergic receptor densities after dopaminergic deafferentation and a significant downregulation of A2 density in the olfactory tubercle. Perhaps, the yet unknown reduction of A2 receptors in hemiparkinsonian olfactory tubercle can be correlated to hyposmia in Morbus Parkinson.

Poster 48:

Titel: Expression of calcium-binding-proteins in the septum of the guinea pig

Autoren/Adressen: Beata Hermanowicz-Sobieraj (University of Warmia and Mazury in Olsztyn), Krystyna Bogus-Nowakowska (University of Warmia and Mazury in Olsztyn), Anna Robak (University of Warmia and Mazury in Olsztyn); beata.hermanowicz@uwm.edu.pl

Abstract:
The septum (SE) is a nodal point of the limbic system. It is known that modulation of GABAergic septal activity is essential for occurrence of theta rhythm specific for learning and memory. Markers for GABAergic neurons are calcium-binding proteins (CaBPs: calbindin, CB; calretinin, CR; parvalbumin, PV), which may act as Ca2+ buffers or sensors. The aim of the study was to determine a correlation between expression of CB, CR and PV at transcriptional level (mRNA) and at final product level (protein) in the guinea pig SE.

All these proteins were revealed by immunohistochemistry (IHC); DAB method and fluorescence staining; mRNA levels of the CaBPs genes were measured by real-time quantitative PCR (qPCR).

The results indicated that mRNAs levels of each CaBPs revealed by qPCR correlate with their final products revealed by IHC. CB displayed the highest, while PV the least expression at mRNA level. Immunohistochemical study showed that, CB-immunoreactive (-ir) perikarya were the most numerous, CR-ir perikarya occurred in lower amount than CB-ir ones, while PV-ir perikarya were the least numerous among studied CaBPs. Colocalization between CB and CR or PV was seen in single cells in the SE.

In conclusion, the highest expression of calbindin suggests that this protein is the most important among studied CaBPs for proper functioning of SE neurons. Co-occurrence of CB with CR or PV in single cells may suggest that CB could compensate other proteins as a Ca2+ buffer or could function as a Ca2+ sensor, or may play other yet unknown role.

Poster 49:

Titel: Butyrate partly shows an antiinflammatory effect on bv-2 microglial cells

Autoren/Adressen: Tobias Hoeflein (Christian-Albrechts-Universität zu Kiel), Uta Rickert (Christian-Albrechts-Universität zu Kiel), Janna Schneppenheim (Christian-Albrechts-Universität zu Kiel), Ralph Lucius (Christian-Albrechts-Universität zu Kiel); t.hoeflein@anat.uni-kiel.de

Abstract:
Chronic neuroinflammation, amongst others mediated by activated microglial cells, is associated with neurodegenerative diseases like Morbus Parkinson and Morbus Alzheimer. Therefore, anti-inflammatory agents might be a target for treating these diseases. Anti-inflammatory effects of butyrate in the gut are well described. Here, we investigated the influence of butyrate on a Lipopolysaccharid (LPS) activated microglial cell line (BV-2).

Experiments were performed with an in vitro inflammation model. BV-2 cells were activated with LPS in presence or absence of butyrate. We determined the production of nitric oxide (NO) via Griess-assay, gene expression of inflammatory cytokines and enzymes via qPCR, release of cytokines via ELISA and the influence of butyrate on signaling pathways via Western blotting.

LPS-stimulation induced a significant inflammatory response of BV-2 cells. Treatment with butyrate significantly decreased the production of NO, which can be linked to suppressed gene expression of iNOS. Also significantly suppressed was the gene expression of the cytokines of Interleukin-6 (IL-6) and tumor necrosis factor-ALPHA (TNF-ALPHA) while that of IL1-BETA was significantly increased. The release of IL-6 (ELISA) decreased significantly, while that of TNF-ALPHA increased significantly. Phosphorylation of MAP kinase pathways decreased significantly by butyrate.

Butyrate mostly suppressed the inflammatory response of LPS stimulated BV-2 cells. However, some proinflammatory cytokines were increased. Further studies are required to look into that ambivalent matter. With predominant antiinflammatory effects on microglia cells, butyrate might be of interest for the therapy of neuroinflammatory or neurodegenerative diseases.

Poster 50:

Titel: Neurovascular interface in porcine small intestine: specific for nitrergic rather than nonnitrergic neurons

Autoren/Adressen: Samir Jabari (Institue for Anatomy), Winfried Neuhuber (Institue for Anatomy), Axel Brehmer (Institue for Anatomy); samir.jabari@fau.de

Abstract:
In the 1970s, by using classic histological methods, close topographical relationships between special areas of enteric ganglia and capillaries were shown in the pig.

In this study, by application of double and triple immunohistochemistry, we confirmed this neurovascular interface and demonstrated that these zones are mainly confined to nitrergic neurons in the myenteric and the external submucosal plexus. In another set of experiments, we prepared specimens for electronmicroscopical analysis of these zones.

In the upper small intestine of the pig, the respective neurons display type III morphology, i.e. they have long, slender and branched dendrites and a single axon. Both ganglia and capillaries display continuous basement membranes, the smallest distances between them being 1,000 nm at the myenteric and 300 nm at the external submucosal level. The capillary endothelium was mostly continuous but, at the external submucosal level, scattered fenestrations were observed.

This particular neurovascular relationship suggests that nitrergic neurons may require a greater amount of oxygen and/or nutrients. In guinea pig and mouse, previous ischemia/reperfusion experiments showed that nitrergic neurons are electively damaged. Thus, a preferential blood supply of enteric nitrergic neurons may indicate that these neurons are more vulnerable in ischemia.

Poster 51:

Titel: Adult neurogenesis in the rat hippocampus: structural development and activity-related homo- and heterosynaptic plasticity of adult newborn dentate granule cells

Autoren/Adressen: Tassilo Jungenitz (Goethe-University), Marcel Beining (Ernst-Strüngmann Institute (ESI) for Neuroscience in Cooperation with Max-Planck Society), Tijana Radic (Goethe-University), Thomas Deller (Goethe-University), Hermann Cuntz (Ernst-Strüngmann Institute (ESI) for Neuroscience in Cooperation with Max-Planck Society), Peter Jedlicka (Goethe-University), Stephan W. Schwarzacher (Goethe-University); tassilo.j@gmx.de

Abstract:
Adult neurogenesis of dentate gyrus granule cells (GCs) is present in mammals, including humans, and has been implicated in hippocampal forms of learning and memory. At which cell age newborn neurons (abGCs) are integrated and which forms of synaptic plasticity are expressed is not well understood.

We used intrahippocampal injections of viral vectors to label abGCs and mature GCs (mGCs). The obtained structural data were used for reconstructions of complete dendritic trees and spine formation during maturation of abGCs. High-frequency stimulation (HFS) of the medial perforant path (MML) was applied to induce LTP and to study structural and functional integration of abGCs.

Our results show that dendritic maturation of abGCs is essentially completed at 21 dpi, whereas spine numbers increased from 21 dpi on and reached mature state at 77 dpi. Indicating, that dendritic structural maturation precedes functional integration. AbGCs stayed structurally distinct from mGCs. In response to HFS, young abGCs (28-35 dpi) but not old abGCs or mGCs remodel their dendritic arbor, indicating an afferent activity-dependent dendritic plasticity. Investigation of spines following HFS revealed homosynaptic spine enlargement in the stimulated MML and heterosynaptic spine shrinkage in the adjacent outer and inner molecular layers. Spine enlargement and shrinkage occurred in parallel on dendritic segments of the same neuron and appeared gradually from 21 dpi on, with a sharp increase between 28-35 dpi.

In summary, abGCs stay structurally distinct from mGCs and undergo a critical period during their dendritic arbor is shaped and their ability to express heterosynaptic plasticity emerges.

Poster 52:

Titel: In vivo time lapse imaging of axonal dense core vesicle trafficking in anaesthesized and awake mice

Autoren/Adressen: Johannes Knabbe (Heidelberg University), Joris Nassal (Heidelberg University), Heinz Horstmann (Heidelberg University), Matthijs Verhage (Centre for Neurogenomics and Cognitive Research), Thomas Kuner (Heidelberg University); nassal@ana.uni-heidelberg.de

Abstract:
Dense core vesicles (DCV) are large, electron-dense vesicles designed to transport a variety of cargo molecules, including neuropeptides or neurotrophins, from their site of production at the neuronal soma towards their respective release sites in dendrites or axons. Trafficking and movement characteristics of DCVs have been typically investigated in different cell culture models. Yet, DCV trafficking characteristics and their responsivity to physiological release signals could differ fundamentally in the mammalian brain in vivo due to the densely packed tissue neuropil, neuronal connectivity, neuron-glial interactions or different functional brain states.

In this study, we used multiphoton-in-vivo-imaging to visualize DCV trafficking in the central nervous system in anaesthetized or awake mice through a chronically implanted cranial window. Viral co-expression of live fluorescent DCV- and axonal-markers in thalamic projection neurons allowed us to specifically visualize DCVs in axonal projections from the thalamus to upper layers of the cortex. The vesicles where then tracked semi-automatically. Ultrastructural features of the fluorescent labeled vesicles were assessed using electron-microscopy and photooxidation.

We were able to analyze the movement of hundreds of vesicles in individual axons of different animals. These data for the first time reveal speed, directionality and number of moving DCVs and their movement characteristics at axonal en passant boutons in vivo in awake and anaesthetized mice.

This approach will enable future studies of the physiological mechanisms triggering DCV cargo-release and studies examining DCV trafficking in pathophysiological situations potentially linked to defects in DCV trafficking, such as neurodegenerative disorders and the aging brain.

Poster 53:

Titel: Interference with sprouty2/4 is neuroprotective and improves axonal regeneration

Autoren/Adressen: Lars Klimaschewski (Medical University Innsbruck), Barbara Hausott (Medical University Innsbruck); lars.klimaschewski@i-med.ac.at

Abstract:
Intracellular negative feedback inhibitors of receptor tyrosine kinase signaling, such as the Sprouty (Spry) proteins, play a key role in development and maintenance of the nervous system. Sprouties function as growth factor antagonists by specific interference mainly with processes upstream of extracellular regulated kinases.

Applying three different in-vivo lesion models we demonstrate that reduction of Spry2 and -4 in neurons and glial cells promotes neuronal survival and axonal regeneration in the central and peripheral nervous system.

Injection of Spry2/4 siRNAs into rat brains reduces the lesion size in response to endothelin-induced vasoconstriction (a model for stroke) three weeks after the injury. In kainate-induced epileptogenesis, secondary brain damage is decreased as well. Heterozygous Spry2/4 knockout mice exhibit reduced neuronal loss three weeks after kainate injection into the hippocampus which is accompanied by increased astrocytosis and reduced neuronal migration (dispersion of granule cells). In the peripheral nervous system, primary sensory neurons dissociated from Spry2 knock-out ganglia reveal stronger ERK activation and enhanced axon outgrowth. Following sciatic nerve crush, significantly more myelinated axons regenerate in Spry2+/- mice which is accompanied by faster recovery of sensomotor performance, higher number of motor endplates in distal muscles and increased expression of GAP-43.

Taken together, our results suggest a role for Spry2 as a potential target for pharmacological inhibition to accelerate long-distance regeneration in peripheral nerves and to promote long-term neuronal survival in neurological disease.
Supported by the Austrian Science Fund (FWF, SPIN PhD program).

Poster 54:

Titel: The morphological similarity of the hippocampal formation in spontaneously hypertensive rats (shr) and wistar kyoto rats (wky)

Autoren/Adressen: Małgorzata Kolenkiewicz (University of Warmia and Mazury in Olsztyn), Anna Kozłowska (University of Warmia and Mazury in Olsztyn), Meng-Li Tsai (National Taiwan University), Maciej Równiak (University of Warmia and Mazury in Olsztyn); malgorzata.kolenkiewicz@uwm.edu.pl

Abstract:
Attention-deficit hyperactivity disorder (ADHD) is characterized by impairing levels of hyperactivity, impulsivity and inattention. The pathology of disease is not fully understood, but it seems that disturbances in the mesocorticolimbic system have influence on the ADHD induction. Hippocampal formation (HF) is one of the limbic structures which plays an important role in declarative memory consolidation. Some studies have shown disruptions in short and long-term memory in ADHD patients. There is also incomplete and inconsistent information about morphometric changes in the hippocampal formation in ADHD patients. Thus, the aim of this study was to investigate changes in HF volume during postnatal life in spontaneously hypertensive (SHR) rats which are the most widely accepted animal model of ADHD.

The volumes of the hippocampal formation were analyzed using Cavalieri method in 4-, 7- and 10-week old SHR and Wistar Kyoto (WKY) rats used as control animals. Morphometric measurements of HF were manually obtained on the frozen sections stained by immunohistochemistry.

Although we did not notice any statistically significant differences in hippocampal volume between SHR and WKY, each strains showed different characteristics. In SHR volume was similar and there were no statistically significant differences between investigated stages. Whereas, in the WKY we noticed statistically significant increase of HF volume between 4th and 10thweek.

In conclusion, the lack of differences between SHR and WKY indicate that ADHD has no impact on the morphology of the hippocampal formation. Moreover in SHR development of HF occurs less abruptly in comparison with WKY.
Supported by grant PL-TW II/4/2015.

Poster 55:

Titel: Volumetric differences of dorsal and ventral dentate nucleus during brain development in the spontaneously hypertensive rat as a model of attention-deficit hyperactivity disorder

Autoren/Adressen: Anna Kozłowska (University of Warmia and Mazury in Olsztyn), Małgorzata Kolenkiewicz (University of Warmia and Mazury in Olsztyn), Mariusz Majewski (University of Warmia and Mazury in Olsztyn), Jye-Chang Lee (National Taiwan University), Maciej Równiak (University of Warmia and Mazury in Olsztyn); kozlowska.anna@uwm.edu.pl

Abstract:
Attention-deficit hyperactivity disorder (ADHD) affects children and is characterized by inattention, impulsivity and motor hyperactivity. ADHD is associated with structural, functional and chemical abnormalities in various regions of the brain e.g. cerebellum. It is generally known that cerebellum is responsible for motor (dorsal dentate nucleus - DDN), cognitive and/or emotional (ventral dentate nucleus - VDN) regulation. Therefore, the main aim of the present study was to track bilateral changes in the volume of the DDN and VDN during postnatal development in the spontaneously hypertensive rat (SHR; as an animal model for ADHD) as well as Wistar Kyoto rats (WKY) used as control group.

The volumes of the DDN and VDN were compared using Cavalieri method in adolescent/adult SHR and WKY rats at the ages from 4 to 10 weeks. Morphometric measurements of the regions mentioned above were manually obtained on the frozen sections stained by immunohistochemistry.

The results show that development of the DDN was more linear than VDN. Moreover, the volume of left DDN was significantly lower ($P<0.05$) in the SHR rats at 5 week of age compared to the WKY strain.

In conclusion, the data indicate that there are volume abnormalities during DDN development in the juvenile SHR rats which may be related to ADHD onset. However, further studies are necessary to elucidate in detail the exact role of DDN and VDN in the pathophysiology of ADHD.

This study was supported by a grant PL-TW II/4/2015.

Poster 56:

Titel: Kinesin - new insights in motor protein dysfunction in an als animal model

Autoren/Adressen: Kilian Kürten (Ruhr-Universität Bochum), Veronika Matschke (Ruhr-Universität Bochum), Carsten Theiss (Ruhr-Universität Bochum); kilian.kuerten@rub.de

Abstract:
Amyotrophic lateral sclerosis (ALS) is a fatal neurodegenerative disease effecting motorneurons. Several cellular processes are described to be dysfunctional in ALS, however a single causative dysfunction has not yet been found. 90% of all ALS cases appear sporadically (sALS).
An animal proven to be an excellent model for those sporadic ALS cases is the Wobbler mouse. The macroscopic but also cellular pathology is strikingly similar to those of patients suffering from ALS.
Our goal is to study the involvement of Kinesin in impaired intracellular transport. Kinesin has already been linked to several neurological diseases. Moreover, as a motor protein, one of its possible cargos are neurofilaments, which have been described to accumulate in ALS patients.

To investigate a possible difference between Kinesin expression in the animal model, we analyzed mRNA expression using qPCR as well as protein expression by Western Blotting. To exclude a genetic mutation, we sequenced and compared the mature Kinesin sequence of Wobbler and wildtype mice.

It was possible to show that there are no differences in the Kinesin sequence. The first results show a difference in mRNA and Protein expression between Wobbler and wildtype mice. The functional studies still have to be completed.

Due to different expression patterns, Kinesin seems to be an interesting target for further ALS research.

Poster 57:

Titel: Electron tomography of active zones in hippocampal mossy fiber boutons

Autoren/Adressen: Katharina Lichter (University Hospital of Wuerzburg (1), University of Wuerzburg (2)), Martin Pauli (University of Wuerzburg), Manfred Heckmann (University of Wuerzburg), Anna-Leena Sirén (University Hospital of Wuerzburg), Esther Asan (University of Wuerzburg), Christian Stigloher (University of Wuerzburg); katharina.lichter@stud-mail.uni-wuerzburg.de

Abstract:
Hippocampal mossy fiber synapses play a key role in hippocampal memory processing and show unique presynaptic plasticity. The morphological complexity of mossy fiber terminals in the hippocampus is well documented, but it is not clear how this structural complexity is coupled with the functional properties in synaptic transmission. Active zones (AZ), as specialized presynaptic release sites of synaptic vesicles (SV), and their cytomatrix (CAZ) are essential for transforming action potentials into chemical signals. However, many aspects of AZ architecture in hippocampal mossy fiber boutons (MFBs) and its alteration in plasticity remain to be elucidated.

We used electron tomography (ET) on hippocampal sections of male C57BL/6 mice to study the architecture of MFB-AZs in CA3 stratum lucidum. The high Z-resolution of ET facilitates detailed information about SV-organization and localization of filamentous structures at AZ-level. Different methods of tissue preparation, e.g. High Pressure Freezing (HPF) of acute hippocampal slices, conventional fixation and combinations thereof were established and compared for ultrastructure preservation and characteristics as well as artifact introduction.

Electron microscopy revealed remarkable differences in synaptic ultrastructure depending on tissue preparation methods. First analyses of dual axis tomograms performed on MFB-AZs in HPF material allowed detection of filamentous structures at the MFB-presynaptic membrane and associated SVs with yet enigmatic function.

In correlation with super resolution microscopy, e.g. dSTORM, ET in hippocampal MFBs provides a promising and synergistic tool to elucidate the architecture of the (C)AZ.

Poster 58:

Titel: Adult neurogenesis in mice and pigeons-a comparative view in two different animal models

Autoren/Adressen: Julia Mehlhorn (University of Düsseldorf), Isabelle Masson (University of Düsseldorf), Katrin Amunts (University of Düsseldorf and Research Center Jülich), Christina Herold (University of Düsseldorf); julia.mehlhorn@hhu.de

Abstract:
Adult neurogenesis is a dynamic process that includes the generation and proliferation of neurons in the brain over lifespan. However, comparative studies in the same experimental setup between different species to understand the common basis of this process are rare.

Here, C57BL/6 mice (Mus musculus, housed in cages with enriched environment) and free flying homing pigeons (Columba livia f.d.) were treated with 5-bromo-deoxyuridine (BrdU) and sacrificed about three months later. Brains were immunohistochemically processed to examine cell proliferation (with Nestin, SOX2 and doublecortin (DCX)), newborn neurons or glia (with NeuN/BrdU or S100/BrdU double labeling) and apoptosis (with TUNEL detection).

In pigeons, BrdU-positive and DCX-positive neurons were widely distributed, with the highest numbers in the ventricular zone, areas of the hippocampal formation and the nidopallium, along the superior and supreme frontal and mesopallial lamina, the olfactory bulb and the striatum. The quantity of DCX-positive cells exceeded BrdU-positive cells. In mice the highest numbers of BrdU-positive and DCX-positive neurons were detected in the subgranular zone of DG and the OB. More DCX-positive neurons were detected in the ventricular zone and lower numbers in CA3, CA2 and the ventral striatum. Both species did not show signs of increased apoptosis.

Inter-species differences were detected in the localization of newly developed neurons. Further investigations about the functional consequences would be interesting. Besides, our findings may introduce the pigeon as a new model organism in comparison to humans, because both species show adult neurogenesis in the striatum.

Poster 59:

Titel: The origin of axonal ribosomes

Autoren/Adressen: K. Müller, C.F. Vogelaar; Tineke.Vogelaar@unimedizin-mainz.de

Abstract:
Neurons are highly specialised and polarised cells with processes that function partially independent of the cell body. The axons comprising ascending and descending tracts in the spinal cord and axons in the peripheral nerves range in length from several cm in mouse to 1 m in humans and even 30 m in the blue whale. Recent studies have shown that axons contain local pools of mRNA. Local translation plays a role in growth cone turning and the formation of a new growth cone after injury (Vogelaar et al, 2009).

For local translation of axonal RNAs the translational machinery should also be present in axons. For a long time, it was assumed that ribosomes are transported along the axon, together with the RNA. However, a recent study challenged this view by claiming that ribosomes are transferred from glial cells to the axon. This transfer is suggested to occur especially after axonal injury. Since the current studies cannot rule out the neuronal origin of ribosomes, the two systems are believed to co-exist.

We created the “RiboTracker” transgenic mouse line with floxed STOP tdTomato-tagged ribosomal protein L4 (RPL4) in the Rosa26 locus, thus expressing L4-tdTomato in specific cell types when crossed with Cre lines. In order to prove the neuronal origin of axonal ribosomes, we crossed the RiboTracker mice with CamKIIα Cre and Advillin Cre mice and studied dorsal root ganglion (DRG) axons in culture and *in vivo* in injured sciatic nerves versus uninjured controls. Furthermore, the RiboTracker mice were crossed with CNPase Cre mice, so that glial cells contained the tdTomato-labelled L4. Our data support the hypothesis of a glia-to-axon transfer of ribosomes and go even beyond this by providing evidence for glial cells to be the exclusive source of axonal ribosomes in the sciatic nerve.

Poster 60:

Titel: Loss of entire multi-subunit baf (mswi/snf) complexes impairs global epigenetic programs in forebrain development

Autoren/Adressen: Ramanathan Narayanan (University Medical Center Göttingen), Cemil Kerimoglu (German Research German Center for Neurodegenerative Diseases (DZNE) Göttingen), Mehdi Pirouz (Max Planck Institute for Biophysical Chemistry Göttingen), Linh Pham (University Medical Center Göttingen), Robin Wagener (University Medical Center Göttingen), Kamila Kiszka (University Medical Center Göttingen), Joachim Rosenbusch (University Medical Center Göttingen), Michael Kessel (Max Planck Institute for Biophysical Chemistry Göttingen), Andre Fischer (German Research German Center for Neurodegenerative Diseases (DZNE) Göttingen), Anastassia Stoykova (Max Planck Institute for Biophysical Chemistry Göttingen), Jochen Staiger (University Medical Center Göttingen), Tran Tuoc (University Medical Center Göttingen); tran.tuoc@med.uni-goettingen.de

Abstract:
BAF (Brg/Brm-associated factors) complexes play important roles in development and are linked to chromatin plasticity at selected genomic loci. Nevertheless, a full understanding of their role in development and chromatin remodeling has been hindered by the absence of mutants completely lacking BAF complexes.

Here, we show that the loss of BAF155/BAF170 in double-conditional knock-out (dcKO) mice eliminates all known BAF subunits, resulting in an overall reduction in active chromatin marks (H3K9Ac), a global increase in repressive marks (H3K27Me2/3), and down-regulation of gene expression.

We demonstrate that BAF complexes interact with H3K27 demethylases (Jmjd3, Utx) and potentiate their activity. Importantly BAF complexes are indispensable for forebrain development, including proliferation, differentiation and cell survival of neural progenitor cells.

Our findings reveal a molecular mechanism mediated by BAF complexes that controls global epigenetic programs and development.

Poster 61:

Titel: 17-beta-estradiol regulates the dendritic distribution of hyperpolarization-activated cyclic nucleotide-gated (hcn)1 channels in ca1 pyramidal cells via g-protein coupled receptor gper1

Autoren/Adressen: Florian Neumüller (University of Hamburg), Gabriele M. Rune (University of Hamburg), Roland A. Bender (University of Hamburg); r.bender@uke.de

Abstract:
In CA1 pyramidal cells, HCN1 channels are enriched in distal dendrites, in which they regulate the summation of excitatory input from the perforant path (Nolan, Cell, 2004). It was recently reported that this enrichment is promoted by reelin via Dab1 signaling (Kupferman, Cell, 2014). As the expression of reelin is stimulated by E2 (Bender, Cereb Cortex, 2010), we reasoned that E2 will also promote HCN1 enrichment in the distal dendrites of CA1. Here we show that this is indeed the case, but provide evidence that the signaling differs from that reported for reelin and involves E2-receptor GPER1.

HCN1 distribution was studied in entorhino-hippocampal cultures from 5-day-old rats that were kept for 10 days in vitro (div10). From div5-div10, matched cultures were incubated with E2, G1 (GPER1-agonist), E2+G36 (GPER1-antagonist) or vehicle. In another set of experiments, cultures were incubated with reelin-blocking CR50 antibodies, reelin-receptor antagonist GST-RAP or vehicle. HCN1 expression was demonstrated immunohistochemically.

E2 increased HCN1 enrichment in the distal dendritic compartment (E2: 37%, Ctl: 31% of total HCN1 in CA1). This increase was replicated, if GPER1-agonist G1 was supplemented (G1: 35%, Ctl: 31%), but was abolished, if E2 was applied together with GPER1-antagonist G36 (E2+G36: 32%, Ctl: 32%). Surprisingly, no effect was observed after CR50 (34 vs. 34%) or GST-RAP (34 vs. 33%) application.

Enrichment of HCN1 in the distal dendritic compartment of CA1 pyramidal cells is promoted by E2, which requires GPER1, but may not involve reelin, as blocking reelin signaling did not have an effect.

Poster 62:

Titel: Cytoarchitectonic parcellation of human posterior intraparietal sulcus and its relation to function

Autoren/Adressen: Monika Richter (C. and O. Vogt Institute for Brain Research), Prof. Dr. med. Katrin Amunts (C. and O. Vogt Institute for Brain Research, Institute of Neuroscience and Medicine (INM-1)), Dipl.-Phys. Hartmut Mohlberg (Institute of Neuroscience and Medicine (INM-1)), Prof. Dr. Simon Eickhoff (Institute of Clinical Neuroscience and Medical Psychology, Institute of Neuroscience and Medicine (INM-1)), Prof.Dr.med.Dr.med. h.c. Karl Zilles (Institute of Neuroscience and Medicine (INM-1), 4Department of Psychiatry, Psychotherapy and Psychosomatics), Prof. Dr. med. Dr. rer. pol. Svenja Caspers (C. and O. Vogt Institute for Brain Research, Institute of Neuroscience and Medicine (INM-1));
monika.richter87@gmx.net

Abstract:
The posterior intraparietal and adjacent parieto-occipital sulcus (pIPS) is functionally heterogeneous, situated at the interface between ventral and dorsal visual streams. In macaques, several areas, e.g. LIP, CIP or V6A, have been identified. In humans, the structure-function relationship, could not be established yet, as no microscopic parcellation of pIPS was available.

Using an observer-independent cytoarchitectonic mapping, pIPS was mapped in ten human postmortem brains. For all detected areas, 3D probability maps were generated within a common reference space, which were used to characterize their functions by performing a meta-analysis using the BrainMap database.

We identified seven cytoarchitectonically distinct areas within pIPS (hIP4-8) and parieto-occipital sulcus (hPO1, hOc6). Lateral pIPS areas hIP4, hIP5, and hIP6 differed mainly by the differentiation of layer V (hIP5/6) and layer III (hIP4). Medial areas hIP7 and hIP8 differed in overall cell density, while hPO1 and hOc6 were distinguished by homogeneity of layer III.
All pIPS areas were involved in spatial and visual perception and working memory, based on a network with early visual, supplementary motor, and frontal opercular cortex bilaterally. Rostral areas were involved in attention, reasoning (hIP5/6/8), and action inhibition (hIP6/8), supported by bilateral connections to ventral premotor and ventrolateral prefrontal cortex (hIP8). Caudal areas were associated with action observation (hIP7) and color perception (hPO1), via bilateral connectivity with ventral and dorsal visual stream.

Using the new maps of human pIPS, we showed their differential involvement in action and perception, helping to disentangle the controversial discussion on homology between pIPS in monkeys and humans.

Poster 63:

Titel: Peptide and mRNA expressions of cocaine- and amphetamine- regulated transcript (CART) in the limbic structures of the guinea pig

Autoren/Adressen: Anna Robak (University of Warmia and Mazury in Olsztyn), Krystyna Bogus-Nowakowska (University of Warmia and Mazury in Olsztyn), Maciej Równiak (University of Warmia and Mazury in Olsztyn), Beata Hermanowicz-Sobieraj (University of Warmia and Mazury in Olsztyn), Witold Żakowski (University of Gdańsk), Barbara Wasilewska (University of Warmia and Mazury in Olsztyn), Janusz Najdzion (University of Warmia and Mazury in Olsztyn), Joanna Wojtkiewicz (University of Warmia and Mazury in Olsztyn), Piotr Podlasz (University of Warmia and Mazury in Olsztyn); beata.hermanowicz@uwm.edu.pl

Abstract:
In the limbic areas CART is involved in reward, emotion, reproduction, and memory processes. The highest CART mRNA and peptides were found in the hypothalamus. Growing body of evidence suggests that there is no a direct relationship between levels of mRNA and corresponding products protein. In the guinea pig CART distribution we examined in many brain areas: the amygdala, extended hippocampal subsystem (HP) including mammillary body-anterior thalamic nuclei axis (MB-ATN), septum-cingulate cortex subsystem (SE-CG), and preoptic area (POA).
The aim of the study was to examine CART expression in above mentioned areas in the adult guinea pig and compare the expression at the transcriptional and final product levels using qPCR and immunohistochemistry (IHC).

CART expression was measured on mRNA level relative to GAPDH enzyme by real-time quantitative PCR (qPCR) analysis. Total RNA from dissected samples was isolated using Total RNA Mini (A&A Biotechnology, Poland); cDNA obtained using Maxima cDNA Synthesis Kit (Life Technologies, USA); qPCR was conducted using SYBR® Green (Sigma-Aldrich, Germany).

The qPCR analysis has shown that the highest profile was obtained for the amygdala, moderate for MB and POA, low level for hippocampal-cingulate subsystem and septum, whereas extremely low for ATN.

The CART mRNA expression levels tend to correlate with protein abundance levels encountered by IHC in all the limbic structure studied. High or moderate CART mRNA expression in amygdala and MB agree with protein abundance levels (CART-positive perikarya), as well as extremely low CART mRNA level in the ATN corresponds with the protein expression (mainly punctate structures).

Poster 64:

Titel: Nmnat2 and nad+ - a link to neurodegeneration in the spinal cord of the wobbler mouse

Autoren/Adressen: Pascal Röderer (Ruhr-Universität Bochum), Veronika Matschke (Ruhr-Universität Bochum), Carsten Theiss (Ruhr-Universität Bochum); Pascal.Roederer@rub.de

Abstract:
ALS is a devastating motor neuron disease and to this day not curable. While 5-10% of patients inherit the disease (familiar ALS) up to 95% of patients are diagnosed with the sporadic form (sALS). ALS is characterized by the degeneration of upper motor neurons in the cerebral cortex and of lower motor neurons in the brainstem and spinal cord.
We are investigating the molecular defects of the sALS with our mouse model - the Wobbler Mouse. The Wobbler mouse resembles almost all phenotypical hallmarks of human sALS patients and is therefore an excellent disease model. A point mutation in the VPS54-gene impairs the retrograde Golgi traffic and is thought to be responsible for the phenotype.
Recent findings suggest an essential implication of the NAD+-producing enzyme Nmnat2 in neurodegeneration as well as maintenance of healthy axons.

With aid of mRNA-Microarrays, qPCR-experiments and Western Blot analysis proteins of interest are checked. Beside this electron microscopic analysis and NAD+-assays are performed.

Up to now significant changes of the expression of Nmnat2 mRNA and protein within the spinal cord were detected. This seems to go along with a misregulation of mitochondria, however its role for neurodegeneration in the spinal cord of the Wobbler mouse is still obscure.

The results suggest that the misregulation of Nmnat2 and its consequences for the downstream signaling are key features of the motor neuron degeneration of the Wobbler mouse.

Poster 65:

Titel: Mswi/snf (baf) complexes are indispensable for neurogenesis and development of embryonic olfactory epithelium

Autoren/Adressen: Joachim Rosenbusch (Zentrum Anatomie UMG Göttingen), Christina Bachmann (Zentrum Anatomie UMG Göttingen), Huong Nguyen (Zentrum Anatomie UMG Göttingen), Linh Pham (Zentrum Anatomie UMG Göttingen), Tamara Rabe (MPI Göttingen), Patwe Mehga (Zentrum Anatomie UMG Göttingen), Godwin Sokpor (Zentrum Anatomie UMG Göttingen), Ahmed Mansouri (MPI Göttingen), Anastassia Stoykova (MPI Göttingen), Jochen F. Staiger (Zentrum Anatomie UMG Göttingen), Tran Tuoc (Zentrum Anatomie UMG Göttingen); tran.tuoc@med.uni-goettingen.de

Abstract:
SUMMARY
Neurogenesis is a key developmental event through which neurons are generated from neural stem/progenitor cells. Chromatin remodeling BAF complexes have been reported to play essential roles in neurogenesis of center nervous system. However whether BAF complexes are required for neuron generation of olfactory system is unknown.

Here, we identified onscBAF and ornBAF complexes, which are specifically presence in olfactory neural stem cells (oNSCs) and olfactory receptor neurons (ORNs), respectively. We report that in the absence of BAF complexes in BAF155/BAF170 double-conditional knock-out (dcKO), OE is not formed.

We found that conditional deletion of BAF155, a core subunit in both onscBAF and ornBAF complexes, causes impairment of proliferation of oNSCs and maturation, axonogenesis of ORNs in developing olfactory epithelium. Mechanistically, BAF155 is required for normal activation of Pax6-dependent transcriptional activity in stem cells/progenitors of OE.

Our findings unveil a mechanism mediated by mSWI/SNF complex in OE neurogenesis and development.

Poster 66:

Titel: Neither attention deficit hyperactivity disorder (adhd) nor hypertension affects the volume of the basolateral amygdala in the spontaneously hypertensive rats (shr).

Autoren/Adressen: Maciej Równiak (University of Warmia and Mazury Olsztyn), Anna Kozłowska (University of Warmia and Mazury in Olsztyn), Małgorzata Kolenkiewicz (University of Warmia and Mazury in Olsztyn), Mariusz Majewski (University of Warmia and Mazury in Olsztyn), Chen-Tung Yen (National Taiwan University); mrowniak@uwm.edu.pl

Abstract:
Spontaneously hypertensive rats (SHR) are characterized by two health problems: attention-deficit hyperactivity disorder (ADHD) and hypertension, which may directly affect the volume of the basolateral amygdala. Limbic structures such as amygdala have been implicated in the genesis of ADHD; it has been suggested that they mediate mood and cognitive disturbances in affected individuals. Hypertension results in SHR rats in huge enlargement of lateral ventricles. As lateral ventricles directly border the basolateral amygdala such enlargement may have also impact on the volume of this brain region. Thus, we sought to test the hypothesis that, there might be basolateral amygdala volume abnormalities in juvenile and adult SHR rats due to ADHD and/or hypertension.

The volumes of the lateral, basolateral and basomedial amygdaloid nuclei were compared using Cavalieri method in juvenile/adult SHR rats and Wistar Kyoto rats (WKY) rats used as control animals. Morphometric measurements were manually obtained on the frozen sections stained by immunohistochemistry.

The results show that in contrast to some previous findings in human children and adolescents, we found no significant differences in the basolateral amygdala volumes among juvenile and adult SHR and WKY rats due to ADHD or hypertension.

Concluding, finding of amygdala volume loss is not stable across different samples of patients with ADHD and was not confirmed in SHR animal model of ADHD in the present study. Contradictory findings may be related to the different locations of alterations along the complex circuits responsible for the different symptoms of ADHD.

This work was supported by grant: PL-TW II/4/2015.

Poster 67:

Titel: The indusium griseum - hippocampal remnant or delimited area?

Autoren/Adressen: Marie Sanders (Ruhr-Universität Bochum), Elisabeth Petrasch-Parwez (Ruhr-Universität Bochum), Hans-Werner Habbes (Ruhr-Universität Bochum), Monika von Düring (Ruhr-Universität Bochum), Eckart Förster (Ruhr-Universität Bochum); marie.sanders@rub.de

Abstract:
The indusium griseum (IG), also called supracallosal gyrus, is a thin three layered cortical structure dorsal to the corpus callosum, that is commonly regarded as an extant continuation of the dentate gyrus. Notwithstanding, the current state of research reveals several disagreements with this thesis, so that further studies are still required.

In order to elucidate possible differences between the IG and hippocampal subareas, we investigated its postnatal development in mouse brain using Prox1, Secretagogin, Necab2, Calbindin, Calretinin, Parvalbumin and PCP4 immunohistochemistry.

Surprisingly, the lack of Prox1 immunoreactivity within the IG revealed that this region does not represent a continuation of the dentate granule cells which are defined by Prox1 expression. Moreover, our investigations provide strong evidence that the IG differs from other hippocampal subareas as well. Thus, the expression pattern of Necab2 and Secretagogin demarcates the subiculum, CA1 and CA3 from the IG. Nevertheless, Necab2 and Secretagogin immunostaining revealed similarities between CA2 and the IG.

Furthermore, we detected an alteration concerning the dominating calcium binding protein within the IG during its postnatal development. While Calbindin initially predominates within this region, Secretagogin appears to prevail increasingly after several days post natum.

In conclusion, our results indicate that the IG does not simply represent a continuum of one of the hippocampal subregions, but most likely a distinct region within the hippocampal formation characterized by an exceptional cell population.

Poster 68:

Titel: Expression profiles of n-cadherin and protocadherin-19 in the postnatal mouse limbic system

Autoren/Adressen: Anne Schaarschuch (Jena University Hospital), Christoph Redies (Jena University Hospital), Nicole Hertel (Jena University Hospital);
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Abstract:
Cadherins are a superfamily of calcium-dependent cell-cell adhesion molecules that are involved in brain development and organization. Previous genetic studies have shown that mutations in Protocadherin-19 (Pcdh19) lead to an epilepsy syndrome with a variable degree of cognitive disability. Ictal symptoms suggest a prominent involvement of frontotemporal and limbic structures during seizures. Expression studies of Pcdh19 in mouse confirmed a wide presence during brain development while the function of Pcdh19 and related pathological mechanisms are still largely unknown. The neuronal cadherin (N-Cadherin; Ncdh) is known for its important role in neurulation, brain development and synaptic function. Ncdh and Pcdh19 were recently discovered to form a protein complex, which exhibits strong adhesion and possibly regulates neurulation in zebrafish.

We investigated the expression pattern of Pcdh19 and Ncdh in the limbic system at postnatal stages P0 (day of birth), P2, P5 and P7 in C57BL/6J mice by using double-label in situ hybridization.

Results confirmed a strong expression of both Ncdh and Pcdh19 in structures of the limbic system with co-expression in the nuclei of the amygdala, the hippocampus and the ventral hypothalamus. Detailed neuroanatomical analyses revealed the fine regulation of Pcdh19 and Ncdh expression at the boundaries between several nuclei.

In conclusion, we found that Pcdh19 and Ncdh are expressed in distinct patterns that show a remarkable degree of colocalization. Therefore, our findings suggest that the molecular complex formed between the two cadherins is possibly involved in developmental maturation of the postnatal limbic system in mouse.

Poster 69:

Titel: Role of gdf-15 in high-grade malignant glioma

Autoren/Adressen: Anna Steinmann (Institute of Anatomy and Cell Biology, Heidelberg University), Tanja Eisemann (DKFZ/ZMBH Alliance, Heidelberg), Juan Carlos Boffi (Institute of Anatomy and Cell Biology, Heidelberg University), Thomas Kuner (Institute of Anatomy and Cell Biology, Heidelberg University), Heike Peterziel (DKFZ/ZMBH Alliance, Heidelberg), Jens Strelau (Institute of Anatomy and Cell Biology, Heidelberg University); steinmann@ana.uni-heidelberg.de

Abstract:
High-grade glioma constitutes the prevalent and most malignant primary brain cancer in humans. The tumors are characterized by a high proliferative rate, aggressive invasiveness and marked therapy resistance enabling tumors to escape complete surgical resection, chemo- and radiotherapy. Growth differentiation factor-15 (GDF-15) is a member of the TGF-beta superfamily which is implicated in pathological processes including atherosclerosis, heart failure and cancer. In high-grade glioma patients, GDF15 expression correlates with shorter overall survival.
So far most studies addressed the role of GDF15 in tumor cells, although high expression of the protein is also observed in the tumor microenvironment (TME) i.e. in tumor-associated reactive astrocytes and in infiltrating immune cells.

To decipher the in vivo role of TME-derived GDF15 in high-grade glioma, we stereotactically implant GDF15-positive and negative syngeneic glioma cells with different invasive capacities into wt and GDF15-deficent C57BL/6 mice.

The resulting tumors are analyzed at defined time points for histopathology, tumor size, invasion and proliferation as well as the extent of reactive gliosis and the recruitment of immune cells into the tumor tissue. In parallel we investigate the migratory behavior of the different glioma cells ex vivo by implanting them on organotypic brain slices from wildtype and GDF15-deficient mice. This paradigm allows to assess effects of GDF15-deficiency in both tumor cells and TME.

Taken together, these analyses will help to define whether therapeutic approaches based on functional ablation of GDF15 may constitute a promising strategy for the treatment of high-grade glioma.

Poster 70:

Titel: Chromatin regulation in forebrain morphogenesis

Autoren/Adressen: Tran Tuoc (University Medical Center Göttingen);
tran.tuoc@med.uni-goettingen.de

Abstract:
Chromatin remodeling is an important regulator of developmental gene expression.

The BAF (mammalian SWI/SNF) complexes are a family of multi-subunit ATP-dependent chromatin remodelers that use ATP hydrolysis to alter chromatin structure.

Hundreds of distinct BAF complexes are predicted to form in vivo through combinatorial assembly of at least 15 identified BAF subunits. Integrated BAF complex subunits, which interact through composite surfaces with transcription factors and epigenetic factors, are essential for genome targeting and thus are responsible for conferring functional specificity.

In my talk, I will discuss recent progress in understanding of chromatin remodeling during neural development. I will highlight roles of chromatin remodeling SWI/SNF (BAF) complexes in forebrain and cortical morphogenesis.

Poster 71:

Titel: Multiple changes of receptor binding sites in the 6-ohda-hemiparkinson-modell of rats

Autoren/Adressen: Sara Van Bonn (Rostock University Medical Center), Teresa Mann (Rostock University Medical Center), Oliver Schmitt (Rostock University Medical Center), Alexander Hawlitschka (Rostock University Medical Center), Markus Cremer (Research Center Jülich), Karl Zilles (JARA-BRAIN, Jülich-Aachen Research Alliance), Andreas Wree (Rostock University Medical Center); wree@med.uni-rostock.de

Abstract:
Parkinson's disease (PD) is characterized not only by dopaminergic cell loss in the substantia nigra (SN), pars compacta but also by synaptic plasticity. The complex regulatory and partly compensatory processes are associated with changes in neurotransmitter receptor densities. To assess these changes, 6-hydroxydopamine (6-OHDA) was injected into the medial forebrain bundle of rats, inducing a nearly complete lesion of dopaminergic neurons in the SN.

The density of 8 receptors inside (caudate putamen (CPu), accumbens nucleus (AcB), globus pallidus (GP), SN, subthalamic nucleus (STh), claustrum (Cl)) and outside (cingulate cortex (CG), motor cortex (M), somatosensory cortex (S), lateral habenular nucleus (LHb), CA1 of the hippocampus (CA1), dentate gyrus (DG)) the basal ganglia was analyzed by quantitative in vitro receptor autoradiography.

After dopaminergic deafferentation the density of M2-receptor decreases in CPu, AcB and SN. nACh-receptor density decreases in CPu, AcB, GP, SN, STh, CG, M, S and LHb, while D2/D3-receptor density increases in CPu, AcB and GP, but decreases in SN. 5HT2A -receptor density decreases in CPu, AcB, SN, STh, Cl, and GABAA-receptors in CPu, AcB and GP. Unilateral lesion causes an increased density of alpha1-receptors in CG, M and CA1, while reduced ones in SN. Alpha2-receptor density increases in CG and M and decreases in SN.

This study enables a better understanding of functional plasticity on the differentially regulated receptor systems on synaptic level in hemiparkinsonism and implicates the evaluated receptors as a possible therapeutic target in the therapy of PD.

Poster 72:

Titel: Evidence for circadian and dopaminergic regulation of fatty acid oxidation

Autoren/Adressen: Patrick Vancura (University Medical Center of the Johannes Gutenberg University Mainz), Tanja Wolloscheck (University Medical Center of the Johannes Gutenberg University Mainz), Kenkichi Baba (Morehouse School of Medicine), Gianluca Tosini (Morehouse School of Medicine), P. Michael Iuvone (Emory University School of Medicine), Rainer Spessert (University Medical Center of the Johannes Gutenberg University Mainz); : p.vancura@uni-mainz.de

Abstract:
The mammalian retina is a tissue of highest energy expenditure and oxygen consumption, a situation that is even intensified during nighttime. As a consequence the oxidative metabolism of the retina has to comply with daily changes in energy demand and its impairment might contribute to retinopathies - as seen in diabetes, one of the most common causes of blindness in Europe and the USA.

To examine daily adaptation of the energy metabolism in healthy and diabetic retina at gene level, transcriptional regulation of key enzymes of metabolic pathways has been investigated in the present study.

Transcriptional profiling identified mRNA-levels of mitochondrial fatty acid β-oxidation enzymes, i.e. carnitine palmitoyltransferase-1α (Cpt-1α) and medium chain acyl-CoA dehydrogenase (Acadm) to display daily rhythms with peak expression during daytime in preparations of the whole retina and microdissected photoreceptor cells. Consistently Cpt-1α immunostaining was seen to be most prominent in the inner segment of photoreceptor cells. Furthermore periodicity of both Cpt-1α and Acadm transcripts persisted in constant darkness, was mitigated in mice deficient for dopamine D4 (D4) receptors, and altered in db/db mice - a model of diabetic retinopathy.

The data of the present study support a concept in which daily adaptation of retinal energy metabolism involves clock-dependent release of dopamine with subsequent action on D4 receptors, targeting transcriptional regulation of mitochondrial β-oxidation, and its circadian dysregulation as a putative implication in diabetic retinopathy.

Poster 73:

Titel: Assembling a dopaminergic synapse: the role of cell adhesion and scaffolding molecules

Autoren/Adressen: Rebecca Wallrafen (UMG), Yasmin Aktas (Universität Göttingen), Thomas Dresbach (UMG); rebecca.wallrafen@stud.uni-goettingen.de

Abstract:
Three themes have been the hallmark of our understanding of neurotransmitter release: (1) release occurs in a quantal fashion from synaptic vesicles, (2) molecular scaffolds organize release at active zones and (3) cell adhesion molecules signal across the synaptic cleft to mediate the assembly of synapses and endow synaptic junctions with specific properties. Surprisingly, little is known about the role of synaptic scaffolds and cell adhesion molecules at dopaminergic (DA) synapses. One of the best studied cell adhesion systems consists of postsynaptic Neuroligins (NL) and presynaptic Neurexins. NL mutations are linked to autism and Alzheimer's disease, possibly by causing imbalance between excitation and inhibition. We aim to test the hypothesis that impaired DA synapse assembly contributes to this imbalance.

Here we established a novel co-culture system involving dissociated DA midbrain and hippocampal neurons, i.e natural target cells of DA axons. In addition, we started to characterize DA terminals contacting hippocampal cells with immunofluorescent stainings.

Presynaptic markers (Bassoon, Synaptophysin, Synapsin, vGAT, vGluT1-3, vMAT2) were heterogeneously expressed in DA axons and their distribution changed during culture development. This co-culture system will readily allow us to test the effect of knock down and overexpression of scaffolding and cell adhesion molecules, including NL, on DA synapse formation and function.

The findings of our study give insight into the molecular composition of DA varicosities projecting onto hippocampal neurons and will introduce the possibility that cell adhesion and scaffolding molecules regulate DA synapse formation and function.

Poster 74:

Titel: Downstream molecular targets of bcl11a in postmigratory upper-layer projections neurons

Autoren/Adressen: Christoph Wiegreffe (Ulm University), Tobias Wahl (Ulm University), Natalie Joos (Ulm University), Pentao Liu (Wellcome Trust Sanger Institute), Nancy A. Jenkins (The Methodist Hospital Research Institute), Neal G. Copeland (The Methodist Hospital Research Institute), Stefan Britsch (Ulm University); christoph.wiegreffe@uni-ulm.de

Abstract:
The neocortex plays a central role for higher order functions of the brain, including cognitive, emotional, and sensory motor functions. It forms through a series of interdependent developmental processes comprising migration, layer type-specific differentiation, wiring, and survival of neurons. We recently demonstrated that Bcl11a regulates sequential steps in neocortical projection neuron development, such as radial migration as well as postmigratory morphogenesis and survival (Wiegreffe et al., Neuron 2015). While we showed that Bcl11a controls neuron migration through transcriptional regulation of Sema3c, it is unclear, through which molecular pathways Bcl11a exerts its late functions in neocortical development.

To identify downstream targets of Bcl11a in postmigratory upper-layer neurons, we selectively isolated upper-layer cortical tissue from P2 Bcl11a mutant and control brains using laser capture microdissection (LCM) technology, subjected the captured cells to a differential transcriptome analysis, and carried out a gene ontology (GO) enrichment analysis.

This analysis revealed a significant enrichment of genes coding for signaling molecules that also play a role in the regulation of synapse organization and neuron differentiation. Moreover, we found an enrichment of a set of genes involved in cell adhesion that contained several members of the cadherin superfamily. Here, we present quantitative real-time PCR and RNA in situ hybridization results for selected candidate downstream molecular targets of Bcl11a from our screen.

Our data point at defective wiring of upper-layer neurons and form the basis for functional analyses of the postmigratory phenotype in Bcl11a mutants.

Poster 75:

Titel: Clock-dependent regulation of interphotoreceptor retinoid-binding protein in murine retina

Autoren/Adressen: Tanja Wolloscheck (Institute of Functional and Clinical Anatomy), Patrick Vancura (Institute of Functional and Clinical Anatomy), Rainer Spessert (Institute of Functional and Clinical Anatomy); wollosch@uni-mainz.de

Abstract:
Interphotoreceptor retinoid-binding protein (Irbp) is the most abundant soluble protein in the interphotoreceptor matrix and plays a critical role in the visual retinoid cycle. Dysregulation of Irbp expression is associated with visual dysfunction and retinal degeneration and has been implicated in diabetic retinopathy - one of the most common causes of blindness in Europe and USA. For these reasons a better understanding of the expressional control of Irbp is of high physiological and pathological relevance.

Irbp expression was measured in preparations of the whole retina and microdissected photoreceptors of clock- and db- knockout mice.

Irbp expression was seen to display a daily rhythm with peak values during daytime.The cycling of Irbp persisted in constant darkness, was phase-advanced in mice deficient for clock and was unaltered in db/db mice - a model of diabetic retinopathy.

The data of the present study suggest that the visual retinoid cycle is under circadian control.

Poster 76:

Titel: Crossreactivity of a polyclonal antiserum directed to chlamydia trachomatis with the ubiquitin-ribosomal protein fusion protein rps27a

Autoren/Adressen: Almamy Abdullah (University Medicine Göttingen), Abdul Asif (University Medicine Göttingen), Horst Schroten (University Heidelberg, Mannheim), Hiroshi Ishikawa (The Nippon Dental University, Niigata), Bernhard Reuss (University Medicine Göttingen); breuss@gwdg.de

Abstract:
Infections with the sexually transmitted endobacterium Chlamydia trachomatis (CT) can induce autoreactive antibodies, interacting amongst others with neuronal antigens and by this are able to cause neurological disease.

We tried here to identify possible target proteins on a molecular level, and tested interactions of two polyclonal rabbit antisera directed to CT (α-CT) with either protein extracts of a human choroid plexus papilloma cell line (HIBCPP-cells), or a first trimester prenatal brain multiprotein array (HexElect, Source Bioscience).

In HIBCPP-cells, immunocytochemistry reveals a primarily cytoplasmic location of α-CT, granular structure of which suggested ribosomes as a subcellular target organelle. Corresponding Western blot analysis revealed α-CT to label three different protein bands of varying molecular weight and intensity. We further intended to identify these proteins by 2D-Western blot analysis and mass spectrometry of immunopositive spots, however due to unspecific background this attempt remained unsuccessful. Instead, incubation of a commercial multiprotein array (HexElect, Source Bioscience) with α-CT revealed the ribosomal small subunit component RPS27a as a possible cellular target for this serum.

Together with previous findings of RPS27a as an autoimmune target in a mouse model of systemic lupus erythematosus (SLE)*, this could be a first hint for a role of CT for the induction of SLE typic immune changes. However direct evidence for this will have to be demonstrated by further experiments.
* Gutjahr et al., 2005, Genomics 85, 285–296.

Poster 77:

Titel: Protective effects of abn-cbd ligands in controlled cortical impact and in vitro models.

Autoren/Adressen: Julian Cardinal von Widdern (Martin Luther University Halle-Wittenberg, Halle, Germany), Michael Sebastian Ulrich (Johannes Gutenberg-University, Mainz, Germany), Urszula Grabiec (Martin Luther University Halle-Wittenberg, Halle, Germany), Beat Alessandri (Johannes Gutenberg-University, Mainz, Germany), Faramarz Dehghani (Martin Luther University Halle-Wittenberg, Halle, Germany); julian.cardinal-von-widdern@student.uni-halle.de

Abstract:
The synthetic cannabinoid abnormal-Cannabidiol (abn-CBD) has been shown to protect neurons by altering the migration and functional state of microglial cells. N-arachidonyl-serine (ARA-S) was discussed to act on the same target. Our aim was to investigate the neuroprotective potential of abn-CBD and ARA-S in different in vivo and in vitro models.

To verify whether abn-CBD inhibits secondary lesion growth and improves the neurological outcome a rat model of controlled cortical impact (CCI) was used. Cerebral blood flow, neurological scoring, Beam Walk-test and Beam Balance-test were performed. The lesion volume was calculated and immunohistochemistry for GFAP, Iba 1, IL-1β and NeuN performed. Furthermore, ARA-S was tested in a excitotoxicity model of rat hippocampal slice cultures. Finally, an in vitro scratch wound assay was used to examine the Abn-CBD effects on pure astrocytic or astrocytic microglia co-cultures.

The application of abn-CBD caused in vivo an increased number of microglial cells in animals treated with abn-CBD on day 14 post-injury. A significant increase in CBF was observed within 80min after application in traumatized and sham-operated animals. Treatment with abn-CBD significantly reduced the lesion volume after 14d. This correlated with a significantly better motorfunctional outcome of treated animals. ARA-S showed neither an effect on the number of degenerating neurons nor microglial cells. In the scratch-wound-assay abn-CBD inhibited gap-closure after 24h and 36h in co-cultures but not in isolated astrocytes.

Abn-CBD is a promising substance to protect neurons with distinct effects on scar formation.
It positively influences the CBF and motorfunction.

Poster 78:

Titel: Role of the NKG2D system in glioma stem cells

Autoren/Adressen: Charlotte Flueh (Universitätsklinikum Schleswig-Holstein), Vivian Adamski (Universitätsklinikum Schleswig-Holstein), Kirsten Hattermann (Christian-Albrechts-Universität zu Kiel), Guranda Chitadze (Universitätsklinikum Schleswig-Holstein), Michael Synowitz (Universitätsklinikum Schleswig-Holstein), Dietrich Kabelitz (Universitätsklinikum Schleswig-Holstein), Janka Held-Feindt (Universitätsklinikum Schleswig-Holstein); charlotte.flueh@uksh.de

Abstract:
Glioblastoma (GBM) are malignant and 100% lethal brain tumors. Tumor stem cells have a major influence on tumor malignancy and progression. Another key element of tumor viability are immunological escape mechanisms, involving the Natural Killer Group 2, member D (NKG2D) receptor-ligand system. Cell-bound NKG2D-ligands such as MHC class I related molecule A and B (MICA and MICB), and the UL-16 binding protein family (ULBP1-6) are recognized by the NKG2D-receptor (NKG2Dr) and trigger cytotoxic effects of NK- and T-cells. By releasing soluble NKG2DL tumor cells inhibit the killing potential of effector cells.

We analyzed the expression profile and localization of NKG2DL in solid human GBM and stem-like cells isolated from solid GBM and glioma cell lines using quantitative qrtPCR and double immuno-staining.

MICA, ULBP1 and ULBP2 are detectable and co-localized with each other in solid GBM, but distinct from most stem cell marker expressing cells. Stem-like spheres from solid GBM show downregulation of NKG2DL in comparison to differentiated cells. However, stem-like spheres from glioma cell lines show heterogeneous regulation.

The NKG2D system is present in glioma biology and might be an important factor concerning the survival of distinct tumorcell subpopulations.

Poster 79:

Titel: Effects of n-arachidonoyl glycine after the neuronal injury

Autoren/Adressen: Urszula Grabiec (Martin Luther University Halle-Wittenberg), Tim Hohmann (Martin Luther University Halle-Wittenberg), Albrecht Klemenz (Martin Luther University Halle-Wittenberg), Chalid Ghadban (Martin Luther University Halle-Wittenberg), Candy Rothgänger (Martin Luther University Halle-Wittenberg), Alexandra Antonietti (Martin Luther University Halle-Wittenberg), Andreas Zimmer (University of Bonn), Faramarz Dehghani (Martin Luther University Halle-Wittenberg); faramarz.dehghani@medizin.uni-halle.de

Abstract:
N-arachidonoyl glycine (NAGly) is postulated to be an immunmodulatory endocannabinoid involved in regulation of multiple immune cell functions. NAGly was shown to activate the GPR18 receptor, which is believed to be a switch between cytotoxic M1 and reparative M2 macrophages. In this study, we investigated the role of targeting NAGly-GPR18 signaling in excitotoxically lesioned organotypic hippocampal slice cultures.

Murine organotypic hippocampal slice cultures (OHSC) lesioned with N–methyl–D–aspartate (NMDA, 10µM), primary neurons and microglial cells of BL6J or CB2-/- mice were used. Preparations were analyzed by staining, live cell imaging, Patch Clamp and qRT-PCR.

NAGly (0.1µM, 1µM, 10µM) protected the dentate gyrus granule cells after excitotoxic lesion. Incubation with abn-CBD antagonist (O-1918) and CB2 antagonist (AM630) abolished the protective effects of NAGly. The motility of CB2-/- microglial cells was increased, when incubated with NAGly. NAGly (0.1 µM, 10 µM) alone did not affect the membrane potential of mature pyramidal neurons, whereas a combined stimulation with NMDA resulted in an increased depolarization. gpr18 mRNA was significantly decreased (6 h) after excitotoxic treatment in OHSC, suggesting a role of GPR18 during the early phase of the neuronal injury.

Given the reduced expression of gpr18 in OHSC after NMDA treatment and NAGly mediated actions on neurons and glial cells we speculate that gpr18 and its endogenous ligand NAGly plays a role during the neuronal injury and might be a target for therapeutical applications.

Poster 80:

Titel: Therapeutic application of probenecid prevents the progression of established clinical symptoms in a mouse model of experimental autoimmune encephalomyelitis

Autoren/Adressen: Nadine Hainz (Saarland University), Sandra Wolf (Saarland University), Philipp Becker (Saarland University), Thomas Tschernig (Saarland University), Carola Meier (Saarland University); nadine.hainz@uks.eu

Abstract:
Multiple sclerosis is a multifactorial disease of the central nervous system (CNS). In an animal model of multiple sclerosis, the experimental autoimmune encephalomyelitis (EAE) model, inhibition of the channel protein pannexin 1 (Panx1) was previously shown to prevent the onset of clinical symptoms and inflammation. We here hypothesize that therapeutic application of the Panx1-inhibitor Probenecid (PBN) can also restrain progression of ongoing demyelination.

C57BL/6 mice were immunized with MOG35-55 peptide and pertussis toxin to induce EAE. Clinical symptoms were monitored daily (ascending scores 0-5). When score 2, characterized mainly by one-sided hindlimb paralysis, was reached, the mice were randomized into three groups. The first group (EAE) was left untreated, the second group (PBN) received probenecid (250mg/kg BW) and the third group (solvent) received solvent only. The mice were sacrificed after 20 days of therapy or upon reaching pre-defined no-go criteria.

PBN treatment prevented disease progression: While the clinical symptoms of EAE and solvent mice continuously worsened, PBN-treated mice maintained the initial score at start of therapy. Furthermore, the myelin content in the spinal cords of PBN-treated mice had remained high, in contrast to strong spinal cord demyelination in EAE and solvent mice. Spinal cord analysis also revealed fewer inflammatory cells in PBN-treated mice compared to solvent and EAE mice.

Inhibition of Panx1 channels via PBN prevents EAE progression in terms of clinical symptoms, inflammation and oligodendrocyte cell death, possibly via inactivation of the inflammasome – interleukin1ß axis.

Poster 81:

Titel: Analysis of tgfβ1-regulated expression of fc-gamma receptors primary microglia

Autoren/Adressen: Kevin Kern (University Freiburg), Nicolas Neidert (University Freiburg), Kerstin Kriegelstein (University Freiburg), Björn Spittau (University); bjoern.spittau@anat.uni-freiburg.de

Abstract:
Microglia are specialised immune cells of the central nervous system (CNS), which are involved in virtually all immune responses within the CNS. As such, microglia are influenced by complex regulatory mechanisms that are responsible for immune homeostasis. One of these mechanisms controlling the activation of microglia is the regulation via Fc-gamma receptors (Fcgr). In the present study, we analysed the effects of TGF-beta1 on the expression of activating and inhibitory Fcgrs in primary microglia in vitro.

Primary mouse microglia were treated with recombinant TGF-beta1 and a TGF-beta receptor type I inhibitor. Gene expression arrays, western blotting as well as flow cytometry were performed to analyse the expression of Fc-gamma receptors. Moreover, phagocytosis assays were conducted as a functional readout for Fcgr-mediated phagocytosis.

Gene expression arrays clearly demonstrated the upregulation of inhibitory Fcgrs and the downregulation of activating Fcgrs after stimulation with TGF-beta1. Interestingly, this regulation was not detectable using flow cytometry. However, in vitro almost all microglia were positive for Fcgrs increasing the difficulty to detect changes in protein levels. Further, preliminary results from phagocytosis assays did not show significant difference in the uptake of IgG-coupled latex beads after different stimuli of microglia.

Together, our data show that TGF-beta1 regulates the transcription of Fcgrs in primary microglia. However, these regulations were not detectable on protein levels. It has to be further elucidated whether these observations are due to post-transcriptional modifications or masked by high expression of Fcgrs in primary microglia in vitro.

Poster 82:

Titel: Formyl peptide receptor agonist ac2-26 improved neuroinflammation in a mouse model of pneumococcal meningitis

Autoren/Adressen: Eugenia Kress (RWTH Aachen), Nadine Schubert (RWTH Aachen), Marvin Rüger (RWTH Aachen), Simone Tauber (RWTH Aachen), Thomas Pufe (RWTH Aachen), Lars-Ove Brandenburg (RWTH Aachen);
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Abstract:
Bacterial meningitis is despite progress in research and the development of new treatment strategies still a cause of severe neuronal sequelae. The brain is protected from penetrating pathogens by the blood-brain barrier and the innate immune system. The invading pathogens are recognized by pattern recognition receptors including the G-protein coupled formyl peptide receptors (FPRs), which are expressed by immune cells of the central nervous system. Interestingly, FPRs show a broad spectrum of ligands including pro- and anti-inflammatory ligands. Here, we investigated the effects of AnnexinA1 and its mimetic peptide (Ac2-26) as potent anti-inflammatory ligand on the inflammation in a mouse model of pneumococcal meningitis.

Therefore, wildtype, mFPR1 and mFPR2-deficient mice were intracerebral injected with Streptococcus pneumoniae D39 (type 2) as important meningitis pathogen. Subsequent, the different mice groups were treated with intraperitoneal injection of Ac2-26 (1 mg/kg body weight) two and 8 hour after infection. The degree of inflammation was analyzed in various brain regions by means of immunohistochemistry and real-time RT-PCR 30 h after infection.

The results showed a positive modulation of the innate immune response including decreased glial cell activation, reduced neutrophils infiltration and pro-inflammatory cytokine expression, whereas anti-inflammatory cytokine expression are decreased compared to the non-infected control groups.

Altogether, the results suggest that FPR1 and FPR2 play an important role in the innate immune responses against Streptococcus pneumoniae within the CNS. Furthermore, Ac2-26 could be applied as a new approached therapy for bacterial meningitis.

Poster 83:

Titel: Analysis of Tgfβ1-regulated expression of Tmem119 and Olfml3 in primary microglia

Autoren/Adressen: Nicolas Neidert (Institute of Anatomy and Cell Biology, Faculty of Medicine, University of Freiburg), Kevin Kern (Institute of Anatomy and Cell Biology, Faculty of Medicine, University of Freiburg), Kerstin Krieglstein (Institute of Anatomy and Cell Biology, Faculty of Medicine, University of Freiburg), Björn Spittau (Institute of Anatomy and Cell Biology, Faculty of Medicine, University of Freiburg); bjoern.spittau@anat.uni-freiburg.de

Abstract:
Microglia are the immune cells of the central nervous system (CNS) and play essential roles under physiological and pathological conditions. Transforming Growth Factor-beta 1 (TGFβ1) mediates immunosuppressive functions and plays important roles in cancer, inflammation and development. The aim of the study was to elucidate TGF-beta1-mediated effects on the expression of Transmembrane Protein 119 (Tmem119) and Olfactomedin-like 3 (Olfml3) in murine primary microglia. Tmem119 and Olfml3 have been shown to be microglia-specific genes, however, the functions of Tmem119 and Olfml3 remain elusive.

Primary microglia have been treated with TGF-beta1 and expression of Tmem119 and Olfml3 was analysed using qRT-PCR, western blotting as well as immunocytochemistry (ICC). Moreover, intracellular localisation of Tmem119 and Olfml3 was addressed using a cellular localisation kit. Finally, in silico analysis of Tmem119 and Olfml3 promoter regions were performed.

We demonstrate that TGF-beta1 upregulates expression of Tmem119 and Olfml3 in microglia. In silico promoter analysis revealed the presence of putative SMAD binding elements (SBE) in the cis-regulatory elements of Tmem119 and Olfml3 suggesting that Tmem119 and Olfml3 are direct TGF-beta1 target genes. Using ICC, we show that the intracellular localisation of Tmem119 and Olfml3 corresponds to the prediction that Tmem119 is a transmembrane protein and Olfml3 is a secreted protein.

Together, our data show that expression of the microglia-specific genes Tmem119 and Olfml3 is increased by TGF-beta1, further underlining the significance of TGF-beta1 as an important endogenous factor for the regualtion of microglia functions and microglia maturation.

Poster 84:

Titel: The effect of fingolimod treatment on b cell aggregation in the central nervous system in a b cell-dependent mouse model of multiple sclerosis

Autoren/Adressen: Quirin Notz (Universität Würzburg), Kathrin Bail (Universität Würzburg), Marie Wunsch (Universität Würzburg), Andrea Schampel (Universität Würzburg), Damiano Rovituso (Universität Würzburg), Stefanie Kuerten (Universität Würzburg); stefanie.kuerten@uni-wuerzburg.de

Abstract:
Meningeal B cell follicular-like structures in secondary progressive multiple sclerosis (SP-MS) have been associated with a severe disease course. The S1P1 receptor agonist fingolimod is an approved drug for the treatment of MS and keeps lymphocytes trapped in the lymph node, preventing them from circulating into the central nervous system (CNS) and thereby diminishing inflammation. This project aimed to delineate the impact of fingolimod on B cell aggregate formation in MP4-induced experimental autoimmune encephalomyelitis (EAE), a B cell-dependent mouse model of MS.

A total of n = 34 female C57BL/6 mice were actively immunized with MP4. Fingolimod treatment was initiated either at the peak of acute EAE or 50 days after onset. Control mice received vehicle solution. Serial cerebellar sections were screened for the presence of inflammatory infiltrates and immunohistochemically stained in order to study the evolution of B cell aggregates into lymphoid follicles.

Compared to the corresponding control group, the total number of infiltrates was significantly reduced and no B cell aggregates were observed when fingolimod was administered at the peak of disease. In contrast, treatment during chronic EAE did not result in a significant difference between fingolimod- and vehicle-treated animals in terms of total infiltrate and B cell aggregate number. Lymphoid neogenesis remained likewise unaffected.

Our results indicate that fingolimod does not influence already established B cell aggregates in chronic EAE. Regarding presently ongoing studies, these data raise doubts as to whether fingolimod can be a promising treatment option for SP-MS.

Poster 85:

Titel: Interaction of an antiserum directed to neisseria gonorrhoeae with the human snare-complex protein snap23 leads to impaired exocytosis in sy5y neuroblastoma cells

Autoren/Adressen: Bernhard Reuss (University Medicine Göttingen), Abullah Almamy (University Medicine Göttingen), Horst Schroten (University Heidelberg, Mannheim), Hiroshi Ishikawa (The Nippon Dental University), Abdul Asif (University Medicine Göttingen); breuss@gwdg.de

Abstract:
Early maternal infections with the Gram-negative bacterium Neisseria gonorrhoeae (NG) correlate with an increased risk of the offspring to suffer from schizophrenic psychosis in later life.*
* Sørensen et al., 2009, Schizophrenia Bull. 35, 631-637.

We hypothesized an immune mediated mechanism for this and therefore investigated interactions of antibodies to NG (α-NG) with a first trimester prenatal brain multiprotein array.

Amongst others the SNARE complex protein Snap23 was identified as a possible target antigen for α-NG, an interaction that could be confirmed by Western Blot analysis using a commercially available Snap23 protein sample. Specificity of this interaction was demonstrated by the fact that a sample of the closely related SNARE protein Snap25 failed to interact with α-NG. On the functional level, in SH-SY5Y-cells, α-NG pretreatment was able to interfere with exocytosis as revealed by impaired membrane translocation of the insulin dependent glucose transporter GLUT-4. Further along this line, vesicle recycling after insulin stimulation, as revealed by endocytosis of the fluorescent endocytosis marker FM1-43, was also attenuated in α-NG treated cells.

Together these findings suggest Snap23 to provide a functionally important autoimmune target for anti-gonococcal antibodies. Whether this interaction contributes to the correlation between maternal infections and psychosis remains to be clarified in the future.

Poster 86:

Titel: Effects of nimodipine on microglial cells

Autoren/Adressen: Andrea Schampel (University of Wuerzburg), Tobias Koeniger (University of Wuerzburg), Sueleyman Erguen (University of Wuerzburg), Stefanie Kuerten (University of Wuerzburg); andrea.schampel@uni-wuerzburg.de

Abstract:
The L-type calcium channel antagonist Nimodipine is known to induce beneficial effects on local vascularization of the central nervous system. This is why it is commonly used as gold-standard for treating vasospasms after subarachnoidal haemorrhage. Recently beneficial effects of Nimodipine were reported regarding cognitive performance, memory and aging. However the effect of Nimodipine on inflammatory-mediated neurodegenerative diseases has not been well studied yet.

Our studies investigate the role of Nimodipine in experimental autoimmune encephalomyelitis (EAE) - the most commonly used animal model for multiple sclerosis (MS). We observed that Nimodipine treatment attenuated clinical symptoms of relapsing-remitting EAE. This effect was mirrored by a diminished histopathology of spinal cord nerve fibers as studied in ultrastructural analyses. While there was no effect of Nimodipine treatment on the extent of inflammation, the number of IBA-1-positive cells was significantly reduced.

This observation led to intense slice and cell culture studies which suggest that our treatment strategy leads to microglial apoptosis as well as a decreased survival rate and iNOS expression.

This may ensure a more favorable environment for axonal repair and remyelination.

Poster 87:

Titel: Chemosensory cholinergic signaling network in the thymic medullary epithelium

Autoren/Adressen: A. Soultanova (Justus-Liebig-University), C. Cen (Justus-Liebig-University), K. Fleck (Justus-Liebig-University), G. Krasteva-Christ (University of Wuerzburg), U. Boehm (University of Saarland), S. M. Wienhold (Charité-Universitätsmedizin Berlin), H. Müller-Redetzky (Charité-Universitätsmedizin Berlin), M. Witzenrath (Charité-Universitätsmedizin Berlin), W. Kummer (Justus-Liebig-University); aichurek.soultanova@anatomie.med.uni-giessen.de

Abstract:
A subset of medullary epithelial cells in the thymus (mTECs) was previously shown to be cholinergic and express components of bitter taste cascade. In this study we set out to further characterize these cells and elucidate their function.

Immunohistochemistry, real-time RT-PCR and intracellular calcium measurements were conducted on thymi from ChAT- (choline acetyltransferase) and Chrna3-eGFP (nicotinic receptor subunit alpha3) reporter mice, mice expressing diphtheria toxin A driven by TRPM5 promoter (TRPM5: channel in taste transduction signaling), and wild-type mice with streptococcal pneumonia. Newborn human thymi were subjected to immunohistochemistry.

Analysis of thymi at different age stages revealed that expression of ChAT and chemosensory components in the mTECs starts at birth but not before. The ChAT-positive cells in the thymus are in proximity to terminally differentiated mTECs (Hassall-like bodies) carrying Chrna3. In human newborn thymus, these cells closely surround or are integrated in the outer layer of the Hassall's corpuscles. Hassall-like bodies were not observed in TRPM5-DTA mice lacking chemosensory cells. These cholinergic cells respond to the bitter substance denatonium with an increase in intracellular calcium concentration. Thymic mRNA expression of TRPM5 and alpha-gustducin was up-regulated in streptococcal pneumonia-infected mice.

We identified a novel chemosensory cholinergic cell type in the thymic medulla and hypothesize that there is paracrine acetylcholine signaling between these cells and Hassall's corpuscles, and that this signaling plays a role in bacterial pathogen detection and defense.

Funded by DZL and SFB-TR 84.

Poster 88:

Titel: The enteric nervous system as an immune target in multiple sclerosis

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Abstract:
Multiple sclerosis (MS) is an autoimmune disease caused by the infiltration of autoreactive lymphocytes into the central nervous system (CNS). Several experimental studies have shown that the gut is a key player in the pathogenesis of MS. Furthermore, there is clinical evidence of frequent bowel dysfunctions such as constipation.

This study aims at investigating the background of these clinical symptoms in a mouse model of MS, the MP4-induced experimental autoimmune encephalomyelitis (EAE). In order to determine whether the enteric nervous system (ENS) is a possible immune target in EAE, we performed ultrastructural and immunohistochemical analysis of the small intestinal wall in a total of 10 EAE, 10 non-immunized and 10 control-immunized mice. In addition, we quantified serum antibody titers against ENS proteins and detected specific autoantigens of the ENS by immunoprecipitation and mass spectrometry.

Our data demonstrate infiltration of macrophages and lymphocytes into the myenteric plexus and a progressive gliosis in acute and chronic EAE mice. Ultrastructural analysis showed neurodegeneration of the ENS. Furthermore, serum antibodies directed against enteric neuronal and enteric glial proteins were detected in EAE mice, but were absent in controls. These specific autoantigens were 2,4-dienoyl-CoA reductase, apolipoprotein A-I, small nuclear ribonucleoprotein Sm D2 and eukaryotic translation initiation factor 3 subunit D.

To our knowledge this is the first study providing evidence that the ENS is a possible immune target in MS. It remains to be elucidated whether MS patients show similar lesions of the ENS and display ENS-reactive lymphocytes in the blood.

Poster 89:

Titel: Identification and characterization of dormant glioma cells in situ and in vitro

Autoren/Adressen: Vivian Adamski (UKSH, Campus Kiel), Annika Hempelmann (UKSH, Campus Kiel), Michael Synowitz (UKSH, Campus Kiel), Kirsten Hattermann (CAU Kiel), Janka Held-Feindt (UKSH, Campus Kiel); Vivian.Adamski@uksh.de

Abstract:
Tumor dormancy is defined as the lack in tumor growth occurring between primary tumor formation and the appearance of recurrences. The mechanisms underlying tumor dormancy are divided into three models: angiogenic, immunogenic and cellular dormancy. Since highly malignant human brain tumors, especially glioblastomas, are characterized by a pronounced infiltrative growth and the frequent development of recurrences, we investigated the existence of dormant glioma cells in human glioblastoma samples in situ, and analysed the influence of chemotherapeutic treatment on the development of glioma dormancy in vitro.

Expression of three different dormancy markers [insulin-like growth factor-binding protein 5 (IGFBP5), ephrin receptor A5 (EphA5) and histone cluster 1 (H2BK)] was investigated by qRT-PCR and double-immunofluorescence staining in solid human glioma samples. In addition, glioblastoma cell lines were stimulated for short- or long-time periods with different Temozolomide concentrations, and checked for cell morphology, and IGFBP5, EphA5, and H2BK expression using qRT-PCR and immunocytochemistry.

We could show that in solid human glioblastoma samples dormancy markers were expressed in situ, were located in single tumor cells and could be co-stained with each other. Upon longtime low-dose Temozolomide treatment in vitro, glioblastoma cells evolved a flat, large cell morphology and expression of especially H2BK was induced.

IGFBP5, EphA5 and H2BK positive dormant glioma cells are found in human glioblastoma samples and seem to develop upon chemotherapeutic treatment. To overcome this rescue effect combined treatment strategies using different chemotherapeutic agents as well as defined treatment-time-protocols must be developed.

Poster 90:

Titel: Longitudinal monitoring of NFκB activity druing the fracture healing after implantation of cell seeded ß tricalcium phosphate scaffolds.

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Abstract:
Introduction:
The goal of this study was to compare the influence and effect of the various sorts of modified scaffolds particularly with regard to the inflammation process in bone healing. For this purpose, NFκB-luc transgenic mice with transplanted ß tricalcium phosphate (ßTCP) scaffolds (with and without strontium (Sr), with Cells (MSC+HUVEC) and with Cells + Sr) were used.

Material and methods:
Under surgery, a critical size fracture was created on the femur of the transgenic mice and subsequently stabilized with an external fixatur. The bone defect was filled by implanting the scaffolds. The expression levels of NFκB could be longitudinally monitored in a Xenogen in vivo imaging system (IVIS). After two months of non-invasive screening, the transgenic mice were euthanized and the fracture sites were investigated histologically.

Results:
The highest peaks of luciferase activity in the early phase of inflammation were observed the ß-TCP+ Cells group. According to the detected signals of NFκB activity in the early phase of healing (15th day), all the groups with Sr seem to reduce inflammation. However, the signal was increased in the late healing stage. particularly for the ßTCP+Sr group. The ßTCP+Sr+ Cells group has shown the most inflammatory reaction compares to the control group.

Conclusion
This study gives for the first time an overview of NFκB expression profiles comparing various sorts of scaffold inflammatory phases of fracture healing for at least two months. Sr in combination with influence the inflammatory reaction and thus the fracture healing.

Poster 91:

Titel: Novel insights into cx43 expression and gap junction formation in induced pluripotent stem cells from human cord blood

Autoren/Adressen: Anja Beckmann (Saarland University), Madline Schubert (Hannover Medical School, Leibniz Research Laboratories), Nadine Hainz (Saarland University), Alexandra Haase (Hannover Medical School, Leibniz Research Laboratories), Ulrich Martin (Hannover Medical School, Leibniz Research Laboratories), Thomas Tschernig (Saarland University), Carola Meier (Saarland University); anja.beckmann@uks.eu

Abstract:
Connexin (Cx) 43 is the most intensely studied gap junction protein in embryonic and differentiated stem cells. However, little is known about the expression and subcellular distribution of Cx43 channels in undifferentiated stem cells, and even less about the structural arrangement of these channels. We therefore investigated the expression of Cx43 in undifferentiated human cord blood-derived induced pluripotent stem cells (hCBiPS2).

Cx43 expression was detected at mRNA and protein level via quantitative real-time PCR and immunohistochemistry in hCBIPS2 cells. For analysis of Cx43 channel ultrastructure and assembly, we performed freeze-fracture replica immunogold labeling (FRIL) and analyzed samples by transmission electron microscopy.

HCBiPS2 cells were shown to express Cx43 mRNA. Cx43 protein was detected by immunofluorescence at sites of membrane contact. Ultrastructurally, FRIL analysis revealed immunogold-labeled Cx43 hemichannels in membranes of undifferentiated hCBiPS2 cells, which occurred in three major assemblies: (1) mature gap junction plaques (2) areas of loosely assembled Cx43 hemichannels, demonstrating an irregular spacing between Cx43 particles and (3) Cx43 labeling on vesicle membranes.

Our study is the first analysis of the ultrastructural gap junction morphology in induced pluripotent stem (iPS) cells from human cord blood. The occurrence of compact gap junction plaques was accompanied by irregular assemblies of Cx43 hemichannels. These data provide new insights into the appearance of Cx43 gap junction channels in undifferentiated iPS cells. The finding of Cx43 hemichannel assemblies points to additional functional aspects beyond those of intercellular communication.

Poster 92:

Titel: Chemosensitizing potential of resveratrol in colorectal cancer: up-regulation of intercellular junctions and apoptosis

Autoren/Adressen: Constanze Buhrmann (Ludwig-Maximilian-University Munich, Munich, Germany), Parviz Shayan (University of Tehran, Tehran, Iran), Bastian Popper (Biomedical Center, Ludwig-Maximilian-University Munich, Germany), Mehdi Shakibaei (Ludwig-Maximilian-University Munich, Munich, Germany); constanze.buhrmann@med.uni-muenchen.de

Abstract:
Current standard treatment regimens against colorectal cancer (CRC), such as 5-Fluorouracil (5-FU), have inadequate response rates, recurrence and metastasis. The naturally-occurring polyphenol resveratrol has been demonstrated to exhibit chemosensitizing potential and anticancer properties. However, these effects have not been fully elucidated and the aim of this study was to investigate the chemosensitizing potential of resveratrol in CRC.

CRC cell lines HCT116 and SW480 and the corresponding isogenic 5-FU-chemoresistant derived clones were cultivated with/without resveratrol and/or 5-FU in a three dimensional alginate tumor model.

Resveratrol alone blocked invasion and metastasis in all four cells lines and synergized the invasion inhibitory effects of 5-FU. Surprisingly, a transition from 5-FU-induced formation of microvilli to a planar cell surface, which was concomitant with up-regulation of desmosomes, gap- and tight junctions (claudin-2) and adhesion molecules (E-cadherin), was observed by resveratrol treatment. Additionally, resveratrol significantly attenuated 5-FU resistance in CRC cells through inhibition of epithelial-mesenchymal-transition (EMT) factors (decreased vimentin and slug, increased E-cadherin) and down-regulation of NF-kB pathway activation (inhibition of IkBa kinase and IkBa phosphorylation and degradation), nuclear translocation and down-regulation of NF-kB gene end-products (MMP-9, caspase-3).

We found that resveratrol chemosensitizies CRC cells to 5-FU through, at least in part, inhibiting an EMT phenotype via up-regulation of intercellular junctions and by down-regulation of NF-kB pathway.

Poster 93:

Titel: The human dental pulp stem and progenitor cells in transmission electron microscopy

Autoren/Adressen: Andreea Didilescu (Carol Davila University of Medicine and Pharmacy, Faculty of Dental Medicine, Bucharest), Vasile-Sorin Manoiu (National Institute of Research and Development for Biological Sciences, Bucharest), Mugurel Rusu (Carol Davila University of Medicine and Pharmacy, Faculty of Dental Medicine, Bucharest); Andreea.Didilescu@gmail.com

Abstract:
Dental pulp stem cells (DPSCs) are multipotent stem cells with many advantages for clinical applications. The aim of the present study was to characterize ultrastructurally the DPSCs.

Three healthy dental pulps extracted for prosthetic reasons were processed in order to be analyzed by transmission electron microscopy (TEM).

Collagen-embedded electronodense (dark) cells with heterochromatinic nuclei and an extremely poor amount of cytoplasm were identified. They were lacking organelles usually involved in secretion, such as rough endoplasmic reticulum (RER) and Golgi complexes. These cells usually presented multiple small cell protrusions, but were occasionally presenting short and thin processes. These dark cells were assessed in TEM as quiescent DPSCs (qDPSCs). Within the dental pulp stroma were also found spindle-shaped cells with long, thin or thick, processes which were building stromal networks. These were rather electronolucent (light) cells with nuclei in which euchromatin prevailed over heterochromatin, with a peculiar cytoplasmic content, almost exclusively represented by mitochondria and intermediate filaments. By taking into account the nucleocytoplasmic ratio of these cells, as well as the lack of RER and Golgi complexes, we identified these light stromal cells as dental pulp progenitor cells (DPPCs). Interestingly, processes of DPPCs were found closely related to, or contacting, the qDPSCs. Moreover, shedded vesicles were found between neighbour DPPCs and qDPSCs, being considered suggestive for a reciprocal paracrine influence of these cell types.

The presence of mixed population of DPPCs and DPSCs may explain why in various molecular studies the results indicate more or less different molecular phenotypes.

Poster 94:

Titel: P38mapk signalling contributes to blistering and reduction of desmosome size induced by pemphigus autoantibodies in human epidermis

Autoren/Adressen: Desalegn Tadesse Egu (LMU), Volker Spindler (LMU), Jens Waschke (LMU); Jens.Waschke@med.uni-muenchen.de

Abstract:
Pemphigus vulgaris (PV) is a skin blistering disease caused by autoantibodies targeting the adhesion proteins desmoglein 1 and 3. These proteins together with others form the desmosomes which are adhesive contacts vital for cell cohesion. The mechanisms underlying pemphigus skin blistering are not fully elucidated, but p38MAPK activation is one of the signalling events necessary for full loss of cell cohesion. However, it is unclear whether intracellular signalling mediates the hallmark changes in desmosome morphology. In this study, we thus tested the p38MAPK dependency of blister formation and of the ultrastructural changes induced by PV autoantibodies in human skin.

Ex vivo human skin model, transmission electron microscopy, serial cryosectioning, H&E, immunostaining

Injection of IgG fractions of PV patients (PV-IgG) as well as the monoclonal Dsg3 antibody from a PV mouse model AK23 induced p38MAPK activation, interdesmosomal widening, formation of split desmosomes and a reduction of desmosome size. In contrast, full epidermal blister formation and lower desmosome numbers were evident in tissue samples exposed to PV-IgG only. Pharmacologic inhibition of p38MAPK blunted the reduction of desmosome size, ameliorated interdesmosomal widening and prevented blister formation.

Our data demonstrate for the first time that skin blistering can be prevented by inhibition of p38MAPK in human epidermis. Moreover, typical morphologic alterations induced by PV-IgG such as interdesmosomal widening and the reduction of desmosome size at least in part require p38MAPK signalling.

Poster 95:

Titel: Estrogen receptor splicing variants in neuronal cell cultures

Autoren/Adressen: Veronika Gebhart (Klinikum der FSU Jena), Konstantina Kalivianaki (University of Crete), Marilena Kampa (University of Crete); veronika.gebhart@med.uni-jena.de

Abstract:
Rat phaeochromocytoma PC12 cells are known to develop neuronal features upon NGF treatment. In previous studies we showed that these cells are in part estrogen targets. Estrogen effects are mediated through well characterized nuclear receptors and genomic actions. In addition rapid estrogen effects are known to occur, indicating the existence of membrane associated steroid receptors.

This work focuses on the expression of ER□ splicing variations ER□ 36, ER□□46 and ER□□66 in PC 12 cells. With immunocytochemistry and real time PCR we showed that these receptors are in part expressed in PC12 cells.

ER alpha expression levels change upon treatment with estrogens in a dose dependent manner. Immunostaining for these receptors was mostly observed in cytoplasm while nulcei were devoid of specific ER□□immunoreactivity except for ER□□66. Anti-estrogens were only in part capable of blocking these effects

Our findings indicate that expression of estrogen receptors and of their splicing variants may only in part depend on direct genomic steroid actions in this neural cell line.

Poster 96:

Titel: Selenite inhibits reciprocally and dose-dependently the early meniscal inflammatory response

Autoren/Adressen: Klaus Häfelein (Christian-Albrechts-University), Andrea Preuße-Prange (Christian-Albrechts-University), Peter Behrendt (University Hospital Schleswig-Holstein, Kiel), Bodo Kurz (Christian-Albrechts-University); k.haefelein@anat.uni-kiel.de

Abstract:
Meniscal degeneration plays a major part in the development of osteoarthritis (OA). We could lately show, that selenium in a low dose has protective qualities on meniscal tissue. We therefore further investigated the protective qualities of selenium in different partly physiological concentrations in a simulated inflammation in vitro-model to get a better understanding of the dose-dependent relationship.

Meniscal explant disks (3 mm diameter x 1mm thickness) were isolated from 2-year-old cattle. After 3 days of TNFα- (10ng/ml) and sodium-selenite-treatment (low-dose 6,7ng/ml; medium-dose 40ng/ml; high-dose 100ng/ml) glycosaminoglycane (GAG) release (DMMB assay), nitric oxide (NO) production (Griess assay), gene expression of matrix-degrading enzymes (quantitative RT-PCR) and number of cells showing signs of apoptosis (nuclear blebbing) were determined.

TNFα induced a significant release of GAG and NO and increased mRNA expression levels of matrix metalloproteinase (MMP)-3 and a disintegrin and metalloproteinase with thrombospondin motifs (ADAMTS-4) and inducible nitric oxide synthase (iNOS). Low-dose- and medium-dose-selenite significantly decreased the TNF alpha induced GAG release and NO production and showed a tendency to reduce TNF-alpha stimulated iNOS-levels. Low-dose-selenite furthermore decreased significantly apoptosis and showed a tendency to reduce MMP-3 and ADAMTS-4 levels.

Selenium in a sub-physiological concentration shows the highest protective effects on early meniscal tissue degradation. To further determine the molecular mechanisms and the limit of the reciprocal dose-dependent effect future studies are required.

Poster 97:

Titel: Novel approaches in experimental glioma therapy: combining site effects of approved drugs with a local nanostructural delivery technique

Autoren/Adressen: Kirsten Hattermann (University Kiel), Max Lempert (University Kiel), Victor Kaidas (University Kiel), Ralph Lucius (University Kiel), Rainer Adelung (University Kiel), Rolf Mentlein (University Kiel), Janka Held-Feindt (University hospital Schleswig-Holstein, Campus Kiel); k.hattermann@anat.uni-kiel.de

Abstract:
Current therapy of highly malignant gliomas involves neurosurgery followed by radiation and temozolomide treatment. Temozolomide is an alkylating drug that induces apoptosis in glioma cells, and prolongs patients' survival. However, due to resistance mechanisms (e.g. DNA repair) glioma cells may escape from apoptosis and cause rapid relapses. Therefore, alternative cell death-inducing drugs as well as novel local application systems are desirable. Here, we investigate a group of lysosomotrope drugs (functional inhibitors of the acidic sphingomyelinase, FIASMA) as potential cytotoxic drugs and nanostructured biomaterials for local implantation.

Glioma cells were exposed to different concentrations of the approved tricyclic antidepressant Clomipramine and the antiprotozoicum Quinacrine in comparison and combination with Temozolomide and monitored by different biochemical and histological methods.

We could show that FIASMA drugs effectively reduced cell numbers and complement Temozolomide effects. We could also show that FIASMA drugs can mediate cell death both via apoptotic and autophagocytic pathways. To develop an alternative we set up ZnO template-based polylactide reservoirs that can be loaded with cytotoxic drugs and positioned in the tumor resection cavity, and first approaches show promising release kinetics.

Conclusion and Perspectives: The FIASMA drugs Clomipramine and Quinacrine show cytotoxic effects when administered to glioma cells and add to the effects of the standard drug Temozolomide. Being approved drugs they could be potentially administered in combination with Temozolomide and mediate additive tumor destroying activity with comparably low side effects. Prospectively we want to use nanostructured reservoirs as implants for local administration of cytotoxic drugs.

Poster 98:

Titel: Bmal1-deficiency decelerates wound healing and accelerated senescence of fibroblast

Autoren/Adressen: Marc Ingenwerth (Medical Faculty of the Heinrich-Heine University), Anna Stahr (Medical Faculty of the Heinrich-Heine University), Nicole Klossowski (Medical Faculty of the Heinrich-Heine University), Julia Reifenberger (Medical Faculty of the Heinrich-Heine University), Charlotte von Gall (Medical Faculty of the Heinrich-Heine University); Marc.Ingenwerth@med.uni-duesseldorf.de

Abstract:
Impaired wound healing in the elderly presents a major clinical and economic problem. The clock protein Bmal1 has been shown to regulate cellular senescence. However, little is known about the role of Bmal1 in wound healing. Therefore, we analyzed would healing after surgical suture in Bmal1-deficient mice.

The scar tissue was processed for histology using Standard Goldners trichrome staining. In addition, in primary fibroblast cultures proliferation, senescence and migration were analyzed with BrdU assay, PMP70 immunocytochemistry and scratch test, respectively.

We observed a decelerated suture resorption in Bmal1-deficient mice. Moreover, fibroblast cultures of Bmal1-deficient mice showed a lower number of proliferating cells as well as a higher number of senescence cells as compared to fibroblast cultures from wildtype littermates. Moreover, fibroblasts of Bmal1-deficient mice showed a higher migration velocity.

In conclusion, Bmal1-deficiency affects wound healing presumably as a consequence of increased fibroblast senescence.

Poster 99:

Titel: Caveolin-1 and caveolin-3: structural and functional insights into their role in murine airway smooth muscle constriction

Autoren/Adressen: Maryam Keshavarz (Institute of Anatomy and Cell Biology, UGMLC, German Center for Lung Research, Giessen, Germany), Melanie Skill (Institute of Anatomy and Cell Biology, UGMLC, German Center for Lung Research, Giessen, Germany), Uwe Pfeil (Institute of Anatomy and Cell Biology, UGMLC, German Center for Lung Research, Giessen, Germany,), Magdalena Walecki (Institute of Anatomy and Cell Biology, UGMLC, German Center for Lung Research, Giessen, Germany,), Wolfgang Kummer (Institute of Anatomy and Cell Biology, UGMLC, German Center for Lung Research, Giessen, Germany,), Gabriela Krasteva-christ (UGMLC, German Center for Lung Research, Giessen, Germany, Julius Maximilian University, Würzburg, Germany); maryam.keshavarz@med.uni-giessen.de

Abstract:
Serotonin and acetylcholine are bronchoconstrictors clinically relevant for airway diseases associated with airway hyperreactivity. Caveolins (cav-1, -2 and -3), which are binding partners for receptors and enzymes, are structural components of caveolae. The process of cav assembling into caveolae requires cytoplasmic adapter proteins (cavin-1 to -4).

Here, we addressed the role of cav-1, cav-3, cavin-1 and -4 in airway smooth muscle (SM) constriction utilizing immunofluorescence, RT-PCR, electron microscopy, western blotting, co-immunoprecipitation and functional analysis (organ bath and videomicroscopy) in cav-1 and cav-3 deficient (KO) and wild-type mice.

In mouse airways, cavin-1 and -4 interact with cav-1 and cav-3, respectively. Cav-1 expression was decreased in tracheal SM in cav-3-KO mice. Caveolar numbers were diminished in cav-1-KO but not in cav-3-KO tracheal SM. Muscarine-induced tracheal constriction was not altered in either KO-strain but was increased in intrapulmonary bronchi of cav-3-KO mice. However, serotonin-induced constriction was lost in the trachea of both KO-strains. Protein and mRNA for cavin-1, -4 and cav-1 and -3 were also detected in human intrapulmonary bronchi and primary SM cells.

In conclusion, cav-1 and cav-3 are essential for serotonin-induced tracheal SM constriction pointing to an involvement of different serotonin receptors in the trachea and bronchi that differ in their coupling to caveolae. Cav-3 was previously found to interact with muscarinic receptor type-2 (m2AChR) in bronchial SM cells. Thus, depletion of cav-3 might cause a disturbance of m2AChR coupling to caveolae resulting in increased muscarine-induced bronchoconstriction.
Funding: DFG (SFB-TR84)

Poster 100:

Titel: Circadian and diurnal changes in the morphology and cytoskeleton of human leukocytes

Autoren/Adressen: Julian Lang (Johann Wolfgang Goethe-Universität), Helmut Wicht (Johann Wolfgang Goethe-Universität), Martina Pfeffer (Johann Wolfgang Goethe-Universität), Horst Werner Korf (Johann Wolfgang Goethe-Universität); julilang@stud.uni-frankfurt.de

Abstract:
Shifted phases and declining amplitudes of circadian rhythms play a major role in many diseases; thus, it would be desirable to have an easily accessible marker for the phase and amplitude of such rhythms. We searched for such markers in peripheral blood, which can easily be obtained in routine examinations.

Blood was collected from healthy volunteer donors at 3 different times of day and blood smears were prepared directly. Other blood samples were taken into culture and analyzed at 4-hour intervals. Polymerized actin was stained using phalloidin; leukocytes were identified immunohistochemically using different CD markers. Data were obtained by inspecting blood smears using fluorescence microscopy and by employing fluorescence activated cell sorting (FACS).

We did indeed observe a diurnal and circadian rhythm in the appearance of the leukocytes, they possessed significantly fewer filopodia at midnight than at midday and this 24-hour rhythm was maintained in cell cultures. In the FACS analysis, we did observe a pronounced circadian fluctuation in the intensity of the phalloidin stain. These rhythms could be observed in most leukocytes; of these, the B-lymphocytes (CD 23-positive cells) showed the most pronounced amplitudes.

Our findings may offer an opportunity to determine the phase and amplitude of circadian rhythms in the immune system in clinical routine examinations.

Poster 101:

Titel: Modeling muscular dystrophies with patient - derived induced pluripotent stem cells

Autoren/Adressen: Lampros Mavrommatis (Ruhr-University Bochum), Ajeesh Balakrishnan-Renuka (Ruhr-University Bochum), Matthias Vorgerd (Universitätsklinikum Bergmannsheil), Beate Brand-Saberi (Ruhr-University Bochum), Holm Zaehres (Ruhr-University Bochum); holm.zaehres@rub.de

Abstract:
uscular dystrophies (MD) comprise more than 30 genetically inherited distinct disorders affecting millions of individuals worldwide. MD are characterized by progressive muscle wasting and weakness of variable distribution and severity. One predominant treatment for MDs throughout the years was considered to be the modulation of adult skeletal muscle stem cell populations. Since these ‚satellite cells' are still not expandable from human patients in sufficient amounts, muscle cells differentiated from induced pluripotent stem cells (iPSC) can be considered as an emerging alternative.

We are generating human iPSC from one patient with a congenital myopathy of unknown origin (MD1) (Weise, Brand-Saberi et al., 2006) and two patients with Limb-girdle muscular dystrophy (LGMD2A) (Güttsches, Brand-Saberi, Vorgerd et al., 2015) using ectopic expression of the reprogramming factors Oct4, Sox2, Klf4 and cMyc. The latter patients have known mutations in the muscle-specific Calpain-3 gene (15q15.1-21.1). We are applying multi-step myogenic differentiation protocols to induce skeletal precursors and muscle cells from these MD patient-derived iPSC.

MD1 and LGMD2A fibroblasts could be successfully reprogrammed to iPSC. In comparison to iPSC from healthy control patients the MD1 iPSC fail to differentiate into cells with muscle morphology. We are using immunohistochemistry, gene expression profiling as well as ultrastructural analysis to evaluate muscle cell differentiation deficiencies in these MD iPSC in vitro models.

Our studies explore induced, pluripotent stem cell technology to understand human skeletal muscle development as well as the pathogenesis of congenital muscular dystrophies.

Poster 102:

Titel: The changing role of dmp1 during tongue development of mouse embryo

Autoren/Adressen: Hidetaka Murata (Jichi Medical University Hospital), Masataka Sunohara (The Nippon Dental University), Iwao Sato (The Nippon Dental University); ma-suno@tky.ndu.ac.jp

Abstract:
Dentin matrix protein 1 (DMP-1) belongs to the Small Integrin-Binding Ligand N-linked Glycoprotein (SIBLING) family and is plays an important role in the mineralization of hard tissues. However, it has many other functions in addition to the regulation of mineralized tissues. The purpose of this study was to examine expression patterns and changing role of DMP-1 during tongue development of mouse embryo.

During embryonic days 12.5 (E12.5), E14.5, E17.5, and E18.5, we analyzed the expression and the localizations of DMP-1 by in situ hybridization and immunohistochemical stain in the developing mouse tongue. And also we detected the mRNA of tongue morphogenesis markers such as FGF6, TGF-β1, Collagen I, osteocalcin, chondromodulin 1, tenomodulin, Vascular endothelial growth factor (VEGF), caspase-3 and Aifm from embryonic stages by real-time RT-PCR.

At E12.5, the antisense probe for DMP-1 was detected in a few mesenchymal cells surrounding blood vessels and faint localization was seen at E18.5 in the embryonic mouse tongue by in situ hybridization. On the other hand, the DMP-1 and osteocalcin abundance levels gradually increased compared with the other tongue markers from E12.5 to E18.5 ($p < 0.001$).

During mouse tongue development and morphogenesis, our data suggested that DMP-1 affects osteocalcin and Caspase-3. And then, DMP-1 also has some effect on the angiogenic marker VEGF in specific stages and areas, terminating the differentiation of the tongue from other developing tissues. These findings suggest that DMP-1 may be involved in regulating the temporal expression and has the changing functions at embryonic stages in the mouse tongue.

Poster 103:

Titel: Mechanical injury activates macroautophagy and chaperone-mediated autophagy in bovine cartilage time sequentially.

Autoren/Adressen: Andrea Preuße-Prange (Christian-Albrechts-Universität zu Kiel), Klaus Haefelein (Christian-Albrechts-Universität zu Kiel), Peter Behrendt (University Hospital Schleswig-Holstein, Campus Kiel), Alan Grodzinsky (Massachusetts Institute of Technology), Bodo Kurz (Christian-Albrechts-Universität zu Kiel); a.preusse@anat.uni-kiel.de

Abstract:
Mechanical injury induces damage in cartilage and triggers a remodeling process that ultimately can manifest as post-traumatic osteoarthritis (PTOA). The exact role of autophagy in development of PTOA is not yet clear.
Therefore, we investigated whether there is a time-dependent activation of different autophagy forms (macroautophagy (MA) and chaperone-mediated autophagy (CMA)), which could play an important role with regard to application of autophagy-stimulating agents in PTOA treatment.

Cartilage explants from femoro-patellar grooves of 2-year-old cattle were randomly divided into groups, and incubated in standard culture medium. After 24 hours half of the explants were subjected to a single load compression (50% strain, velocity 2 mm/s) using a computer controlled compression device. Subsequently explants were removed at different time intervals (20 minutes to 4 days), embedded for histological analysis or frozen for mRNA isolation. Gene expressions of MA markers (LC3-b and ULK-1) and CMA markers (HSPA8 and HSPA1a) were examined.
Measurement of glycosaminoglycane release (DMMB-assay) and the amount of apoptotic cells (nuclear blebbing and TUNEL) were used to verify that mechanical injury leads to tissue damage.

Our study shows that activation of CMA starts already 20 minutes after a single compression and persists even after four days, while the expression of MA increases significantly after 60 minutes and decreases after 120 minutes.

Based on these results further investigations are carried out, which should clarify whether selective stimulation of on or the other autophagy form needs to be time-dependent in order to decelerate or inhibit the remodeling processes that occur in PTOA.

Poster 104:

Titel: Subsets of telocytes not being telocytes (i): myocardial telocytes

Autoren/Adressen: Mugurel Rusu ("Carol Davila" University of Medicine and Pharmacy of Bucharest), Sorin Hostiuc ("Carol Davila" University of Medicine and Pharmacy of Bucharest), Alexandra Vrapciu ("Carol Davila" University of Medicine and Pharmacy of Bucharest), Sorin Manoiu (The National Institute of Research and Development for Biological Sciences), Florentina Grigoriu ("Carol Davila" University of Medicine and Pharmacy of Bucharest); anatomon@gmail.com

Abstract:
Background. Telocytes (TCs) are defined morphologically as small-sized cells with long, thin, moniliform processes coined telopodes (Tps). Numerous papers indicate TCs as a distinctive cell type. Their size recommends transmission electron microscopy (TEM) as the most precise tool for their identification. Most existing studies on TCs indicate several reliable markers likeCD34, vimentin, PDGFR or c-kit, for their identification. Even if potentially useful, they are not specific.
Aim. We aimed to reproduce previous studies on myocardial TCs to check their validity.

Material and methods. We performed a TEM study on cardiac samples from six adult Wistar rats. Sample sections obtained from human autopsy material (10 cases) were stained with CD10, CD34, Ki67, and c-kit.

Results and discussions. In the interstitia between cardiomyocyte bundles we usually found endothelial tubes. Endothelial cells (ECs) that build up these tubes looked, both on immunohistochemical and ultrastructure samples, similar to TCs, and identical to cells indicated as TCs in previous studies on this topic. Moreover, TCs-like stromal cells and telopodes-like processes were configuring neo-vessels, therefore being endothelial tip cells and their filopodial prolongations. Immunohistochemically we found that myocardial TCs-like cells express CD10 and CD34, and have a heterogeneous expression of Ki67 and c-kit. This phenotype is characteristic for endothelial walls or sprouts.

Conclusions. Our study shows that data presented in previous studies on myocardial telocytes are not enough to allow the reproducibility of the results. At least a subset of structures considered as TCs might actually belong to the endothelial lineage.

Poster 105:

Titel: Immunohistochemical study of antimicrobial and cytoskeletal proteins in infantile labial salivary glands

Autoren/Adressen: Mechthild Stoeckelhuber (Technical University of Munich), Denys J. Loeffelbein (Technical University of Munich), Bernhard Olzowy (LMU Munich), Christoph Schmitz (LMU Munich), Steffen Koerdt (Technical University of Munich), Marco R. Kesting (Technical University of Munich); mechthild.stoeckelhuber@tum.de

Abstract:
The labial salivary glands of the lip belong to the minor salivary glands and secrete mucous and serous fluids for the maintainance of the oral health. The acquired and the innate immune system protect the oral cavity from infection. The cytoskeleton plays an important role in acinar cell protein secretion.

The localization and distribution of proteins of the innate immune system were studied in serous acinar cells and the ductual system by immunohistochemistry.

Numerous antimicrobial proteins could be observed in the labial glands: ß-defensin-1, -2, -3, lysozyme, lactoferrin, and cathelicidin. Cytoskeletal components like actin, myosin II, cytokeratin 7 and 19, alpha- and beta-tubulin were predominantly detected in apical cell regions and may be involved in exocytotic processes.

The human labial glands contribute to the innate immunity of the oral cavity by the production of antimicrobial proteins. Cytoskeletal proteins in the apical and lateral region of acinar and ductal cells might point to their involvement in exocytosis and stabilization.

Poster 106:

Titel: Crucial regulators of angiogenesis during tooth germ development

Autoren/Adressen: Masataka Sunohara (The Nippon Dental University), Shigeru Morikawa (National Institute of Infectious Diseases), Iwao Sato (The Nippon Dental University); ma-suno@tky.ndu.ac.jp

Abstract:
During embryonic development, vasculogenesis and angiogenesis are crucial process involved in organ development. But the mechanisms of formation of blood vessels in tooth germ remains poorly understood. The purpose of this study was to investigate the regulators of angiogenesis involved in initial formation of blood vessels during tooth development.

We performed in situ hybridization analysis using the probes of the angiogenesis-related molecules and then stained serial sections of mouse embryos immunohistochemically with the antibody against them.

On in situ hybridization and immunohistochemistry, localizations of the angiogenesis-related molecules were observed in enamel organ, dental papilla and peripheral dental mesenchyme. And also the stage-specific expression patterns of them were observed around the blood vessels at embryonic stages in the mouse tooth germ.

In this investigation, we confirmed the regulators of angiogenesis may have involved in initial formation of blood vessels during tooth germ development.
*This work was supported by JSPS KAKENHI Grant Numbers 22592052, 26462800.

Poster 107:

Titel: Morpho-mechanistical steps of endothelial cell adherens juntion formation

Autoren/Adressen: Julian Volland (Julius-Maximilans-University Würzburg), Süleyman Ergün (Julius-Maximilans-University Würzburg), Nicole Wagner (Julius-Maximilans-University Würzburg); nicole.wagner@uni-wuerzburg.de

Abstract:
Physiological vascular permeability contributes to normal angiogenesis and immune responses while abnormal increase in vascular permeability is often associated with many pathological conditions such as inflammation, atherosclerosis and tumor-induced angiogenesis. The paracellular pathway mostly relies on the coordinated modulation of endothelial cell-cell junctions composed of tight and adherens junctions. It is well known that adherens junctions, the cadherin-catenin complexes at their core and the associated actin cytoskeleton, play an important role in cell-cell adhesion and the maintenance of endothelial integrity. However, the mechanistical steps by which endothelial cells establish adherens junctions are not understood in detail. We therefore analysed the dynamics of cell-cell formation and corresponding adhesion complexes in cultured Myocardial Endothelial (MyEnd) cells.

(Confocal and immunelectron microscopy)

Using confocal and immunelectron microscopy, we determined detailed spatial and temporal expression of VE-Cadherin and beta-catenin at different stages of cell-cell junction formation in wildtype and Ceacam1 knockout MyEnd cells.

We show that the cell adhesion molecule Ceacam1, which has been thought to be exclusively expressed at the apical surface of endothelial cells, is localized at basolateral membrane sites during initial cell contact formation and remained there until endothlial adherens juntions achieve a mature state by well-orginized VE-cadherin-betacatenin complexes which implies that Ceacam1 might be involved in the procedure by which endothelial cells initiate and establish contact sites, probably via homophilic interaction.

Poster 108:

Titel: Atoh8 in muscle regeneration and reprogramming

Autoren/Adressen: Satya Srirama Karthik Divvela (Ruhr University Bochum), Ajeesh Balakrishnan-Renuka (Ruhr University Bochum), Marion Boeing (Ruhr University Bochum), Anthony Otto (School of Biological Sciences), Ketan Patel (School of Biological Sciences), Markus Napirei (Ruhr University Bochum), Holm Zaehres (Ruhr University Bochum), Beate Brand-Saberi (Ruhr University Bochum); satya.divvela@rub.de

Abstract:
Atoh8 belongs to the atonal basic helix loop helix transcription factor family. Previous studies on Atoh8 have proved its significance in many developmental events. We have previously reported its regulatory role in skeletal myogenesis and recently its expression in the inner cell mass of the blastocyst. However, the role of Atoh8 in such early developmental stages and skeletal myogenesis remains to be resolved. In this study, we plan to decipher the potential role of ATOH8 in the context of pluripotency and skeletal myogenesis.

As an initial step, we decided to study the role of Atoh8 in cellular reprogramming and primary myoblast differentiation by comparing wildtype and Atoh8 knockouts.

The Atoh8 knockout fibroblasts cultured on feeders completely failed to reprogram, whereas the Atoh8 knockout fibroblasts cultured in feeder-free condition (Matrigel) were able to give rise to iPSCs, but with very low efficiency. Corresponding to the above results, qRT-PCR performed at different time points during the reprogramming process revealed significant alterations in mRNA levels of MET and pluripotency markers in Atoh8 knockouts. While in case of skeletal myogenesis, the knockout of ATOH8 results in the reduction of skeletal muscle fiber thickness and the weight and size of the mice in general. ATOH8 knockout primary myoblasts tend to differentiate prematurely.

Altogether, our data point towards a crucial role of Atoh8 in reprogramming and in self-renewal of iPSCs. In myogenesis, we assume that the homeostasis between myoblast proliferation and differentiation is impaired in case of Atoh8 knockouts.

Poster 109:

Titel: Transformation of the pre-streak embryocyst and the goosecoid expression in the pig

Autoren/Adressen: Braah Harmoush (University Medical Centre Göttingen), Peter Schwartz (University Medical Centre Göttingen), Christoph Viebahn (University Medical Centre Göttingen); braah.harmoush@stud.uni-goettingen.de

Abstract:
The chain of events leading up to establishing the blueprint of the body plan in the mammalian blastocyst prior to gastrulation has been under intense scrutiny for some years now, however the rapid and complex developmental changes occurring immediately after hatching from zona pellucida are less well investigated. In this study we defined the post-hatching pre-gastrulation stage1 in the pig embryo, a species with a delayed early development and an archetypical mammalian embryonic disc, which undergoes dramatic morphological changes from a spherical to a flat disc. During the transient embryocyst formation by the epiblast cells, the polar trophoblast is lost rapidly and the hypoblast appears to carry the blueprint of the body plan which is defined amongst others by the expression of the transcription factor goosecoid.

Analysis of 8 to 9 day-old naturally fertilised pig embryos by light and electron microscopy and in situ hybridization shows hypoblast cells to have spread on the ventral surface of the epiblast without intervening basement membrane but with a marked and early anterior-posterior differentiation into cuboidal versus squamous cells.

The expression of goosecoid corresponds to the anterior pre-gastrulation differentiation and confines to the anterior half of embryonic disc and extraembryonic region extending wider than other mammals, while there was low correlation between the discontinuity of polar trophoblast and epiblast cavity formation which leads to the unfolding of the embryocyst.

Therefore, a functional connection between molecular and morphological characteristics specific to the pig may be a necessary condition for initial axis formation in the epiblast.

Poster 110:

Titel: Topography of germ line related bmp signaling pathway members in the rabbit blastocyst

Autoren/Adressen: Kristina Hartung (University of Wuerzburg), Christoph Viebahn (University Medical Center, Georg-August-Universität, Göttingen), Bernd Püschel (University Medical Center, Georg-August-Universität, Göttingen); bpuesch@gwdg.de

Abstract:
Bone morphogenetic proteins (BMPs) are signaling molecules of the transforming growth factor β (TGFβ) family. They are involved in many different developmental processes and play crucial roles in the early embryonic development during mesoderm and germ cell formation. Potential target cells and tissues are affected by BMP binding to serine/threonine kinase receptors which use Smad molecules to transduce the signal to the intracellular effectors. Knockout studies of BMPs (e.g. BMP4), their receptors (e.g. Acvr1/ALK2) and transducers (e.g. Smad5) in mouse revealed in some cases similar defects in primordial germ cell specification suggesting an exclusive function of certain BMP receptors in signal transduction. To see whether the expression of selected BMP receptors found in mouse is conserved we analyzed the rabbit embryo as an example of another mammalian species.

Part of the cDNA of the receptors Acvr1, Bmpr1a, Bmpr1b, and the transducer Smad5 was cloned from rabbit embryos and used to generate a riboprobe for in situ hybridization. For the examination of mRNA expression of these genes we analyzed the pre-primitive streak stages 1 and 2 and the primitive streak stage 3.

While the expression of Acvr1, Bmpr1a and Smad5 were detectable in various intensities allover in the embryonic disc of all stages analyzed, expression of Bmpr1b seemed to be initiated in the embryonic disc at stage 3 and was not detectable at stage 1 and 2.

In summary it can be stated that the expression patterns found in the rabbit embryo are comparable to those found in the mouse.

Poster 111:

Titel: Early behavior of primordial germ cells (pgcs) in mammals: embryonic/extraembryonic displacement and clustering
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Autoren/Adressen: Waad Hassan (Universität Göttingen), Christoph Viebahn (Universität Göttingen); christoph.viebahn@medizin.uni-goettingen.de

Abstract:
The earliest PGCs defined in human scatter in the yolk sac endoderm, integrate later in the gut endoderm and migrate, as in other mammals, to the genital ridge wherefrom the gonads develop. Earlier PGC developmental stages, i.e. before the endodermal integration, lack in human. However, they are well studied in the mouse showing PGC-clustering in the allantois. Also in the pig embryo a PGC-cluster is found but at pre-allantoic stages.

Due to the preliminary data about PGC-cluster in the pig, the lack of information in the human, and the diversity amongst mammals we used semi-thin sections and plastic sections of Oct4-hybridized embryos to analyze early PGC-cluster in mammals other than mouse.

The pig embryo at pre-allantoic stages shows PGC-cluster in the posterior mesoderm. The cluster protrudes into the exocoelom covered with a flat mesothelium. Morphologically these PGCs are indistinguishable from their neighbors contrary to those at later stages when they scatter mostly in the yolk sac and, few, in the allantois. Only one of our eight hybridized older embryos showed a cluster on the allantois-yolk sac border. The rabbit PGCs scatter early in the yolk sac, gut endoderm and, few, in the amnion, whereas none are seen in the allantois.

In conclusion, the tendency of the mammalian PGCs to cluster or to locate extraembryonically shows diversity reflecting variable interactions between PGCs and the embryonic/extraembryonic tissues possibly important for early PGC development. This makes it challenging to rely on one mammalian species as the model organism for the human.

Poster 112:

Titel: Expression patterns of pkd1 and pkd2 in early amniote development.

Autoren/Adressen: Stanislav Kremnyov (Lomonosov Moscow State University), Christoph Viebahn (Center of Anatomy, University of Goettingen), Nikoloz Tsikolia (Center of Anatomy, University of Goettingen); s.kremnyov@gmail.com

Abstract:
Polycystin-1 (PKD1) is a membrane receptor protein, which can act as a mechanosensor. Polycystin-2 (PKD2) is nonselective calcium channel protein from transient receptor potential channels family. PKD1 and 2 can function as heterodimers as well as individually and were shown to regulate cell migration and polarity during kidney morphogenesis, but their role in early embryonic development is still obscure.

To find signs of involvement of PKD1 and PKD 2 and therefore regulated mechanosensing during morphogenesis of amniote gastrulation we analyzed expression patterns of these genes by in situ hybridization.

PKD1 is evenly expressed at stage 4 chick embryo whereas at stages 4+ and 5 the expression increases solely in the primitive streak. Transversal sections display high PKD1 expression in migrating cells but a weak signal in the epiblast. At stage 6, PKD1 is expressed in migrating mesoderm cells lateral to the primitive streak only. PKD2 at stages 4-6 is expressed throughout the epiblast with intensive expression in the area of presumptive neural plate whereas migrating mesoderm cells are PKD2 negative. During rabbit gastrulation PKD1 displays predominantly intraembryonic, evenly distributed expression whereas PKD 2 shows strong expression in the posterior node. At stage 6, PKD2 is also expressed in the embryonic disc margin and in the neural plate.

Expression data suggest independent roles of PKD 1 and 2 in the chick embryo and involvement of PKD1 and mechanosensing in migration of mesoderm. Expression of PKD2 in both analyzed species indicates a possible role during early amniote neural development.

Poster 113:

Titel: The lymphatics of the mouse head

Autoren/Adressen: Melanie Lohrberg (University Medicine Goettingen), Prof. Dr. Jörg Wilting (University Medicine Goettingen); Melanie.lohrberg@med.uni-goettingen.de

Abstract:
Histological studies of the lymphatic vascular system in adult mice are hampered by the fact that bones cannot be sectioned properly. Here we performed decalcification of 14-day-old mice heads followed by paraffin embedding and staining of serial sections with a lymphendothelial-specific Lyve-1 antibody to reach a more precise description of lymphatic drainage in the mouse head.

We prepared paraffin sections of decalcified mouse heads and performed an immunohistochemical staining with an anti-Lyve1 antibody. To confirm findings in the meninges and the brain, we performed immunofluorescence staining of cryo-embedded mouse brains.

We could show that the inferior nasal meatus contains numerous lymphatics and is connected to the nasolacrimal duct (NLD) which is ensheathed by a dense network of lymphatics. Thereby the lymphatics of the eye lids and conjunctiva are connected to those of the inferior nasal meatus. Tongue, palatine and buccal mucous membranes possess numerous lymphatics, while the dental pulp has none. Lymphatics are also present in the dura mater and might even enter the brain along blood vessels that penetrate the cortex. The outer auditory canal contains a dense lymphatic network which is continued into the peripheral parts of the tympanic membrane and the tympanic cavity.

Due to our findings, we suggest that cerebro-spinal fluid (CSF) can be drained via the optic nerve and the NLD, whereas CSF which is drained via the Fila olfactoria into the nasal mucous membrane is used for the humidification of respiratory air.

Poster 114:

Titel: Wnt signaling in lymphangiogenesis

Autoren/Adressen: Grit Lutze (University Medical Center Göttingen), Kerstin Buttler (University Medical Center Göttingen), Jörg Wilting (University Medical Center Göttingen); grit.lutze@med.uni-goettingen.de

Abstract:
WNTs are a group of secreted proteins that play important roles in all phases of embryonic development. They control cell fate decisions, proliferation and migration, including convergent extension movements and planar cell polarity. Their role in lymphangiogenesis has rarely been studied. We have shown that Wnt5a-null mice possess cyst-like lymphatics in the dermis. The underlying mechanisms are unknown.

We used Wnt5a-null-mouse (KO) embryos and ex vivo lymphangiogenesis assays using cultured skin of the embryos (with Wnt-activators and inhibitors). We also studied human lymphatic endothelial cells (LECs) with immunological methods and in vitro lymphangiogenesis assays. With qPCR we analyzed the expression of WNT5A and related signal pathway components.

We observed major defects of the dermal lymphatics (large, isolated, dilated and blood-filled vessels, disorganized lymphatic networks) in the skin of KO-embryos. Treatment of dermis of KO-mice with recombinant Wnt5a protein led to a normalization of the morphology of the lymphatic networks, whereas treatment of normal dermis with the porcupine-inhibitor LGK974 (which inhibits Wnt secretion) induced dilation of lymphatics. In vitro, LGK974 also prevented sprouting of LECs very efficiently, and showed significant blocking of LEC migration. After inhibition of WNT secretion in LECs, we observed altered expression of WNT5A and other WNT-signaling pathway components, and lymphangiogenesis-related genes.

Our data show that lymphangiogenesis defects in Wnt5a-KO-mice are due to morphogenetic defects rather than proliferation defects. Wnts control the behavior of LECs, and have important functions for lymphatic network formation.

Poster 115:

Titel: High resolution episcopic microscopy (hrem) – an efficient method for analysing chick embryos

Autoren/Adressen: Barbara Maurer-Gesek (Medical University of Vienna), Stefan H Geyer (Medical University of Vienna), Wolfgang J Weninger (Medical University of Vienna); barbara.maurer-gesek@meduniwien.ac.at

Abstract:
This presentation aims at evaluating and demonstrating the possibilities high-resolution episcopic microscopy (HREM) offers for performing descriptive and metric analysis of chick embryo anatomy. It focuses on the developing heart and the pharyngeal arch artery system.

A total of 160 chick embryos of developmental stages 16 to 35 according to Hamburger Hamilton (HH) were examined. Standard protocols as well as experimental protocols were used for embryo preparation and for producing HREM data, which essentially represent series of digital images, captured from freshly cut surfaces of resin blocks during their sectioning on a microtome. The data were visualized and analysed on high-end hardware operating the software Amira®.

HREM data with voxel sizes of 1.5 x 1.5 x 1.5 µm3 to 9 x 9 x 9 µm3 could be created reproducibly without loss of specimens and with an image-capturing rate of approximately 400 images per hour. Surface rendered computer models could be generated and allowed highly effective volumetric analysis. Simple virtual reslicing of 3D volume or surface rendered models and through the raw HREM data permitted measuring distances. Lumen diameters could be measured by rotating the 3D models so that the virtual planes cut precisely perpendicular to the longitudinal axis of the vessel segments to measure, thereby provide exact measurements of lumen diameters. Examples and measuring protocols are presented.

HREM is an excellent tool for descriptive and metric analysis of chick embryo morphology and tissue architecture.

Poster 116:

Titel: Electroporations with dual types of pulses are more efficient than those with single type of pulses

Autoren/Adressen: Qin Pu, Tannaz Norizadeh Abbariki, Takayuki Suzuki, Ruijin Huang
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Division of Biological Science, Graduate School of Science, Nagoya University, Nagoya, Japan; ruijin.huang@uni-bonn.de;

Abstract:
Electroporation in chick embryos is a powerful tool for introducing gene constructs into developing tissues. The conventional electroporation technique usually uses a single pulse type. BEX CO.,LTD. have developed a new electroporator, CUY21EDITII, which generates two types of pulses: poration and driving pulses. For use, a poration pulse is firstly applied followed by several driving pulses. The poration pulse is characterized by a high and short current and is designed to permeablise the cell membrane, while the driving pulses (with a low current) is thought to force constructs into the cell. To compare the efficiency of traditional versus the new dual pulse protocols, we carried out electroporations of eGFP constructs in chick embryos. Our results show that electroporations with dual types of pulses is more efficient than those with single type of pulses.

Poster 117:

Titel: Gross-morphological aspects of the adult zebrafish heart: bilateral asymmetry

Autoren/Adressen: Kaja Schäfer (UMG, Georg-August-University Göttingen), Jörg Männer (UMG, Georg-August-University Göttingen); jmaenne@gwdg.de

Abstract:
Specification of the left-right body axis plays an important role in development of vertebrate hearts. The heart is the first organ to acquire a bilateral asymmetric shape during embryonic development and heart asymmetry is a prerequisite for correct function of the circulation of lung-breathing vertebrates. Asymmmetric morphogenesis of the embryonic vertebrate heart is a phylogenetically highly conserved process. Therefore, the zebrafish has become a well-established model organism to study cardiac ontogenesis. Recent data show that the atrium and ventricle of the developing zebrafish heart become repositioned to the body midline at early larval stages (5dpf.). Furthermore, it is frequently stated in the lliterature that adult teleost hearts are bilaterally symmetric structures. This suggests that, in contrast to other vertebrates, cardiac asymmetry may be a transitory phenomenon in teleosts.

Gross anatomy of adult zebrafish hearts (1-year-old) was studied on 45 specimens by microdissection and SEM.

The ventricle of adult zebrafish hearts has the shape of a three-sided (dorsal, right-ventral, left-ventral) pyramid. Its base is connected to the bulbus arteriosus, which lies in the body midline. Its apex points to the ventral midline at the caudal end of the pericardial cavity. The right-ventral surface of the ventricle contacts the right pericardial wall. On the left side, the left atrial appendage is interposed between the pericardial wall and the left-ventral surface of the ventricle. The atrium lies dorsal and to the left of the ventricle.

The adult zebrafish heart is a bilaterally asymmetric structure. Its anatomy reflects the asymmetry of the embryonic heart.

Poster 118:

Titel: Cadherin expression during odontogenesis of the mouse

Autoren/Adressen: Gudrun Stoya (Jena University Hospital), Jonas Wagenknecht (Jena University Hospital), Nicole Hertel (Jena University Hospital); Nicole.Hertel@med.uni-jena.de

Abstract:
Cadherins are a glycoprotein family of calcium-dependent cell adhesion molecules that provide an adhesive code for the development and maintenance of functional structures during embryogenesis, organogenesis and tumorgenesis. They are involved in the formation of cell-cell-contacts, cell differentiation, cell aggregation, cell polarization and in signaling pathways. These processes are essential for tooth development.

To understand the role of cadherins during odontogenesis, we studied the expression of seven classic cadherins and delta-protocadherins during the different stages of odontogenesis in embryonic (E12,5; E14,5; E16,5) and postnatal (P0; P7) wild-type mice by in situ hybridization.

All cadherins investigated indicate a differential, locally restricted expression pattern in every stage of tooth development in wild-type mice. Every cadherin is specific for particular structures at certain stages and every region shows expression for several cadherins. The combinatory expression of (proto-)cadherins allows the distinction of multiple molecular subdivisions within the teeth that go beyond the strict morphological divisions, and provides a code for understanding its functional organization.

Due to the analysis of the specific expression patterns, we discuss possible functions of the different cadherins during odontogenesis:
1) Cadherins potentially are involved in the asymmetric morphology and topography of a tooth.
2) Cadherins possibly play a role in the regulation of reciprocal epithelial-mesenchymal pathways during odontogenesis.
3) Cadherins mediate cell adhesion and cell polarity. Thus, cadherins maybe have a function in the regulation of the differentiation of ameloblasts.

Poster 119:

Titel: Left-sided nodal expression in parachordal cells near the neurenteric canal of a pre-somite stage new world monkey callithrix jacchus supports symmetry breaking to be independent of ciliary flow in amniotes

Autoren/Adressen: Christoph Viebahn (University Medical Center Göttingen), Rüdiger Behr (German Primate Center); christoph.viebahn@medizin.uni-goettingen.de

Abstract:
Molecular left-right patterning of the mammalian body plan known so far appears to follow principally different schedules: In mouse and rabbit asymmetrical, left-sided expression of the gene coding for the signaling molecule nodal starts in the lateral plate mesoderm at early somite stages while in pig and cattle asymmetrical nodal expression is seen in so-called parachordal cells prior to somite formation, already. Mechanisms breaking initial apparent symmetry of the body plan may, therefore, differ in these two mammalian groups as is, indeed, suggested by the ciliary flow hypothesis convincingly formulated for mouse and rabbit but precluded to be universal amongst mammals (or amniotes, for that matter) because the apical, facultatively cilia-bearing surface of the notochordal process in pig and cattle is tightly covered by subchordal mesoderm prior to somite formation making ciliary flow impossible at the time putatively required for establishing left-sided nodal expression.

The neurenteric canal at the base of the early notochord of reptiles was recently found to be a possibly atavistic characteristic of primate embryos at the time of LR symmetry breaking and now opens the possibility that motile cilia may exist and protrude into its lumen making primates including man possible candidates for the cilia-bearing, late molecular asymmetry group of mammals.

We analysed nodal expression in a pre-somite embryo of the New World monkey Callithrix jacchus by in situ hybridisation and serial histological sections

Nodal mRNA was found to be asymmetrically expressed early in parachordal cells, similar to the situation seen in pig and cattle

Poster 120:

Titel: Viscerometry of the left colic flexure in fetal period. chosen features.

Autoren/Adressen: SŁAWOMIR WOŻNIAK (MEDICAL UNIVERSITY WROCLAW), MICHAŁ PORWOLIK (MEDICAL UNIVERSITY WROCLAW), ZYGMUNT DOMAGAŁA (MEDICAL UNIVERSITY WROCLAW), PAWEŁ DĄBROWSKI (MEDICAL UNIVERSITY WROCLAW); slawomir.wozniak@umed.wroc.pl

Abstract:
To our knowledge there is very few papers concerned with development of left colic flexure. This part of large intestine (the angle) is very important because of its key role colonoscopy in adults. The acute angle could cause the difficulties in this examination.
Aim of this paper: We measured the angle to understand development of this flexure and trace the changes in this value.

The study was conduct on 163 (N) fixed fetuses – among them 78 female (F) and 85 male (M). The age of F group was 105 – 191 gestational days and M 113 – 191 days. The fetuses belonged to the Anatomical Museum of Wroclaw Medical University. We received the approval of university ethics committee.

The angle of left (splenic) colic flexure (LCF) was measured as mean 76.97° ± 25.52 [20°-160°] for female and 76.36° ± 23.52 [20°-110°] for male. In female in age ≤139 days (N=25) the LCF was 88.6° [20°-160°] in age from 160 through 169 (N=16) the angle was 64.5° [30°-90°], in age from N=8; 180 through 191 LCF was 73.16° [53°-90°]. In male group (in the same age groups respectively, N = 35, 7, 19) LCF was 89.68° [31°-110°], 68.66° [30°-90°] and 66.05° [20°-105°].

In both genders (in the young fetuses), the right angle is the most common, gradually decreases and at the end of gestation the value increase again to 70°.

Poster 121:

Titel: Interactive effects of periodontitis and orthodontic tooth movement – new insights from basic research in a rat model

Autoren/Adressen: Christian Kirschneck (University Hospital Regensburg), Jochen Fanghänel (University Hospital Regensburg), Ulrich Wahlmann (University Hospital Regensburg), Michael Wolf (University of Bonn), J Camilo Roldán (University Hospital Regensburg / Catholic Children's Hospital Wilhelmstift Hamburg), Peter Proff (University Hospital Regensburg); christian.kirschneck@ukr.de

Abstract:
Many adult patients suffer from chronic periodontitis with recurrent episodes of active periodontal inflammation. Apart from a co-destructive effect of orthodontic force application on the periodontal attachment and bone, little is currently known regarding interactive effects on orthodontically induced dentine root resorptions (OIRR), the velocity of tooth movement and the underlying cellular and tissue reactions.

63 male Fischer344 rats in three consecutive experiments of 21 animals each (A/B/C) were randomly assigned to 3 experimental groups (n=7, 1/2/3): (A) CBCT; (B) histology/serology; (C) RT-qPCR – (1) control; (2) orthodontic tooth movement (OTM) of the first/second upper left molars (NiTi coil spring, 0.25N); (3) OTM with experimentally induced periodontitis (cervical silk ligature). After 14 days of OTM we quantified blood leukocyte level, OIRR, osteoclast activity and relative gene expression of inflammatory and osteoclast marker genes within the dental-periodontal tissue as well as after 14 and 28 days tooth movement velocity and periodontal bone loss.

The experimentally induced periodontal bone loss was significantly increased by concurrent application of an orthodontic force. Periodontal inflammation during OTM on the other hand significantly augmented the extent of OIRR, relative expression of inflammatory/osteoclast marker genes, blood leukocyte level and periodontal osteoclast activity. In addition, contrary to previous studies, we observed a significant increase in tooth movement velocity.

Although accelerated tooth movement would be favourable for orthodontic treatment, our results suggest that orthodontic interventions should only be performed after successful systematic periodontal therapy and paused in case of recurrent active inflammation.

Poster 122:

Titel: Effects of meloxicam medication during orthodontic therapy – a cellbiological-radiological study on periodontal tissue and fibroblasts

Autoren/Adressen: Christian Kirschneck (University Hospital Regensburg), Matthias Meier (University Hospital Regensburg), Kathrin Bauer (University Hospital Regensburg), Peter Proff (University Hospital Regensburg), Jochen Fanghänel (University Hospital Regensburg); christian.kirschneck@ukr.de

Abstract:
NSAID are used to alleviate pain sensations during orthodontic therapy, but are assumed to interfere in associated pseudo-inflammatory reactions. In particular, the effects of a partially selective COX-2 inhibition over the constitutively expressed COX-1 (11:1) on periodontal cells and tissue, as induced by the NSAID meloxicam, remain unclear. We thus investigated possible adverse side as well as potentially useful beneficial effects during orthodontic therapy and the underlying cellular and tissue reactions.

We randomly assigned 63 male Fischer344 rats in three consecutive experiments of 21 animals each (A/B/C) to 3 experimental groups (n=7, 1/2/3): (A) CBCT; (B) histology/serology; (C) RT-qPCR – (1) control; (2) orthodontic tooth movement (OTM) of the first/second upper left molars (NiTi coil spring, 0.25N); (3) OTM with a daily oral meloxicam dose of 3mg/kg. In vitro, we stimulated human periodontal ligament fibroblasts (hPDL) with orthodontic pressure (2g/cm2) with/without meloxicam (10µmol).

In vivo, meloxicam significantly reduced serum CRP concentration, tooth movement velocity, orthodontically induced dentine root resorption (OIRR), osteoclast activity and relative expression of inflammatory/osteoclast marker genes within the dental-periodontal tissue, while presenting a good gastric tolerance profile. In vitro, we observed a corresponding significant decrease of PGE2/IL-6/RANKL(-OPG) expression and of hPDL-mediated osteoclastogenesis.

By inhibiting prostaglandin synthesis, meloxicam seems to downregulate hPDL-mediated inflammation, RANKL-induced osteoclastogenesis and consequently tooth movement velocity by about 50%, limiting its suitability for analgesia during orthodontic therapy. However, its protective effects regarding OIRR and good tolerance profile suggest the possibility of a future prophylactic application which merits further investigation.

Poster 123:

Titel: The pathology of lipopolysaccharide induced lung injury is more severe in old compared to young mice

Autoren/Adressen: Katharina Kling (Medizinische Hochschule Hannover), Christian Mühlfeld (Medizinische Hochschule Hannover), Elena Lopez Rodriguez (Medizinische Hochschule Hannover), Christiane Pfarrer (Tierärzliche Hochschule Hannover), Christina Brandenberger (Medizinische Hochschule Hannover); kling.katharina@mh-hannover.de

Abstract:
Acute lung injury (ALI) is characterized by hypoxemia, enhanced permeability of the air-blood-barrier and pulmonary edema. The reasons why ALI is associated with higher morbidity and mortality in elderly are poorly understood.

Therefore, this study aimed at providing a comprehensive survey of age dependent characteristics of ALI. ALI was induced by intranasal application of 2.5mg lipopolysaccharide (LPS)/kg body weight (n=10/age group) in 2 months and 18 months old male C57bl/6 mice. Controls received the same volume of saline solution (n=7/age group). After 24 hours, lung function was assessed and lungs were either processed for stereological histopathology or inflammatory analysis (bronchoalveolar lavage fluid (BALF) cytometry and qPCR).

Both young and old LPS mice had elevated BALF protein concentrations and neutrophil and macrophage numbers. Additionally, in both age groups, compared with controls, the gene expression of neutrophil chemokines (Cxcl1, Cxcl2) and intercellular adhesion molecule (Icam) was enhanced and the interalveolar septa volume was increased due to higher volumes of interstitial cells and extracellular matrix. However, the pathology of ALI was more pronounced in old compared to young mice with a 6-fold higher BALF protein concentration, twice the number of neutrophils, significantly induced Cxcl1, Cxcl2 and Icam gene expression and thicker alveolar septa. Furthermore, lung function in old LPS mice was impaired to a higher degree than in young LPS mice.

Our results show that lung function and pathology in ALI is affected by age. The observed age-related differences most likely contribute to a worse prognosis of the elderly in ALI.

Poster 124:

Titel: Mast cells in the atrial myocardium of patients with atrial fibrillation – comparison with patients in the sinus rhythm

Autoren/Adressen: Tomáš Kučera (First Faculty of Medicine, Charles University), Mária Ďurišová (First Faculty of Medicine, Charles University), Natalia Smorodinova (First Faculty of Medicine, Charles University), Martin Bláha (Institute for Clinical and Experimental Medicine), Vojtěch Melenovský (Institute for Clinical and Experimental Medicine), Jan Pirk (Institute for Clinical and Experimental Medicine), Josef Kautzner (Institute for Clinical and Experimental Medicine); tkucer@lf1.cuni.cz

Abstract:
There are various morphological and functional alterations associated with atrial fibrillation and one of those changes is an elevated number of inflammatory cells in the atrial myocardium. Mast cells might be one of the inflammatory cell populations involved in these processes. Our aim was to characterize and quantify mast cells in the atrial myocardium of patients undergoing open heart surgery with atrial fibrillation compared to those in sinus rhythm.

Biopsies from the right and left atrium were obtained during eligible open heart surgery. Paraffin sections were used to detect mast cells immunohistochemicaly using anti-mast cell tryptase antibody. Frequency of cells was expressed as the number per square mm.

Mast cells were detected in samples from both patient groups and displayed their typical morphology. The quantitative analysis of the frequency of mast cells in the atrial myocardium led to the following results: right appendage from patients with AF 4,73±3,13 vs. 5,35±4,32 with SR; left appendage from patients with AF 6,22±3,12 vs. 5,17±3,57 with SR. In the left atrial free wall there was 6,58±4,57 in AF vs. 7,05±4,43 in SR. In addition, cardiac mast cells were all positive for CD117 and no other CD117-positive cells were found.

The quantitative differences in mast cell frequency were not statistically significant when patients with AF and SR were compared. It is unlikely that these cells have specific role in AF pathogenesis. CD117-positive cell population in the atrial myocardium corresponds to mast cells.

Poster 125:

Titel: Immune stimulatory effects of neutrophil extracellular traps in granulomatosis with polyangiitis

Autoren/Adressen: Christina Lange (Christian-Albrechts-University of Kiel), Elena Csernok (Klinikum Bad Bramstedt), Julia Holle (Klinikum Bad Bramstedt); c.lange@anat.uni-kiel.de

Abstract:
Granulomatosis with polyangiitis (GPA, Wegener's granulomatosis) belongs to the antineutrophil cytoplasmic antibody (ANCA)-associated vasculitides. It is accompanied by the presence of autoantibodies against proteinase 3, which is located in granules of neutrophil cells but also detectable in neutrophil extracellular traps (NETs). NETosis, the ejection of DNA fibers armed with antimicrobial enzymes, is a physiological defence mechanism against pathogens but is also linked to autoimmunity. The aim of the study was to analyse the role of NETting neutrophils in GPA pathogenesis, especially their interplay with peripheral blood mononuclear cells (PBMCs).

The amount of cell-free DNA (cfDNA) was determined in sera from GPA patients (pairs active/ inactive disease state, n=18) and from healthy controls (HCs, n=10). We performed in vitro incubation experiments using PBMCs and NETs from patients and HCs for accessing the effect of NETs on PBMC behaviour. We determined proliferation of T- and B-cells (CSFE assay), B-cell maturation (CD38 staining, flow cytometry), production of IgG (ELISpot, ELISA), and secretion of cytokines (ELISA).

We detected a significant increase in serum cfDNA levels of GPA patients. The concentration of cfDNA was associated with disease activity. NETs of patients and HCs induce proliferation of CD4+ T-cells and CD19+ B-cells and B-cell maturation. Furthermore, we detected increased IL-17A secretion after stimulating PBMCs with NETs. A significant difference between PBMCs from GPA patients and HCs was not detectable.

NETs activate PBMCs of GPA patients and HCs. Our findings give supportive evidence that NETosis plays a role in the pathogenesis of GPA.

Poster 126:

Titel: Modulating the non-neuronal cholinergic system (nncs) in macrophages to stimulate phagocytosis: a new strategy to enhance immune defense.

Autoren/Adressen: Amira-Talaat Moussa (Saarland University, Homburg Medical faculty), Andrea Rabung (Saarland University, Homburg Medical faculty), Sandra Reichrath (Saarland University, Homburg Medical faculty), Thomas Tschernig (Saarland University, Homburg Medical faculty); amira_ns55@yahoo.com

Abstract:
Phagocytosis represents a highly effective and tightly regulated mechanism by which macrophages contribute to the human body`s immune defense against microbial infections and cancer. Recent findings highlight the relevance of the non-neuronal cholinergic system (NNCS) for the regulation of macrophage function, which opens new perspectives for the pharmacological treatment of infectious diseases and malignancies. Acetylcholine (Ach) is known as one of the most important neurotransmitters in humans, exerting its effects at least in part via binding to two different classes of receptor molecules, the nicotinic (nAChRs; that are also stimulated by nicotine) and the muscarinic ACh receptors (mAChRs; that are also stimulated by the mushroom poison muscarin), which are both expressed as different subtypes. In monocytes and in monocyte-derived macrophages, expression of the high-affinity choline transporter, the choline acetyltransferase, the vesicular acetylcholine transporter, nAChRs and mAChRs was demonstrated. However, their relevance for the regulation of phagocytosis remains to be elucidated.

Using FACS-analysis, we have tested in this pilot study, whether treatment of LPS- or PMA-stimulated U937-derived macrophages with ACh, its cholinergic agonists carbachol and nicotine, or ACh-antagonists α-bungarotoxin and atropine, modulates phagocytosis. Cell viability was measured using trypan blue stain.

Phagocytotic activity in LPS- or PMA-stimulated U937-derived macrophages was modulated following stimulation with ACh, its cholinergic agonists carbachol and nicotine, or ACh-antagonists α-bungarotoxin and atropine.

Preliminary results of our study support the concept that pharmacologic modulation of the NNCS represents a promising new strategy for the prevention and/or treatment of infectious diseases and cancer.

Poster 127:

Titel: Differential structural alterations in lungs of wild type and dpp4/cd26-deficient rats after infection with pseudomonas aeruginosa

Autoren/Adressen: Michael Neuhaus (Hannover Medical School), Antje Munder (Hannover Medical School), Stephan von Hörsten (Friedrich-Alexander-University of Nürnberg/Erlangen), Matthias Ochs (Hannover Medical School), Andreas Schmiedl (Hannover Medical School); neuhaus.michael@mh-hannover.de

Abstract:
Pseudomonas Aeruginosa (PA) induces nosocomial infections and leads to frequent complications in patients with cystic fibrosis. DPP4/CD26 shows an increased expression in inflamed tissue and leads to an increased recruitment of CD26+-T cells. CD26 deficient Fischer rats exhibit a significantly decreased inflammation in the OVA-induced asthma- and LPS-model. The aim of this study was to test the hypothesis that also after infection with PA the inflammation as well as the degree of structural damage is less pronounced in CD26 deficient rats.

6h after instillation with 1x1010 CFU PA/rat the lungs were extracted. Light and electron microscopic stereological analyses were carried out.

Independent of the genotype in infected lungs compared to controls 1) the acinar airspace was significantly increased, 2) the volume density of the alveolar epithelium was significantly decreased 3) the septal thickness was significantly decreased, 4) more than 40% of the alveolar epithelial surface was damaged, and up to 36% of the epithelial surface was covered with edema. Compared to infected wild types in infected CD26 deficient rats the increase of lung weight was significantly less pronounced, the portion of alveolar airspace occupied with edema was significantly lower and the part of edema interspersed with PA was lower by trend.

Besides differences in the degree of acinar edema no genotype dependent structural alterations were seen. Thus, because of the used high PA concentration the partly pronounced damage of lung parenchyma may mask possible influences of DPP4/CD26 on the inflammatory response in bacterial pneumonia.

Poster 128:

Titel: A bacterial signal peptide increases mucociliary clearance in explanted mouse trachea

Autoren/Adressen: Alexander Perniß (Institute of Anatomy and Cell Biology, German Center for Lung Research), Wolfgang Kummer (Institute of Anatomy and Cell Biology, German Center for Lung Research), Bernd Bufe (Center for Integrative Physiology and Molecular Medicine (CIPMM)), Gabriela Krasteva-Christ (Institute for Anatomy and Cell Biology); alexander.perniss@bio.uni-giessen.de

Abstract:
Objective: Bacterial signal peptides are known to trigger innate immunity responses by activation of formyl peptide receptors (FPRs) present in immune cells, e.g. leukocytes. Members of the FPR-family are also found in the murine vomeronasal organ where they are candidates for chemosensory recognition of bacterial pathogens. Here, we investigated the effects of bacterial signal peptides on mucociliary clearance in the murine trachea.

Methods: The trachea of C57Bl6, TRPM5-deficient (transient receptor potential cation channel subfamily M member 5; a crucial component of the canonical bitter and umami taste transduction) and FVB/NCrl mice was explanted and particle transport speed (PTS) was visualized by tracking directed transport of dynabeads at the surface. The transcriptome of single tracheal ciliated and brush cells, a chemosensory epithelial cell type, was analyzed by single cell deep sequencing.

Results: Deep sequencing showed FPR expression in both ciliated and brush cells. The N-formylated bacterial signal peptide FL185 increased PTS from 43.48±5.05 to 75.96±3.56 µm/s (N=8; $p<0.0001$) at 10 µM which addresses FPR1-3. Specific FPR1 and FPR2 inhibitors [cyclosporine H (1 µM) and t-BOC2 (10 µM)] did not reduce the effect. The effect was conserved in FVB/NCrl mice which are lacking a functional FPR3. In contrast, FL185 was ineffective in increasing PTS in TRPM5-deficient mice. Four other tested bacterial signal peptides did not increase PTS.

Conclusion: A bacterial signal peptide stimulates cilia-driven mucociliary clearance, that could represent a novel defense mechanism against invasive bacteria in the trachea. This effect involves elements of the classical taste transduction cascade.

Poster 129:

Titel: Changes in the vaginal mucosa according to the woman's age

Autoren/Adressen: Mihaela Moscu, Ana-Maria Fatu, Ion Constantin Fatu, Constantin Fatu (Universitatea APOLLONIA din IAŞI); constantinfatu@yahoo.com

Abstract:
The vaginal mucosa has an ectodermal origin as well as other important organs of the body (Central Nervous System and a part of its derivates). The vaginal mucosa undergoes pre-puberty, puberty, pre-menopause, menopause and late-menopause changes. All these changes are the result of a major influence of the cortico-hypothalamic-pituitary-ovarian axis.

The two cavitary systems and the endocrine system will significantly influence the evolution of the vaginal mucosa according to the age.

I have conducted this research on about 1150 cases: pre-puberty – 250, puberty – 500, pre-menopause and menopause – 250 and late- menopause – 150. This research has been conducted respecting all the conditions required by the law and by informing all the subjects.
We noticed important changes at the level of the vaginal mucosa on various periods.

Poster 130:

Absage

Poster 131:

Titel: Is the endocannabinoid system an endocrine modulator in dehp-induced adipogenesis?

Autoren/Adressen: Jana Ernst (Universität Halle/Saale), Kristina Schädlich (Universität Halle/Saale), Bernd Fischer (Universität Halle/Saale), Faramarz Dehghani (Universität Halle/Saale);jana.ernst@medizin.uni-halle.de

Abstract:
Di-(2-ethylhexyl) phthalate (DEHP) is a common plasticizer which is used in plastic products and cosmetics of everyday use. In-vitro and in-vivo studies identified DEHP as an obesogen with endocrine disrupting properties. The knowledge of the underlying mechanisms is scarce, because physiological processes such as food intake, energy metabolism and endocrine homeostasis are controlled by a multitude of regulatory systems, among them adipokines and endocannabinoids. The endocannabinoid system (ECS) involves endocannabinoids, enzymes regulating the endocannabinoid levels and receptors, e.g. cannabinoid receptors and other endocannabinoid-binding receptors such as the peroxisome proliferator-activated receptors (PPARs). DEHP is a known PPAR ligand and interferes with ligand binding of cannabinoid receptors, too. For the adipokine leptin a regulatory influence on the ECS of the central nervous system as well as the intrinsic ECS of adipocytes has been identified. However, comparing lean and obese human subjects, a differential expression of the ECS can be observed in adipose tissue.

Our aim was to investigate the effects of DEHP exposure on the endocrine function of adipocytes and the regulation of the ECS during adipogenesis.

Using SGBS preadipocytes as a human non-immortalized cell model for adipogenic differentiation our data show that receptors and enzymes of the ECS are differentially expressed during adipogenesis. DEHP-exposure led to hypertrophy of SGBS-derived adipocytes. Leptin and adiponectin secretion were affected by DEHP but this was independent of the ECS.

The endocrine disruptor DEHP alters the endocrine function of adipocytes without involvement of the intrinsic ECS as endocrine modulator.

Poster 132:

Titel: Proliferative potential of normal and diabetic term placenta

Autoren/Adressen: Marie Jirkovská (First Faculty of Medicine, Charles University in Prague), Kryštof Zuska (First Faculty of Medicine, Charles University in Prague); mjirk@lf1.cuni.cz

Abstract:
Placenta is temporary organ growing and developing during pregnancy, but the proliferative potential (PP) of term placenta is not known. Pregnancy complicated by maternal diabetes mellitus is associated with enhanced maternal and fetal risks and also with changed placental morphology. Here, a quantitative study of proliferative potential was performed in normal term placentas (C) and placentas from pregnancies complicated by gestational (GDM) and Type 1 (DMI) maternal diabetes.

In specimens of 16 DMI placentas, 13 GDM placentas and 8 C placentas taken by systematic uniform random sampling, immunohistochemical detection of Ki67 was performed in histological sections of five haphazardly chosen blocks per placenta. The areas of stem, intermediate and terminal villi were measured, and Ki67-labelled nuclei were counted separately in cytotrophoblast, stroma and vascular endothelium in twenty fields of view per section. The counts of nuclei were normalized to the cross-sectional area of villi.

In stem villi, PP was significantly lower in vascular endothelium of both diabetic groups. In intermediate villi, PP was significantly lower in villous cytotrophoblast of both diabetic groups.
In terminal villi, PP was significantly lower in cytotrophoblast of both diabetic groups and in capillary wall of DMI placentas.

In all placentas, cytotrophoblast, stromal cells and vascular endothelium display certain proliferative potential, but the comparison shows that diabetic placenta has lower potential to enlarge areas of structures involved in transport. That factor may decrease the ability of diabetic placenta to comply with fetal demands in final stage of pregnancy.
Supported by PRVOUK P25/LF1/2.

Poster 133:

Titel: Cbe1 - a novel male infertility marker?

Autoren/Adressen: Christiane Pleuger (Justus Liebig University Giessen), Hans-Christian Schuppe (University Hospital Giessen), Wolfgang Weidner (University Hospital Giessen), Sabine Kliesch (University Hospital Muenster), Moira OBryan (Monash University), Martin Bergmann (Justus Liebig University Giessen); christiane.pleuger@vetmed.uni-giessen.de

Abstract:
CBE1 (ciliated bronchial epithelium 1, also known as SMRP1, C9ORF24, or NYD-SP22), named after its expression in ciliated cells within the respiratory tract, is a largely uncharacterized protein that was originally identified in association with the spermatid manchette. The manchette, a transient microtubule-based structure, is involved in defining the head shape and the growing tail of sperms. Previous investigations in mice showed that CBE1 is clearly localized at microtubules of the manchette. Due to this localization, CBE1 could be a candidate for a novel male infertility marker. Moreover, previous investigations showed, that it is absent or significantly reduced in sperm of infertile men. The precise localization and function of CBE1 in the manchette is not known so far.

By using RT-PCR for mRNA detection as well as immunohistochemistry, CBE1 expression and cellular localization will be analyzed in human testicular biopsies showing normal and impaired spermatogenesis. Additionally, CBE1 expression on mRNA and protein level will be investigated in human ejaculates showing normal and diminished sperm quality.

So far, we were able to detect CBE1 mRNA in human testicular homogenates showing normal spermatogenesis and could localize the protein in the flagellum of elongating spermatids and ejaculated spermatozoa by immunohistochemistry.

Further studies on testicular biopsies showing impaired spermatogenesis and ejaculates of patients showing OAT syndrome will clarify the possible causal relationship of CBE1 to male infertility.

Poster 134:

Titel: Wnt-signalling in neuroblastoma

Autoren/Adressen: Jürgen Becker (Universitätsmedizin Göttingen);
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Abstract:
Wingless/Int1 proteins (WNTs) control cell-fate during development via highly conserved pathways that activate or inhibit differentiation or migration of cells in a spatial and temporal order. WNTs bind to several receptors like FZ (Frizzled), LRP5/6, ROR1/2 and RYK. So far WNT signalling is roughly divided into the beta-catenin dependent, so-called canonical pathway and beta-catenin independent pathways like the planar-cell-polarity (PCP) pathway or the Ca2+ dependent WNT-Ca-Pathway. Deregulation of WNT-signalling is widely associated with cancer development and progression.
Neuroblastoma (NB) is an embryonic tumour of the sympathetic nervous system, preferentially located along the sympathetic chain ganglia, pre-vertebral ganglia and the adrenal medulla. WNT signalling is involved in the migration of sympathetic progenitor cells from the neural crest, and their differentiation. So far studies of WNT-signalling in NB have provided conflicting results. However deregulation of WNT signalling pathways might be an essential event in the etiology of NB.

We used 26 NB cell-lines to test for the expression of relevant genes for WNT-signalling. Suitable cell lines were subjected to in vitro assays and treated with recombinant WNTs or specific downstream inhibitors.

NB cell-lines showed heterogeneous response to WNT5A stimulation. Inhibitor experiments suggest cross-talk between beta-catenin dependent and independent signalling leading to increased or decreased migration of cells.

WNT signalling is complex and needs a holistic approach that includes all possible pathways. Our studies show that deregulated WNT-pathways may lead to ectopic or poorly differentiated sympathetic-progenitor cells that may initiate NB development.

Poster 135:

Titel: Relationship between hoffa fat pad volume and body composition

Autoren/Adressen: Birgit Burda (Paracelsus Medical University), Eva Steidle-Kloc (Paracelsus Medical University), Torben Dannhauer (Paracelsus Medical University), Wolfgang Wirth (Paracelsus Medical University), Anja Ruhdorfer (Paracelsus Medical University), Felix Eckstein (Paracelsus Medical University); felix.eckstein@pmu.ac.at

Abstract:
The infra-patellar fat pad (Hoffa) has gained recent interest, as it was shown to represent an intra-articular source of adipokines (e.g. leptin). Adipokines have been suggested to cause low grade inflammation and articular tissue degradation, and thereby to provide an endocrine (rather than mechanical) link between obesity and (knee) osteoarthritis. The purpose of the present study therefore was to explore whether, and to what extent, Hoffa adipose tissue volume is related to the body mass index (BMI).

We studied 19 normal weight women (BMI = 20-25; age 57±7yrs) and 19 obese women (BMI 30-35; age 56±8yrs) from the Osteoarthritis Initiative cohort. These had no knee symptoms or radiographic signs of knee osteoarthritis and were matched 1:1 by age (± 5yrs) and body height (± 5 cm). The complete Hoffa volume was determined from sagittal fat-suppressed intermediately-weighted turbo spin-echo MR images (TR=3200ms, TE=30ms, slice thickness =3.00mm) by manual segmentation, using custom software.

Hoffa volume in normal weight women was 22.1±3.2 cm^3 (mean ± standard deviation), and that in obese women was 25.4±3.9 cm^3. The mean (pairwise) difference was 16.1±16.7% and was statistically significant ($p< 0.001$; paired t-test).

The amount of Hoffa adipose tissue is shown to be related to obesity, with a 40% increase in body weight in women being associated with a 16% increase in Hoffa volume. These findings indicate that the Hoffa may represent a potential endocrine link between obesity and knee osteoarthritis, with more intraarticular adipose tissue potentially releasing higher amounts of intra-articular adipokines.

Poster 136:

Titel: Hiking across the brain: unique spatio-temporal patterns of neuronal migration and cortical layering in the reelin-deficient neocortex

Autoren/Adressen: Nieves Mingo-Moreno (Universität Göttingen), Robin Wagener (Centre Médical Universitaire), Jochen Staiger (Universität Göttingen);nieves.mingo@med.uni-goettingen.de

Abstract:
The adult mammalian neocortex is a six-layered structure divided into specialized areas, well-defined by a distinct cytoarchitecture and specific wiring patterns. The appropriate positioning of neurons during cortical development, crucial for proper brain function, is orchestrated by the secreted extracellular glycoprotein reelin. Theories aiming for the precise role of this protein are based on the phenotype of a mouse mutant with a homozygous loss-of-function mutation of the reelin gene (i.e. reeler mouse).

On the basis of layer-specific mRNA expression and triple cell birth dating approaches, we could demonstrate that the reeler cortex, usually described as “inverted”, is disrupted in a more complex and even area-specific fashion.

Cells in the adult somatosensory cortex show massive intermingling of layer II/III and IV fated cells, that are sandwiched by layer V and VI fated cells. The motor cortex, on the contrary, exhibits a substantial general cell scattering, while the visual cortex presents a tendency of an inverted laminated pattern. We also found individual postmitotic neurons entering the reeler preplate, indicating that preplate splitting could be not fully inhibited. We additionally reveal that the developing reeler brain displays a temporally and spatially altered migration, area and cell population dependent, which might cause the adult phenotype.

Our results highlight prominent differences through the anterior-posterior axis of the reeler neocortex and indicate the necessity to reevaluate the mutant cortex in order to understand reelin function during cortical development.

Poster 137:

Titel: Abrogation of gap junctional communication in embryonic stem cells results in a disruption of primitive endoderm formation

Autoren/Adressen: Philipp Wörsdörfer (University of Würzburg), Felicitas Bosen (University of Bonn), Martina Gebhardt (University of Würzburg), Nicole Russ (University of Bonn), Katrin Zimmermann (University of Bonn), David Kessie (University of Würzburg), Thileepan Sekaran (University of Bonn), Angela Egert (University of Bonn), Süleyman Ergün (University of Würzburg), Hubert Schorle (University of Bonn), Alexander Pfeifer (University of Bonn), Frank Edenhofer (University of Würzburg), Klaus Willecke (University of Bonn); philipp.woersdoerfer@uni-wuerzburg.de

Abstract:
Gap junctional intercellular communication (GJIC) has been suggested to be involved in early embryonic development but the functional role remains unknown. Connexin (Cx) 43 and Cx45 are co-expressed in embryonic stem cells (ESC), form gap junctions and are considered to exhibit adhesive function and/or to contribute to the establishment of communication compartments.

We describe the generation of Cx43/Cx45-double deficient mouse ESCs to achieve almost complete breakdown of GJIC.

Deletion of both, Cx43 and Cx45, results in a global block of differentiation in embryoid bodies without affecting pluripotency marker expression and proliferation in ESCs. We demonstrate that GJIC-incompetent ESCs fail to form primitive endoderm, representing the inductive key step of further differentiation. Lentiviral overexpression of either Cx43 or Cx45 rescued the phenotype, indicating a redundant function of both connexins. Upon differentiation GJIC-incompetent ESCs show an altered subcellular localization pattern of the transcription factor NFATc3. Control EBs exhibit more activated NFATc3 localized to the nucleus as mutant EBs. Moreover, pharmacological inhibition by Cyclosporin A, a well-described inhibitor of calcineurin, phenocopies the loss of GJIC in control cells.

Here, we report that Cx43/Cx45-double deficient ESCs exhibit a block in global differentiation while retaining pluripotency markers and full proliferative potential. We show that Cx43/Cx45-mediated GJIC is essential to accomplish proper induction of well-structured primitive endoderm formation in EBs representing a key step during early embryonic development. Analysis of NFATc3 staining pattern and application of small molecule inhibitors indicate that primitive endoderm layer formation might be regulated through GJIC by an NFATc3-dependent mechanism.

Poster 138:

Titel: Generation of large volumes for electron-microscopy using serial sectioning

Autoren/Adressen: Heinz Horstmann (Anatomie Heidelberg), Johannes Knabbe (Anatomie Heidelberg), Thomas Kuner (Anatomie Heidelberg); horstmann@ana.uni-heidelberg.de

Abstract:
For a complete analysis of the connectome in neuronal tissue it is of crucial importance to capture the ultrastructural details of small structures such as organelles and synapses as well as long range connections between more distant regions. To achieve these goals in one preparation we designed new devices for the capture and subsequent imaging of thousands of ultrathin sections comprising a volume of up to several hundred cubic micrometers in total.

Continuous sections of block-stained or resin-embedded samples can be cut on any ultra-microtome and are automatically fetched by a moving tape with minimal space separating the sections. The tape is hydrophilic on the surface to accept the sections and does not lead to charge accumulation while imaging. After complete sectioning and post-staining, the tape can be transferred to a SEM-stage equipped with a motorized device that allows for the longitudinal movement of the tape and positioning of the sections within area accessible for imaging.

Our device is fully compatible with available ultra-microtomes and SEM-Systems. It allows the storage and subsequent SEM imaging of several thousand sections at a section thickness ranging from 35 to 100nm. By using software for the automated imaging of an entire section and subsequent manual movement of the tape to the following section, large volumes can be imaged relatively quickly at high resolution.

This system can be used to generate images of large volumes with electron-microscopic resolution for the analysis of the connectome of neuronal tissue and detailed three-dimensional reconstruction of whole cells.

Poster 139:

Titel: Cortical connectomics of the rat

Autoren/Adressen: Jennifer Meinhardt (University Rostock), Julia Beier (University Rostock), Oliver Schmitt (University Rostock); schmitt@med.uni-rostock.de

Abstract:
So far, cortical connectomics of the laboratory rat is limited to an ipsilateral data, only. The aim of this study was to establish a bilateral complete cortical connectome based on published data of tract tracing studies.

A retrospective approach was used to collate connectivity data from peer reviewed publications that describe tract tracing results by applying anterograde, retrograde and bilaterally transported tract tracing substances as well as neurotrophic viruses and intracellular fillings. For the first time, monosynaptic, transsynaptic and collateral connectivity data were extracted within our data analysis approach.

A rich contralateral connectivity is available within the cortical connectome. Infralimbic and frontal cortical areas as well as insular cortices indicate clusters of dense interhemispheric connections. With regard to small animal DTI-studies we do not found a complete reciproacal cortical connectivity rather than a selective reciprocal connectional architecture.

Our data demonstrates for the first time a bilateral cortical connectome of the laboratory rat. Cortical connections show a specific network organization. Based on the principle to preserve neuroanatomical data at all levels of spatial descriptions from nearly 7000 publications we observed a specific connectional layout of cortical layers.

Poster 140:

Titel: The role of bcl11b/ctip2 in hippocampal mossy fiber connectivity

Autoren/Adressen: Ruth Simon (Ulm University), Sathish Venkataramanappa (Ulm University), Claudia Soi (Ulm University), Elodie De Bruyckere (Ulm University), Herbert Schwegler (Otto-von-Guericke-University, Magdeburg), Stefan Britsch (Ulm University); ruth.simon@uni-ulm.de

Abstract:
Hippocampal structures play an important role in learning and memory. The dentate gyrus, one of only two brain regions where adult neurogenesis occurs, contributes in particular to the formation of new memories. The correct wiring of granule cell neurons to CA3 pyramidal cells via the mossy fiber tract is essential for the functionality of the mature hippocampus. Bcl11b/CTIP2, a Krueppel-like zinc finger transcription factor, is expressed in the developing as well as the adult nervous system. Ablation of Bcl11b in the forebrain uncovered dual phase-specific functions of Bcl11b demonstrated by feedback control of the progenitor cell compartment as well as regulation of granule cell differentiation during postnatal development. In addition, loss of Bcl11b expression leads to a severe disorganization of the mossy fiber tract causing most likely the observed learning and memory impairments. Employing an inducible mouse model we determined Bcl11b functions specific for adult neurogenesis and maintenance of mature granule cell neurons. Although no obvious changes of the mossy fiber tract occurred by loss of Bcl11b expression in adulthood we observed a reduced connectivity that might be responsible for the impaired spatial working memory of the adult-induced Bcl11b mutant.

At this point the mechanism(s) of Bcl11b-dependant regulation of mossy fiber outgrowth and connectivity is not known. Transcriptome analyses revealed potential Bcl11b target genes involved in axon guidance and synaptic function. Chromatinimmunoprecipitation and in vivo electroporation experiments further determines the functional interaction of Bcl11b with confirmed target genes.

Poster 141:

Titel: Thanksgiving ceremonies after the dissection course:
A report on procedures in departments of anatomy in German-speaking countries.

Autoren/Adressen: Pabst R (Medical School Hannover), Schmiedl A , Schrieber S , Tschernig T , Pabst V C .; Pabst.Reinhard@mh-hannover.de

Abstract:
Materials: The departments of anatomy in Germany, Austria and the German-speaking part of Switzerland were sent a detailed (18 items) questionnaire asking about ceremonies held at the end of the dissection course in the curriculum of medical students. Details on objective, organization, the number of participants and the role of medical students were requested.
Results: The response rate was very high (95 %). In more than 95 % a ceremony was organized, starting mainly anno 1980. The title of the ceremony varied from commemoration ceremony (42 %), mourning (19 %) memorial service (19 %) and thanksgiving 7 %). The number of participants reached more than 300 in 15% of these ceremonies. The invitation comes mostly from the student group organizing the ceremony (62 %). The ceremony is offered mainly for the students of the course (23 %), for student tutors (16 %), relatives of the body donors (23 %) and scientific staff (15 %). The students actively participated with musical contributions, (19 %) gestures such as candles (17 %) and flowers (12 %), speeches (17%) and readings (12 %).
Conclusions: The results are discussed with regard to ceremonies in various countries with different religious backgrounds. This dissection course is unique among all courses in the medical curriculum as it obviously also has spiritual aspects. Only after this course are such ceremonies organized.

Poster 142:

Titel: Correlation between time-course of expression of trophic factors in denervated vibrissal muscles with functional recovery of whisking after facial nerve injury reveals that proper reinnervation requires elevated BDNF, FGF2 and IGF2, but reduced expression of IGF1 and NGF

Autoren/Adressen: Svenja Rink[1], Maria Grosheva[2], Klaus Nohroudi[1], Alisa Schwarz[1], Habib Bendella[3], Levent Sarikcioglu[4], Lars Klimaschewski[5], Tessa Gordon[6*], Doychin N. Angelov[1]
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Abstract:
After peripheral nerve injury, recovery of motor performance negatively correlates with the poly-innervation of neuromuscular junctions (NMJ) due to excessive sprouting of the terminal Schwann cells. Denervated muscles produce short-range diffusible sprouting stimuli, of which some are neurotrophic factors. Based on recent data that vibrissal whisking is restored perfectly during facial nerve regeneration in blind rats from the Sprague Dawley (SD)/RCS strain, we compared the expression of brain derived neurotrophic factor (BDNF), fibroblast growth factor-2 (FGF2), insulin growth factors 1 and 2 (IGF1, IGF2) and nerve growth factor (NGF) between SD/RCS and SD-rats with normal vision but poor recovery of whisking function after facial nerve injury. To establish which trophic factors might be responsible for proper NMJ-reinnervation, the transected facial nerve was surgically repaired (facial-facial anastomosis, FFA) for subsequent analysis of mRNA and proteins expressed in the *levator labii superioris* muscle. A complicated time course of expression included (1) a late rise in BDNF protein that followed earlier elevated gene expression, (2) an early increase in FGF2 and IGF2 protein after 2 days with sustained gene expression, (3) reduced IGF1 protein at 28 days coincident with decline of raised mRNA levels to baseline, and (4) reduced NGF protein between 2 and 14 days with maintained gene expression found in blind rats but not the rats with normal vision. These findings suggest that recovery of motor function after peripheral nerve injury is due, at least in part, to a complex regulation of lesion-associated neurotrophic factors and cytokines in denervated muscles.

Poster 143:

Titel: Investigation of the function of SDF1/CXCR4 signaling during the head myogenesis

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Abstract:
Stromal derived factor-1 (SDF1) and its chemokine receptor CXCR4 mediate oriented migration of somite myogenic precursor cells and control their proliferation and differentiation during early embryonic development. Previous studies demonstrate that inhibition of SDF1/CXCR4 signaling leads to interruption of limb muscle formation, include the should muscle and colacal/perineal muscle. Furthermore, manipulation of SDF1- signaling affects the myotome formation in somites. However, it is not known whether SDF1/CXCR4 signaling is involved in the head muscle formation. To investigate the function of SDF1/CXCR4 signaling during the head myogenesis, we first analysed CXCR4 mouse mutant. Our results show that the facial muscle development was affected. Since the facial muscle develops in the branchial arch, we will next study whether and how the branchial myogenesis is controlled by the SDF1/CXCR4 signaling in chick embryos.

Poster 144:

Titel: Changes in the buccal mucosa according to the woman's age

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Abstract:
Research has been conducted on age groups: pre-puberty, after-puberty (10-20 years, 20-30, 30-40 years), in pre-menopause the female groups between 40-50 years, in menopause – 50-60 years and in late menopause – after 60 years.

Taking into account the common embryological origin of the oral with the vaginal epithelium, we have conducted comparative studies in the two fields which led to the idea that the female hormones are very significant in preserving the trophicity of the mucosa and not only.

The reduction signs of the estrogen hormones start from early ages (40 years) but especially after 50 years these phenomena occur in most of the cases.

Poster 145:

Titel: Patterns of skull trauma in an early Bronze Age population from Slovakia

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Abstract:
The early Bronze Age cemetery of Ludanice – Mýtna Nová Ves is situated on the northern edge of the Nitra valley, now belonging to central Slovakia. It is part of the Middle Danube region, which was an important trade route and a contact zone between eastern Mediterranean, Black Sea and Central Europe. Additionally, the natural resources of both tin and copper for bronze production, meant a certain wealth. Many graves contained rich grave goods, such as jewellery, tools or weapons made of bronze or flint. Archaeologically, many graves containing weapons and armoury have been identified as warrior burials.
Preliminary results of the anthropological and palaeopathological investigation of skeletons from the cemetery's Únětice culture phase (1850 - 1700 BCE) reveal a high number of head injuries. About 15% of the juvenile and adult population show traces of blunt force trauma. In addition, a smaller number of possible arrow shot wounds was identified. Most individuals could be determined as male, nevertheless about 25% were females. Only few injuries show vestiges of healing. In most cases, the skull vault was perforated due to the high impact of the blows, and the underlying brain tissue was severely damaged. Almost immediately, such injuries must have been lethal. The trauma patterns, and the damage to the brain will be interpreted.

Poster 147:

Titel: Anatomical and imaging evaluation of angiogenesis in the inferior rectal carcinomas

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Abstract:
In this paper we will focus on colorectal vascular device and rectal malignancies processes of angiogenesis in order to highlight certain aspects that may help stop tumor evolutionary process. I used bariun enema, colonoscopy, CT, MRI and 3D reconstruction techniques in the pelvis. The study included a sample of 28 patients colonoscopic diagnosed with lower rectal cancer, which were evaluated by imaging and immunohistochemistry to obtain basic information on the location of the tumor, tumor stage, invasion depth, mesorectum affecting, relations with peritoneum and also with perirectal fascia and surrounding organs, highlighting rectal arteries and neoformation vessels and to correlate these data in order to obtain prognostic imaging criteria for malignancy and preoperative prognosis in lower rectal cancer. I applied EMVI score (extramural vascular invasion) results in these cases and compared them with the results of imaging and immunohistochemical studies. The main result of this study is that EMVI score can lead to an early diagnosis and give informations about the prognosis of patients only in conjunction other laboratory criteria.
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Key words: lower rectal cancer, angiogenesis, extramural vascular invasion

Poster 149:

Titel: Case of glioblastoma with prolonged survival prognosis

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Abstract:
Glioblastomas have the most reserved prognosis of all cerebral tumors. The average survival span of the patients suffering from this type of tumor is no higher than one year, in spite of the radio- and chemotherapeutic treatment. However, there are some studies that have shown that it is possible for an extremely small percent of the patients to live even up to three years.
We are reporting a case of a 42-year old female patient, who was hospitalized in the neurosurgery ward, accusing severe headaches, memory loss and dysphasia. The patient's medical history revealed that three years before she had been diagnosed with right temporal glioblastoma and that she had suffered a surgery during which an almost total surgical ablation had been performed. After the surgery, the patient was treated using radiotherapy (60 Gy). Currently the imagistic investigations showed the presence of a local relapse. During a surgical approach a small fragment of the tumor was collected and it was processed using the normal histological technique. The anatomopathological diagnosis was: glioblastoma with glomeruloid proliferation of intratumoral vessels and small areas of focal necrosis. Previous slides have been reexamined and compared with the recent examination. The Envision technique was used for both samples, in order to obtain imunohistochemical colorations with antibodies anti-GFAP, anti-EGFR (epidermal growth factor receptor), anti-PCNA şi anti-Ki67. The imunohistochemical reactions were intensly positive at the level of the tumoral cells for the anti-GFAP antibodies. The proportion of tumor cells with EGFR amplification was 20% in the first tumor and 34% in the second one. The PCNA proliferation index had average values of 18% (first tumor), respectively 33% (second tumor), while the average for Ki67 was 10%, respectively 18%.
Conclusions: The young age of the female patient, the temporal site of the tumor, the small proliferation index of the first tumor as well as radiotherapy seem to represent factors indicating a positive prognosis.