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Rubrik: 1.Main Topic I
Abstract Nr.:1

Titel:Combined therapy with cyclodestrin/allopregnanolone and miglustat in npc1 mutant mouse model influences neuronal numbers and volumes of cerebellar compartments

Autoren: Maass F.(1),Petersen J.(1),Schmitt O.(1),Witt M.(1),Rolfs A.(2),Wree A.(1),

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Abstract:
Niemann Pick Type C1 (NPC1) is an autosomal recessive storage disorder characterized by intracellular accumulation of cholesterol and glycosphingolipids in many tissues including brain. In a series of experiments we could demonstrate that a combined therapy utilizing cyclodextrin, allopregnanolone and miglustat is able to restore the motor disturbances in a mutant mouse model of NPC1 disease. The present study was designed to elucidate morphological changes, underlying these improvements. Particularly, we examined the effects of the combined therapy with respect to the cereballar structures.
Three groups of mice were included in this study: sham (NaCl)-treated and combination-treated mutant NPC1 mice, and their age matched healthy siblings. Sham-treated NPC1 mutant mice had a dramatic age dependent loss of Purkinje cells and an accompanying loss of interneurons in molecular and granular layers, when compared with the control group. Volumes and neuronal numbers of deep cerebellar nuclei also showed degenerative transsynaptic changes.
Combined therapy of NPC1 mice from P7 onwards resulted in a significantly increased lifespan and beneficial effects on the general health, including less neurological symptoms like ataxia.
Morphologically, in the combination-treated NPC1 mice we found reduced degenerative changes in the cerebellum, i. e. more Purkinje perikarya, more interneurons in the molecular layer, and more neurons in the deep cerebellar nuclei. These structural alterations are in a good agreement with the behavioral improvements in these mice and can be explained by reduced neuronal storage of cholesterol and glycosphingolipids upon combination-therapy.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:2

Titel:Effect of 5/6 nephrectomy on the expression of hippocampal polyamines in a rodent model of chronic kidney disease

Autoren: Hanowski T.(1),Lesch T.(1),Knöfel F.(1),Kielstein H.(1),Jäger K.(1),

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Abstract:
The prevalence of chronic kidney disease (CKD) is increasing worldwide. Currently about 14% of the population in industrialized countries is thought to suffer from some degree of renal impairment. Epidemiological studies show that cognitive impairment progresses with the deterioration of renal function, best epitomized by marked cognitive impairment of patients on dialysis as compared to the general population. The aim of our study was to evaluate the effect of CKD on the expression of spermine synthase (SMS) and spermine oxidase (SMOX) in hippocampi of Fischer rats. These enzymes are involved in polyamine cycle. Polyamines may affect the memory in different ways, for example they are ligands for NMDA receptors and influence the cell growth and aging. 14 weeks old male Fischer rats (n=30) were divided into two groups. The first group was sham-operated (n=13) and the other underwent 5/6 nephrectomy (n=17). All animals were sacrificed for blood and tissue sampling, 6 weeks after the operation. Rat brains were formalin-fixed and consecutively hippocampal sections were immunohistochemically stained. As compared to the control group the CKD rats showed a significant altered SMS and SMOX expression. In both groups the expression was region-specific. These data suggest that CKD influences the hippocampal expression of polyamines affecting the cognitive potential and herewith contribute to the cognitive deficits of CKD patients.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:3

Titel:Expression patterns of prosap2/shank3 isoforms across brain regions of mice and rats

Autoren: Janssen A.(1),Schmeisser M.(1),Bockmann J.(1),Boeckers T.(1),

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Abstract:
ProSAP/Shank proteins are essential components of the postsynaptic density. With their multiple protein-protein-interaction domains they form connecting platforms between neurotransmitter receptors, signalling molecules and the actin cytosceleton. Mutations in these genes can severely affect neuronal connectivity and lead to several mental disorders like autism or schizophrenia.

To analyze the role of ProSAPs/Shanks in autism, we generated and characterized ProSAP2/Shank3 mutant mice. Generating full knock-out mice is difficult as ProSAP/Shank proteins are very complex and exist in different isoforms. Until now, four different ProSAP2/Shank3 mutant mouse models exist, generated by five different labs. Each of these models misses different parts of the gene and different isoforms of the protein. These mouse models also differ in their phenotypes. Hence, it seems that different ProSAP2/Shank3 isoforms have distinct functions, depending on which protein-protein-interaction domains they include. Analyzing wild-type and ProSAP2/Shank3 mutant brain material showed that expression of these isoforms differs across brain regions. When developing therapeutic approaches for autism, it might be crucial to consider the different roles and expression patterns of the different isoforms.

Rats, in contrast to mice, show a broader range of social behaviour and their neuronal circuitry is closer to that of humans. They are also preferred by the pharmaceutical industry. Therefore we additionally analyze the expression of ProSAP/Shank isoforms in brain regions of wild-type rats. As autism affects four times more men than women, we compare male and female animals and hope to identify a putative protective effect in females which might then be used as therapeutic target.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:4

Titel:Expression of some neurotrophic factors and their corresponding receptors in the rat carotid body

Autoren: Atanasova D.(1),Dimitrov N.(2),Lazarov N.(3),

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Abstract:
The carotid body (CB) is a small neural crest-derived organ that detects the oxygen level in blood and regulates ventilation. The most abundant cell types in the CB glomeruli are glomus or type I cells which are enveloped by processes of sustentacular or type II cells. Growth and neurotrophic factors have been established as signaling molecules playing an important role in the development of the CB. To gain insight whether these signaling molecules are present in the adult rat CB, we examined the expression and cellular localization of some neurotrophic factors and their corresponding receptors in this organ by immunohistochemistry. The results show the presence of nerve growth factor (NGF), brain-derived neurotrophic factor (BDNF), glial cell line-derived neurotrophic factor (GDNF) as well as p75NTR, tyrosine kinase A receptor (TrkA), tyrosine kinase B receptor (TrkB) and GDNF family receptor alpha1 (GFRα1) in the adult CB. At the lightmicroscopical level the immunoreactivity for NGF and both its low-affinity (p75) and high-affinity (TrkA) receptors is detected in the majority of glomus cells and also in a subset of sustentacular cells. BDNF and its receptors, p75 and TrkB, are observed in the glomus cells too. Surprisingly, the immunohistochemical analysis revealed that the neuron-like glomus cells, but not the glial-like sustentacular cells, expressed GDNF and GFRα1. It can be inferred that neurotrophins, particularly the GDNF, may also be involved in the CB cell differentiation and survival in adulthood, and they could possess potential applicability in cell therapy as promising tools for neurodegenerative disorders.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:5

Titel:Intrastriatal botulinum neurotoxin-a injection in rats does not damage striatal cholinergic neurons - a histological and stereological analysis

Autoren: Mehlan J.(1),Brosig H.(1),Hawlitschka A.(1),Schmitt O.(1),Mix E.(2),Benecke R.(2),Wree A.(1),

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Abstract:
Recently we showed that intrastriatally applied BoNT-A reverses the apomorphine-induced rotation behaviour in the 6-OHDA-induced rat model of hemi-Parkinson\'s disease (PD) for more than 3 months and restores the symmetric forepaw usage, which is disturbed by the 6-OHDA-lesion. Furthermore, intrastriatal treatment with BoNT-A in rats leads to multiple round axonal swellings in the CPu that are immune reactive either for choline acetyltransferase (ChAT) or for tyrosine hydroxylase (TH) and which we tentatively named BoNT- induced varicosities (BiVs).
To test the potential of an intracerebral BoNT-A treatment as a therapeutic option of PD and to exclude cytotoxic effects of BoNT-A we studied the consequences of intrastriatal injection of BoNT on brain histology and the number of cholinergic neurons of the CPu by the optical fractionator method. Here we investigated the long-term effect of the injection of 1 ng BoNT-A into the right CPu of Wistar rats on the number of ChAT-positive interneurons as well as on the number and the size of ChAT- and TH-positive BiVs in the CPu.
Significant differences in the number of ChAT-positive neurons between the right BoNT-A-treated CPu and the left untreated CPu were not detected. The numeric density of the ChAT- and TH-positive BiVs in the CPu reached a maximum 3 months after BoNT-treatment and decreased afterwards, whereas the volume of the BiVs increased steadily throughout the whole time course of the experiment.
We conclude that intrastriatal BoNT-A application at doses up to 1 ng does not lead a loss of cholinergic neurons.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:6

Titel:Olfactory deficits in Niemann-Pick-disease type C1

Autoren: Witt M.(1),Meyer A.(1),Hovakimyan M.(1),Hummel T.(2),Rolfs A.(3),Wree A.(1),

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Abstract:
Niemann-Pick type C disease (NPC) is a rare autosomal recessive lipid storage disease characterized by progressive neurodegeneration. We used a mouse model (mutated NPC1 gene that encodes for a cholesterol transporting glycoprotein) to examine the effects of this disorder to morphologically distinct regions of the olfactory system.
For histochemistry, we applied antibodies against a series of neuronal and glia marker proteins, proliferation antigens, apoptotic and macrophage markers. Mutant animals present myelin-like lysosomal deposits in virtually all types of cells of the peripheral and central olfactory system. Especially supporting cells of the olfactory epithelium and central glia cells are affected resulting in astrocytosis and microgliosis in the olfactory bulb. Unmyelinated olfactory afferents of the lamina propria seem less affected than ensheathing cells. Electroolfactograms of the olfactory mucosa suggest that NPC1-/- animals exhibit severe olfactory and trigeminal deficits. Treatment with an inhibitor of glucosylceramide synthase, miglustat, may prevent the accumulation of glycosphingolipids and is likely to improve olfactory function. These changes will be investigated based on the present model including immunohistochemistry and electrophysiology.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:7

Titel:The role of ProSAPs/Shanks in early development of hippocampal neurons

Autoren: Halbedl S.(1),Boeckers T.(1),Schmeisser M.(1),

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Abstract:
All three ProSAP/Shank family members (Shank1, ProSAP1/Shank2, ProSAP2/Shank3) are essential scaffold proteins of the postsynaptic density (PSD) of excitatory glutamatergic synapses. In the PSD, ProSAP/Shank proteins multimerize and build large molecular platforms thus providing multiple protein-protein-interaction sites. These platforms are linking postsynaptic receptors with their downstream signaling proteins and the actin cytoskeleton of dendritic spines. Over the last decade, mutations in those genes were found to play a central role in the pathogenesis of autism spectrum disorders and schizophrenia. Interestingly, two studies already implicated a role of ProSAP/Shank in early development of primary hippocampal neurons by revealing ProSAP1/Shank2 and ProSAP2/Shank3 immunoreactivity in growth cones. For a more detailed analysis of ProSAPs/Shanks in early neuronal development, we examined hippocampal neurons at distinct early developmental stages. We could show, that ProSAP2/Shank3 and ProSAP1/Shank2, but not Shank1 strongly appear in growth cones of hippocampal neurons at early stages of development. In parallel we analyzed the expression dynamics of all ProSAPs/Shanks on mRNA and protein levels in developing hippocampal cultures. Moreover, we are using different in vitro and in vivo model systems to elucidate the role of those proteins in early neuronal differentiation.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:8

Titel:Unilateral intrastriatal injections of botulinum neurotoxin a in the rat model of parkinson's disease affects behavioural and structural parameters

Autoren: Hawlitschka A.(1),Antipova V.(1),Mix E.(2),Schmitt O.(1),Dräger D.(1),Benecke R.(2),Wree A.(1),

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Abstract:
Parkinson\'s disease (PD) is one of the most frequent neurodegenerative diseases. Recently, we could show that intrastriatally applied BoNT-A at a dose of 1 ng reverses the apomorphine-induced rotation behaviour in the 6-OHDA-induced rat model of hemi-PD for more than 3 months.
Here we performed further investigations for functional consequences of the intrastriatal BoNT-A treatment on motor function in the rat model of hemi-PD by amphetamine-induced rotation test, cylinder test, accelerod test and open field test. To exclude cytotoxic effects of BoNT-A we analyzed in a second test series with unlesioned BoNT-A treated rats, the distribution of inflammatory markers (GFAP, Iba1). Furthermore, the total number of CPu neurons and the striatal volume of the BoNT-A treated (right) hemisphere and the untreated (left) hemisphere were estimated by the optical fractionator method here.
In hemi-PD rats intrastriatal BoNT-A abolished apomorphine-induced rotations, increased amphetamine-induced rotations and tendentially improved left forelimb usage. Forced motor function in the accelerod test was not significantly changed by BoNT-A and open field activity was also unaltered as compared with sham treatment. Thus, intrastriatal BoNT-A affects spontaneous motor activity of hemi-PD rats to a minor degree compared to drug-induced motor function.
Neither enhanced immune reactivity for inflammatory markers in the right (BoNT-A treated) CPu nor differences between total number of neurons in the BoNT-A treated and untreated CPu were detected. We conclude that intrastriatal BoNT-A application at doses up to 1 ng improve behavioral parameters in hemi-PD-rats without leading to neuronal cell loss or inflammatory reactions.

Kategorie: Poster

Rubrik: 1.Main Topic I
Abstract Nr.:9

Titel:Therapy with cyclodextrin/allopregnanolone and miglustat improves motor but not cognitive functions in niemann-pick type c1 mutant mice

Autoren: Petersen J.(1),Maass F.(1),Hovakimyan M.(1),Holzmann C.(2),Witt M.(1),Lukas J.(3),Rolfs A.(3),Wree A.(1),

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Abstract:
Niemann–Pick disease type C1 (NPC1) is a fatal neurovisceral lipid storage disease of autosomal inheritance resulting from mutations in the NPC1 gene. It was shown that a combined treatment with cyclodextrin, allopregnanolone and miglustat (CYCLO/ALLO/miglustat) ameliorates NPC1 disease in a mutant mouse model (NPC1-/-). The present study aimed to evaluate the possible beneficial effects of CYCLO/ALLO/miglustat-treatment on NPC1-/- mice behaviour.NPC1 mutant mice (NPC1-/-) and age-matched healthy controls (NPC1+/+) were used. The NPC1-/- mice were divided in two groups, becoming either sham (NaCl) or combined therapy. Locomotor activity of NPC1-/- mice was assessed and compared with NPC1+/+ group in open field, elevated plus maze and accelerod tests. For assessment of spatial learning and memory Morris water maze test was conducted.The sham-treated NPC1-/- mice displayed retarded growth starting at P42, exhibiting a significantly lower final weight compared to the combination-treated NPC1-/-. The sham-treated group revealed motor impairments, as indicated by open field and elevated plus maze tests. Furthermore, the accelerod test revealed declined motor coordination in sham-treated NPC1-/- mice. In the water maze the sham-treated NPC1-/- exhibited impairment in remembering the location of the hidden platform. CYCLO/ALLO/miglustat treatment positively influenced motor dysfunction as shown by significantly increased total distance and number of visits in open field and elevated plus maze tests, and improved accelerod performance. The spatial learning, however, did not benefit from therapy. CYCLO/ALLO/miglustat therapy ameliorates motor but not cognitive deficits of NPC1-/- mice, suggesting unequal vulnerability of different brain regions to the treatment.

Kategorie: Poster

Rubrik: 2.Main Topic II
Abstract Nr.:10

Titel:Porcine intestinal and lymphatic tissues under the influence of enterococcus faecium ncimb 10415 and salmonella typhimurium

Autoren: Rieger J.(1),Janczyk P.(2),Hünigen H.(1),Hirschberg R.(1),Plendl J.(1),

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Abstract:
Intraepithelial lymphocytes (IEL) are the first in line to have contact to any antigen present in the gut. Their number increases rapidly postnatally and this seems to be driven by the luminal microbiota. This study aimed to shed light on intestinal morphology and IEL under the influence of a presumably probiotic Enterococcus (E.) faecium and the pathogen Salmonella (S.) Typhimurium.
Weaned piglets were allocated to 4 groups: control, a group fed E. faecium, a group challenged with S. enterica serovar Typhimurium DT 104 and a group challenged with S. Typhimurium and receiving E. faecium in the diet. The influence of age and E. faecium on the morphology of the jejunum and the number and distribution of IEL in the jejunum was evaluated by light microscopy and morphometrics. IEL distribution was investigated within different mucosal layers, i.e. tip and base of villi; and within apical, peri-nuclear and basal intra-epithelial compartment. Additionally pathological findings and the tissue distribution of S. Typhimurium after the infection were characterised within tonsils, jejunal and ileal mesenteric lymph nodes, jejunum, ileum and colon using immuno- and histochemistry. S. Typhimurium was detected with a monoclonal mouse anti-S. Typhimurium antibody. A scoring system for the severity of infection-related changes within the examined tissues was employed. As expected, salmonellae caused damage of intestinal mucosa. S. Typhimurium could be detected in different tissues including the intestinal macrophages. First results revealed that age, tissue and feeding of E. faecium had significant effects on the immunohistochemical score, morphology and number of IEL.

Kategorie: Poster

Rubrik: 2.Main Topic II
Abstract Nr.:11

Titel:Surfactant Proteins of the human larynx

Autoren: Sheats M.(1), Schicht M.(1), Bohr Ch.(2), de Tristan J.(2), Iro H.(2), Paulsen F.(1), Bräuer L.(1),

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Abstract:
Surfactant proteins (SPs) originally known from pulmonary tissue are important players of the immune system and beyond this support the stability and rheology of gas or fluid interphases. In the present study we evaluated the expression and presence of SPs (A, B, C and D) in different locations of the human larynx for the first time. mRNA expression of SP-A, -B, -C and -D was analyzed by RT-PCR in healthy samples of epiglottal fat, oral and laryngeal epiglottal mucosa, vocal and ventricular folds, as well as subglottic and tracheal mucosa. The distribution of all four SPs was analyzed by means of Western blot analysis and immunohistochemistry in healthy human tissue samples. Results reveal that all four SPs are produced in varying contents within the different regions of the human larynx. Based on the known functions, SPs might be involved in immune defense of the larynx. Moreover, they could play a role in regulation of mucus rheology and as a consequence they could be essential components for proper phonation.

Kategorie: Poster

Rubrik: 2.Main Topic II
Abstract Nr.: 12

Titel: The pig's chronic oral exposure to deoxynivalenol (DON) partially attenuates acute effects of *E.coli* lipopolysaccharide (LPS) on hepatic morphology and function

Autoren: Stanek C.(1),Reinhardt N.(1),Diesing A.-K.(1),Nossol C.(1),Kahlert S.(1),Panther P.(1), Rothkötter H.-J.(1),Kuester D.(2),Brosig B.(3),Kersten S.(3),Dänicke S.(3),Kluess J.(1)

Adressen:(1) Institute of Anatomy, (2) Institute of Pathology, Medical Faculty, Otto-von-Guericke University, Magdeburg, Germany and (3) Institute of Animal Nutrition, Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Braunschweig, Germany

Abstract:
Lipopolysaccharides (LPS), a part of the cell wall of gram-negative bacteria, and deoxynivalenol (DON), a mycotoxin produced from crop contaminant *Fusarium spp.*, are each reported to have detrimental effects on the liver. A potentiating toxic effect of the combined exposure was reported previously in a mouse model and hepatocytes *in vitro*, but not in swine as the most DON-susceptible species. Pigs were fed either a control diet (CON) or a diet naturally contaminated with DON (3.1 mg DON/kg diet) for 37d. At day 35 pigs were fitted with permanent venous catheters and after 2d of recovery control pigs were infused for 1h either with 0.9% NaCl (CON-CON), 100 µg/kg BW DON (CON-DON), 7.5 µg/kg BW LPS (CON-LPS), or both toxins (CON-DON/LPS) and DON-fed pigs with 0.9% NaCl (DON-CON) or 7.5 µg/kg BW LPS (DON-LPS). Blood samples were taken before and after infusion (–30, +30, +60, +120, and +180min) for clinical blood chemistry. Pigs were sacrificed at +195 min, livers inspected and evaluated using the histopathological score adapted from Ishak *et al.* (1995). LPS resulted in higher relative liver weight ($p < 0.05$), portal, periportal and acinar inflammation ($p < 0.05$), haemorrhage ($p < 0.01$) and pathological bilirubin levels (CON-CON 1.0 µmol/L vs. CON-LPS 5.4 µmol/L, CON-DON/LPS 8.3 µmol/L; $p < 0.001$). However, prior DON feeding alleviated most effects of LPS infusion on histopathology and blood chemistry to control levels, whereas DON infusion alone had no impact.

References:
Ishak, K; Baptista, A; Bianchi, L., 1995. Histological grading and staging of chronic hepatitis. J Hepatol 22: 696–699.

Kategorie: Poster

Rubrik: 2.Main Topic II
Abstract Nr.: 13

Titel:Basolateral application of the mycotoxin Deoxynivalenol on intestinal porcine epithelial cells IPEC-J2 leads to remarkable changes in gene regulation

Autoren: Diesing A.-K.(1),Nossol C.(1),Ponsuksili S.(2),Wimmers K.(2),Kluess J.(1),Rothkötter H.-J.(1),Kahlert S.(1)

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Abstract
The border between the luminal and systemic side of the intestine is represented by the epithelial cell layer. These cells absorb or exclude substances, which varies along the gut axis. As a result, toxic substances are also transported via the blood circulation to the basolateral side of the epithelium. The mycotoxin deoxynivalenol (DON) is produced by *Fusarium graminearum* and was found in pigs systemically after exposure to contaminated feed. Here we studied the reactions on genome-wide gene expression level in membrane-cultured polarised intestinal porcine epithelial cell line IPEC-J2 after apical and basolateral DON (200 and 2000 ng/mL) application for 72h. Untreated and DON-treated IPEC-J2 samples were analysed with the GeneChip® Porcine Genome Array of Affymetrix. In comparison, the low basolateral DON (200 ng/mL) application triggered 10 times more gene transcripts as the corresponding apical application (2539 versus 267). Both cell layers stayed intact during DON exposure as measured by transepithelial electrical resistance (TEER). Cluster analysis using bioinformatic resource tool DAVID revealed the allocation of significantly regulated genes to numerous biochemical pathways. Selected genes of these pathways like cellular metabolism, information processing and structural design were verified by quantitative PCR. Our results show that apical and basolateral application of epithelial cell layers produced different gene response profiles, depending on the route of application. The evaluation of toxicological potentials of mycotoxins should take this difference in gene regulation dependent on route of application into account.

Kategorie: Poster

Rubrik: 2.Main Topic II

Abstract Nr.:14

Titel: Morphological differentiation and the comparison of two intestinal porcine epithelial cell lines (IPECs) via microarray analysis

Autoren: Nossol C.(1),Kahlert S.(1),Faber-Zuschratter(1), Kluess, J.(1),Ponsuksili S.(2),Wimmers K.(2),Rothkötter H.-J.(1),Diesing A.-K.(1)

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Abstract:
The pig displays a certain genetical and physiological resemblance to humans, therefore it is an often-used experimental animal model for humans. The Intestinal porcine epithelial cell lines-1 and -J2 (IPEC-1 and IPEC-J2 are two spontaneously immortalised cell lines suitable for studying gut physiology. In our study IPECs were characterised with the focus on cellular growth (generation time, cell density, growth without basement membrane anchorage, cellular connections/tight junctions and cellular differentiation). Furthermore, a microarray (GeneChip® Porcine Genome Array) was performed to compare the genome-wide gene expression profile of IPECs. Different pathways were identified and a panel of genes involved in the development of the brush border, structural proteins, cell metabolism and proteins of the tight junctions were selected and analysed in detail by quantitative PCR. Genes that are involved in the cell differentiation (VIL1, VIL2, TLR4, MUC4 and ESPN) were significantly up-regulated in IPEC-J2. This is reflected in the morphological results, for example IPEC-J2 showed more microvilli in comparison to IPEC-1.
The role of p53 in the immortalisation of these cell lines is still unknown. Therefore, we analysed p53 and important p53-related genes like BAD, BAX and BCL-XL on mRNA and protein level. Our results indicate that the permanent growth of the both cell lines is based on the up-regulation of BCL-XL and the down-regulation of p53 and BAX.

Kategorie: Poster

Rubrik: 2.Main Topic II
Abstract Nr.: 15

Titel: The fungal toxin Deoxynivalenol induces in combination with LPS an up-regulation of IL-8 in monocyte derived dendritic cells

Autoren: Nossol C.(1), Diesing, A.-K. (1), Schmidt, A.(1), Kersten S.(2), Kluess, J.(1), Kahlert S.(1), Dänicke S.(2), Rothkötter H.-J.(1)

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Abstract
Mould-contaminated grains and/or mould-contaminated air are a severe health risk, they result in unspecific disease symptoms. There is evidence for an interaction of allergic diseases and the exposure to mould. The exposure to the mycotoxin deoxynivalenol (DON, produced by *Fusarium graminearum*) is a permanent health risk for both human and farm animals as a certain amount of DON remains after standard milling and grain processing procedures. Due to the widespread distribution of DON in the organism after oral uptake and rapid absorption it is not surprising that many reports indicate that DON has affects on the immune system. The mechanisms of DON affecting immunity or haematology after oral uptake have not been defined yet. The present study analyses the function of monocyte-derived dendritic cells (MoDC) after DON exposition and an additional LPS stimulus For the first time it was possible to show a synergistic effect of both – low physiological DON-doses in combination with low LPS-doses on the IL-8-expression. This was shown both on the protein- and RNA-level. The DON and LPS doses inducing this IL-8 production were comparable to those detected in an accompanying in vivo experiment carried out in pigs. As IL-8 together with other anorectic cytokines like IL-1β can affect the food intake and anorexia, the regulation of MoDC shown here may be a reason for low weight gain in pigs fed DON contaminated food.

Kategorie: Poster

Rubrik: 3.Methods/Teaching
Abstract Nr.:16

Titel:3d illustrations in anatomy teaching

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Abstract:
It has been shown already that it is difficult to improve the understanding of complex anatomical situations using regular two-dimensional (2D) images. Understanding of the complex topography of various anatomical regions, including neuroanatomical sites, is one of the outstanding reasons to conduct human dissections courses during the medical education. However, most teaching books present 2D images, making it complicated for the students to study complex anatomical structures at home our outside of the dissection room. The possible advantages of 3D presentations in learning about and understanding of complex spatial interactions have been described and are well appreciated. This work addresses the construction of an atlas of the cranial nerves and base of the skull. High resolution illustrations of various neuroanatomical regions were acquired and can be used for lectures and seminars or for the students to study anatomy at home. The use of 3D anaglyph glasses allows the visualization of the 3D images independent of any specific technical equipment. The presented high resolution illustrations are potentially useful for anatomy browsing, user self-testing, automatic student assessment, preparing materials, and localization in clinical and paraclinical neurology.

Kategorie: Poster

Rubrik: 3.Methods/Teaching
Abstract Nr.:17

Titel:A procedure for quantitative description of the anatomy of the ear channel

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Abstract:
For the realization of an in the channel (ITC) laser vibrometer to measure the movements of the ear drum, we need quantitative 3D data about the anatomy of the ear channel. Data from literature is restricted to the cartilage surrounded outer third of the channel, but as boundary conditions for our technical developments we need as well a spatial description of the bony part, and of the angles of the two bends. Radiologic methods (X-CT, NRI-CT) do not provide the high resolution necessary. We have access to polysiloxane fillings of the ear channel taken from patients for means of adaptation of the ear probes of hearings aids. We analyzed some 70 fillings to identify gross varieties of shape, and to check the applicability of our analytic chain from 3D-scanner (3shape, Denmark) via STL-files to MATLAB® routines for automated evaluation under our applicative perspective. Before we start the analysis of the 150,000 files describing the polysiloxane probes available, we would like to discuss our proposals for the parameters to be extracted in an anatomical context, since re-analysis of such amounts of data should be avoided (even opening and closing of files without any calculations lasts for two days).

Kategorie: Poster

Rubrik: 3.Methods/Teaching
Abstract Nr.:18

Titel:Cholecystectomy by minilaparotomy: an alternative to laparoscopic cholecystectomy

Autoren: Ilie A.(1),Jianu A.(1),Stana L.(1),Hogea B.(1),Selaru M.(1),Motoc A.(1),

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Abstract:
Laparoscopic cholecystectomy (LC) is the new ”golden” standard in the symptomatic management of gall bladder disorders, and many patients requiring surgery choose this method. Mini cholecystectomy (MC) eliminates from the beginning the costs of technical equipment, although some authors consider it hazardous due to its potential danger of damaging the biliary ducts caused by limited visibility. We retrospectively reviewed the outcome of 1190 cholecystectomies performed through a 4-6 cm transverse subcostal incision and compared the results to published series of laparoscopic cholecystectomy. The average duration of the surgical intervention (35 min), conversion rate (3.5%), the average duration of hospitalization (4 days), bile duct injuries (0.16%), average duration before resuming activity (15 days) are compared with the reported results of laparoscopic and mini cholecystectomy. Mini cholecystectomy is a safe alternative to laparoscopic cholecystectomy.

Kategorie: Poster

Rubrik: 3.Methods/Teaching
Abstract Nr.:19

Titel:High resolution episciopic microscopy (hrem) for visualising dermal blood vessels

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Abstract:
The blood vessels and nerves of the nail bed are tiny structures that form highly complex three-dimensional (3D) plexus. Their visualisation, especially in the context of other tissues is challenging. In a pilot study, we aimed at exploring whether the high-resolution episcopic microscopy technique (HREM) is capable of generating volume data that fit for studying the anatomy of the nail bed of human fingers. We removed the nail of the thumb of the corpse of a 58 years old male, who donated his body to the Center for Anatomy and Cell Biology of the Medical University of Vienna. The corpse was fixed with a mixture of 0.5% formol and 4% phenol for 6 months. With a 4 mm biopsy punch, we took a biopsy from the subungual region and processed it for HREM data generation. Then we produced HREM volume data with a voxel size of 1.07x1.07x1.5µm3 and visualised them with the Amira® software. For proper visualisation of the blood vessel and nerve plexuses we created surface rendered 3D computer models. Our study demonstrates the suitability of HREM for creating highly detailed volume data and 3D computer models of the blood vessels and nerves of the nail bed. As a drawback, it reveals that the generation of surface 3D models has to involve manual segmentation and therefore is very time consuming. However, this time expense is justified by the unique contrast, resolution, and quality of the models.

Kategorie: Poster

Rubrik: 3.Methods/Teaching
Abstract Nr.:20

Titel: Art and anatomical tradition at Museum of Anatomy in Iasi

Autoren: Fatu C.(1), Mihaela Moscu M.(2),

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Abstract:
In 1904, in Iasi – the cultural capital of North-Eastern part of Romania, was inaugurated the Institute of Anatomy, an impressive building with a corinthian fronton style, having on its frontispiece a sculpture of the famous Anatomical lesson of Rembrandt. Inside the institute, beside the dissection rooms and the teaching rooms, a Museum of Anatomy was opened, with an impressive number of wax molds, a collection of embryos in different stages of development, a collection of human normal and abnormal crania and normal and abnormal human skeletons. In the years to come, prestigious professors of medical school in Iasi had enriched these collections with anatomical pieces processed by them. Spiritual owners of the museum were Dimitrie D. Gerota, Francisc Rainer and Ernest Juvara. In time, the anatomical collections were improved with numerous pieces, by the laborious work of students and professors who were in the staff of the institute. Nowadays, “Ioan Iancu” Anatomy Institute is one of the most valuable anatomical museums in Europe.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:21

Titel:A 3d cone beam computed tomography study of the styloid process of the temporal bone

Autoren: Didilescu A.(1),Andrei F.(2),Motoc A.(2),Rusu M.(3),

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Abstract:
Aim. To investigate the length and 3D orientation and to detail the morphological variations of the styloid process. Material and methods. Forty-four patients undergoing temporal bone evaluation for different reasons were randomly selected and included in the present study. The length, angulation in the coronal and sagittal planes, as well as morphological variations of the styloid processes were assessed using cone-beam computer tomography. The Pearson's correlation coefficient was used to test possible associations between the length of styloid process and angulations, as well as between angulations. The Student's t-test was used to compare the differences between the sample mean length and angulations in normal and elongated styloid process groups. Results. The sagittal angle showed weak positive correlations with the styloid process length and the transverse angle ($r=0.24$, $p = 0.02$, $n=88$). A medium positive correlation was found between the sagittal and transverse angulations in the elongated styloid process group ($r=0.49$, $p = 0.0015$, $n = 38$). There was a statistical significant difference between the mean sagittal angulation in elongated styloid and normal styloid process groups ($p = 0.015$). The styloid process morphology also varied in terms of shape, number and degree of ossification. Conclusion. The morphometric and morphologic variations of the styloid process may be important factors to be taken into account not only from the viewpoint of styloid syndromes, but also in preoperatory planning and during surgery.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:22

Titel:Anatomical peculiarities of the collateral branches of the superior mesenteric artery and their clinical importance

Autoren: Alecu S.(1),Bardas A.(1),Bordei P.(1),Iliescu D.(1),

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Abstract:
We performed the study of the origin, number, supplied territory and the anastomoses between the branches of the superior mesenteric artery, using as methods the dissection, the plastic injection and the evaluation of aortic angiographies. The artery of the right colic angle usually originates separately from the superior mesenteric. In one case it originated below the origin of the ileocolic artery. We encountered one case in which the left branch of the artery of the right colic angle supplied the anterior surface of the transverse colon and the upper part of the descending colon, while the left colic artery supplied the posterior surface of the transverse colon. The right colic artery may be frequently absent or may originate from the artery of the right colic angle. The ileocolic artery divides into its terminal branches same level only in 11 cases, most commonly as a terminal bifurcation into an upper trunk formed only by the colic branch and a lower trunk that gave birth to other four branches (28 cases). The middle colic artery was unique in 44 cases (21 cases having its origin in the superior mesenteric artery, in 9 cases from the artery of the right colic angle and in 2 cases from the left colic artery) and was absent in 12 cases. In 20 cases we encountered two middle colic arteries. The knowledge of normal morphology of the superior mesenteric artery and in particular of deviation from this type is of great importance in surgical practice.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:23

Titel:Anatomy and mechanics of the human trunk support cranial gaze control

Autoren: Witte H.(1),Andrada E.(2),

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Abstract:
Human gaze control has been subject to a multitude of studies, identifying the role of neural structures involved and their functional contribution. By combining kinematical data and dynamical simulations we are able to make plausible, that the base of gaze fixation during human walking is “intelligent mechanics” of the whole trunk, allowing the head to form an inertial framework for minimized control demand.
The postcranial human body shape is adapted to the needs of endurant walking, using tunable resonance phenomena. The proportions of the lower extremities fit to the mechanical needs described by spring mass models, the upper extremities form pendula for compensation of inertial forces, the proportions of the trunk fit to the function of a damped torsional spring mass resonator. Using that concept we mirrored trunk movements of 106 volunteers (50f/56m) by our model without exception. We could confirm the non-diagonal phase relation between the axial rotations of shoulder and pelvic girdle (around 90° instead of 180° describing the diagonal motions of hand and feet). The model allows to simulate stable phase relations different from those observed in experiments, without mechanical disadvantages. However, with the phase relations observed the lateral swing of the shoulder girdle and the axial rotation of the head are phase-tuned the way that the optical axes of the eyes are directed constantly to one point – gaze fixation without additional neural control. Mechanics of human motion (partly pre-programmed by human anatomy) may serve to minimize neural control effort.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:24

Titel:Does electric stimulation display the anatomy of the nervus peroneus communis? A comparison of topographical anatomy and motor response

Autoren: Panther P.(1),Hausmann J.(2),Nullmeier S.(3),Büntjen L.(1),

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Abstract:
Objective: Hemiplegic patients show often a weakness of dorsiflexion of the foot. The stimulation of the nervus peroneus communis improves the degree of the weakness in foot lifting, promotes the physiologically correct gait and stabilizes the walking pattern. It also increases the walking speed and fewer accidents are observed. The topographical anatomy of the unimpaired nervus peroneus communis shows a stable distribution of nerve fibres belonging to each of the innervated muscles. Here we investigated if there is a reproducible pattern of motor response by electrical stimulation of nervus peroneus communis according to four contacts surrounding the nerve.
Methods: Patients who underwent surgery in which they received a stimulator of the nervus peroneus communis (ActiGait®-System) were analyzed. We correlated the motor response gained by activating each of the four contacts in the cuff with the known topography of the nervus peroneus communis from the literature.
Results: We found a relative constant motor response by electric stimulation of each contact in all investigated patients. The fascicles corresponding to a dorsalextension seem to be localized anteriorely, the fibers causing plantarflexion and inversion are localized more posteriorely. Eversion can be observed in all four contacts.
Conclusion: We found that motor response by stimulation of the nervus peroneus communis is relatively constant. Therfore, the stimulation of nervus peroneus communis follows a topographical anatomy according to previous morphological studies. To elucidate the localization of each fiber portion more closely, further electrophysiolgical investigations of motor response and exact analyses of electrode position are needed.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:25

Titel:Experiences with alternative fixation methods in veterinary gross anatomy

Autoren: Al Aiyan A.(1),Weigner J.(1),Lübke-Becker A.(2), Al Masri S.(1), Richardson K.(3), Plendl J.(1),

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Abstract:
Formaldehyde, the traditional embalming agent used in Veterinary anatomy has potential negative health effects. Fungal contaminants are commonly associated with formaldehyde fixation. The aim of this study was a long-term evaluation of the effectiveness of fixative solutions either with low concentrations of formalin or without formalin.
Over four years, we fixed dog, sheep, horse and cattle cadavers using two different fixatives. The first consisted of 2-3% of formaldehyde and the second of nitrite pickling salt (23%). Both fixatives were supplemented with ethanol (30%) and polyethyene glycol (20%). A maintenance solution of ethanol (30%) and polyethyene glycol (20%) was applied to the cadavers. Muscles, lungs and intestine were sampled at regular intervals and analyzed for the presence of fungi, aerobic bacteria and anaerobic bacteria.
After fixation in low formalin, musculoskeletal structures of specimens retained a close to natural appearance; visceral structures were rigid. Microbiological analysis was negative for fungi. Anaerobic bacteria (Clostridium sporogenes, C. tyrobutyricum) were isolated from the muscles of two sheep. Occasionally aerobic bacteria (Bacillus licheniformis) were detected.
After fixation in nitrite pickling salt, musculoskeletal and visceral structures of specimens retained a natural appearance. Microbiological analysis was negative for fungi. However after 24 weeks Enterococcus spp., Staphylococcus spp., Micrococcus spp., Bacillus spp. and Clostridium perfringens contamination was found.
Both fixation methods combined with the continuous usage of the maintenance solution definitely prevent growth of fungi; they are environmentally friendly and cost effective. Adherence to workplace hygiene is essential to lessen the possibility of transmission to humans.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:26

Titel:Long term follow-up of femoropatellatar cartilage thickness change after acute anterior cruciate ligament tear

Autoren: Cotofana S.(1),Wirth W.(1),Eckstein F.(1),Martin H.(1),Lohmander S.(2),Frobell R.(2),

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Abstract:
Introduction: Patellofemoral joint (PFJ) osteoarthritis (OA) is a common disease affecting both young and elderly individuals but its risk factors remain poorly defined. This study aims to investigate the rate of PFJ cartilage thickness change over 5years after anterior cruciate ligament (ACL) tear and to explore the relationship of these changes with age, sex, and BMI.

Materials: 121 adults (32 women, 26.0/4.9 years) with an acute ACL tear were included in a randomized control trial comparing rehabilitation plus early ACL reconstruction (n=62) and rehabilitation plus the option of having delayed ACL reconstruction if needed (n=59). Cartilage thickness was assessed by manual segmentation of patella and (femoral) trochlea with blinding to time point and treatment group.

Results: Older patients (above median age, 25.63years) lost significantly more cartilage than individuals below median age in the patella (p=0.022) and trochlea (p=0.009) over the first 2 years. Similar differences were found in the patella (p=0.004), but not in the trochlea (p=0.17), between 2-5years. No relationship was found for BMI and gender.

Discussion: Cartilage loss in the trochlea may be an early and temporary event occurring within the first 2 years whereas in the patella this seems to occur later than 2 years after the ACL tear. Older age seems to be a risk factor for these changes.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:27

Titel:Median nerve - entrapment or anatomic variations?

Autoren: Motoc A.(1),Sisu A.(1),Petrescu C.(1),Stana L.(1),Ilie C.(2),Moise M.(1),

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Abstract:
The median nerve courses from the brachial plexus in the axilla, being one of the three main nerves of the forearm and hand. The median nerve can be entrapped at many sites: distal humerus by the ligament of Struthers, proximal elbow by the aponeurosisof the biceps brachii, elbow joint, and proximal forearm. The ligament of Struthers is a fibrous vestigial remnant, (2.2-3.3% of the population), that extends from the anteromedial aspect of the distal humerus to the medial epicondyle. It is a cause of median nerve compression, but only in up to 0.5% of cases. The ligament takes origin from a supracondylar spur of the humerus, if the spur is present. We found in 3 cases of macroscopic dissection the median nerve entrapped to 9.3 - 13.6 cm distance to the anterior medial surface of the arm, but we did not find any supracondylar spur of the humerus to confirm the ligament of Struthers in any of the cases. These dissection cases could be normal anatomic variations because we also find the ulnar nerve and the brachial artery entrapped in the same cadavers where the median nerve was entrapped. As conclusion, the clinical condition due to the median nerve entrapment could cause paresthesis and palsy, but these must be proved using ultrasound and other tests.
Keywords: median nerve, dissection, forearm.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:28

Titel:Morphology and operating mode of the distal interphalangeal joints (DIPJ) and the interphalangeal joint of the thumb (IPJT)

Autoren: Nägerl H.(1),Dumont C.(2),Kubein-Meesenburg D.(1),Fanghänel J.(3),Wachowski M.(2),

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Abstract:
Introduction: The general doctrine in anatomic and orthopedic textbooks says that both articulations functionally represent hinge joints with one degree of freedom (DOF). We quantitatively investigated the spatial curvature morphology of the articulating surfaces by addressing the following questions: To what extent do the curvature radii of the articulating surfaces in the DIPJ or the IPJT differ from one another in the sagittal or transverse plane? Which consequences for DIPJ- or IPJT-function can be derived from the curvature geometry and from the locations of contact on these surfaces? Methods: The radii and centers of the curvatures of the joint surfaces were measured in 40 DIPJs and 28 IPJTs. Several pairs of replicas of the two articulating surfaces were made, aligned in extension and then sliced sagittally or transversely. The radii and centers of curvature were read from the slices' contours. Results: In each joint the articulating surfaces are sagittally and transversally incongruous having medially and laterally a point contact. Each joint has four DOFs: one in abduction/adduction, one in axial rotation, and two in extension/flexion. Function: In extension/flexion the muscular apparatus rotates the distal phalanx around an axis defined by the distal articulating surface and simultaneously around an axis defined by the proximal articulating surface. In the DIPJ, the two axes are parallel producing plane movements. In the IPJT the axes intersect at the radial side producing spherical movements. By these functioning models main features of kinematics and statics and mechanisms of lubrication and nutrition can be explained.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:29

Titel:Multiple hepatic veins and hepatic segmentation

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Abstract:
Aim of the study. In our study we assessed the frequency and the number of the hepatic veins, together with the territory they drain.
Material and methods. Our study was performed on a total of 198 human livers using as methods dissection, barium sulfate injection followed by radiography, plastic injection followed by corrosion and ultrasound.
Results. Among the 28 cases with multiple hepatic veins, in 21 cases the hepatic veins were double - 18 of them were double supernumerary veins and 3 cases were middle hepatic veins. In 6 cases we met triple hepatic veins, 5 cases on the right and one case on the left. Among the 5 triple hepatic veins on the right, 4 ended into the inferior vena cava. In one case, on the right, we met 4 hepatic veins. The right inferior hepatic vein drains a relatively extended area of the right lobe, exceeding the VIth segment up to the neighboring segments (V, VII). The middle right hepatic vein drains the upper part of the VIth segment and the entire VIIth segment, and when there are two right middle hepatic veins, they drain together this territory. The middle hepatic veins also drain the IVth segment while the supplementary left hepatic veins drain the IIIrd segment.
Conclusions. We noticed a greater frequency of multiple hepatic veins on the right. Multiple hepatic veins occur more frequently in the ventro-petal liver while in the dorso-petal liver we did not found any case with more than two right hepatic veins.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:30

Titel:Multiple variations of muscles in the fourth compartment on one hand

Autoren: Fischer K.(1),Breitfeld T.(2),

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Abstract:
Variations of the extensor muscles of the hand are very rare. Nevertheless, there are some authors (Türker, Komiyama) trying to find a classification system. Especially for physicians it is very important to know exactly about such variations.
During dissection course, we found multiple variations of extensor muscles running in the fourth compartment. There is an additional M. extensor pollicis et indicis and an additional M. extensor indicis longus. Furthermore, there is a M. extensor indicis et digiti medii.
Such variations are already described in literature but not the combination in one hand, so far. Moreover, we could define the nervale innervation by dissecting Ramus profundus of N. radialis having direct branches into the muscles.
Besides, we classify the course of the tendons in the fourth compartment into a superficial and a profound level.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:31

Titel:Parapharyngeal space roof pneumatizations

Autoren: Jianu A.(1),Andrei F.(2),Motoc A.(1),Loreto C.(3),Rusu M.(4),

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Abstract:
The rhinopharynx and the parapharyngeal space (PPS) are complex anatomical territories located beneath the skull base. Thorough knowledge of the complex anatomy of the PPS is essential in treatment of pathologies such as parapharyngeal abscesses. The present study was performed retrospectively on a group of 35 subjects evaluated by CBCT for various dental procedures. The mean age of the group was 37.9. The major bony landmarks of the PPS roof were: the petrous apex with the carotid canal, the jugular foramen, the foramen lacerum, the sphenopetrosal fissure or suture, and the root of the pterygoid process. Variable patterns of pneumatization were determined by the petrous apex air cells and the pterygoalar recess of the sphenoidal sinus. As related to the individually pattern of pneumatization, the following types of the PPS roof were defined: (i) type 1 – not pneumatized PPS roof; (ii) type 2 – sphenoidal but not petrosal pneumatization of the PPS roof; (iii) type 3 – petrosal but not sphenoidal pneumatization of the PPS roof; (iv) type 4 – sphenoidal and petrosal pneumatizations of the PPS roof. Although on the left side the degree of pneumatization was higher than on the right side, no statistical differences were recorded. The pattern of pneumatizations in the PPS roof should be assessed when PPS involvement in otitis or sinusitis is considered.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:32

Titel:Peculiarities of origin and distribution of the collateral branches of the inferior mesenteric artery

Autoren: Cobzariu A.(1),Bordei P.(1),Iliescu D.(1),Butoi G.(1),

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Abstract:
Aim of the study. The study of the collateral branches of the inferior mesenteric artery on their origin and number and also their colic supplied territory.
Material and methods. We studied 122 cases, using as study methods the dissection, plastic injection followed by corrosion or dissection, and the evaluation of mesenteric angiographies.
Results. The origin of the left colic artery was found at a distance of 0.5 to 5 cm from the origin of the inferior mesenteric artery, with two variations: directly from the lower mesenteric artery or from a colosigmoidian trunk. The origin of the artery is most often at the level of the vertebrae L3-L5 and their corresponding intervertebral discs. From the left superior colic artery may arise a middle colic artery, either as a single colic artery (when the middle colic from the superior mesenteric is missing), or as a second middle colic artery. In these cases, the superior left colic artery provides a much larger than usual area of vascularization. The sigmoid arteries may originate from: the inferior mesenteric artery through a trunk derived from a trifurcation of the inferior mesenteric, from the colic trunk, arising successively from it or from a common sigmoid trunk, from the superior rectal artery, with variable number, calibers and lengths, and with mixed origin.
Conclusions. The origin and the distribution of the collateral branches of the inferior mesenteric artery is closely related to its origin and length and shows a significant importance in left hemicolectomies.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:33

Titel:The pneumatization patterns of the roof of the parapharyngeal space in CBCT

Autoren: Jianu A.(1),Andrei F.(2),Motoc A.(1),Loreto C.(3),Rusu M.(4),

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Abstract:
The rhinopharynx and the parapharyngeal space (PPS) are complex anatomical territories located beneath the skull base. Thorough knowledge of the complex anatomy of the PPS is essential in treatment of pathologies such as parapharyngeal abscesses. The present study was performed retrospectively on a group of 35 subjects (37.1% males) evaluated by CBCT for various dental procedures. The mean age of the group was 37.9. The major bony landmarks of the PPS roof were: the petrous apex with the carotid canal, the jugular foramen, the foramen lacerum, the sphenopetrosal fissure or suture, and the root of the pterygoid process. Variable patterns of pneumatization were determined by the petrous apex air cells and the pterygoalar recess of the sphenoidal sinus. As related to the individually pattern of pneumatization, the following types of the PPS roof were defined: (i) type 1 – not pneumatized PPS roof; (ii) type 2 – sphenoidal but not petrosal pneumatization of the PPS roof; (iii) type 3 – petrosal but not sphenoidal pneumatization of the PPS roof; (iv) type 4 – sphenoidal and petrosal pneumatizations of the PPS roof. Although on the left side the degree of pneumatization was higher than on the right side, no statistical differences were recorded ($p > 0.05$). The pattern of pneumatizations in the PPS roof should be assessed when PPS involvement in otitis or sinusitis is considered.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:34

Titel:The vascular layers on the rostral ventrolateral medulla

Autoren: Motoc A.(1),Pop E.(1),Jianu A.(1),Rusu M.(2),

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Abstract:
The present study was aimed at documenting the complete neurovascular anatomy of the rostral ventrolateral medulla oblongata (RVLM), in order to offer a general picture of the possible offending vessels of this area, which seems to be involved in the pathogeny of the essential hypertension. The present study was performed on 20 human adult brainstemcerebellum blocks, dissected out of the posterior cerebral fossa at autopsies. The origins of the inferior cerebellar arteries (AICA, PICA) were traced bilaterally (n=40 sides). When present (26/40) AICA most frequently left the basilar artery and PICA (28/40) most frequently left the vertebral artery. At the level of the RVLM, a quadrilateral space delimited by the vertebral artery (VA) and the vertebrobasilar junction, the AICA and the PICA, was defined. Within that space, three vascular layers were identified: a superficial one, formed by the inferior cerebellar arteries, a middle one, consisting of perforating arteries, and a deep, venous one. The RVLM perforating arteries left the VA (31/40), basilar artery (BA) (3/40), anterior spinal artery (ASA) (34/40), PICA (28/40) and AICA (24/40). These perforators had a transverse or oblique course if given off by the VA, BA or ASA, were descendant if given off by the AICA or BA, and were ascending if given off by the VA or PICA. Major vessels, such as the VA, AICA or PICA should not be viewed as the only possible offending vessels at this level. The perforators and the venous layers in the quadrilateral space should also be better evaluated.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:35

Titel:Triorchidism in a torsioned testical – macroscopical and microscopical study

Autoren: Osakwe H.(1),Strecu L.(2),Frandes C.(3),

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Abstract:
Polyorchidism cases are relatively rare, with less than 200 cases quoted in the literature. Most of the cases are represented by triorchidism. The etiology of polyorchidism is unsure. There are a few theories that have been suggested including anomalous appropriation of cells in the genital ridge between the 5th and the 8th week of gestation, duplication or transverse vs. longitudinal division of the urogenital ridge, incomplete degeneration of mesonephrones and development of peritoneal bands. No single theory can explain all types of polyorchidism.
The present case is regarding the most frequent anomaly of polyorchidism, namely triorchidism, diagnosed intraoperatory, as are most, during an intervention for a torsioned testicle at a 12 year old male patient. As with most cases the supranumerary testes was on the left side. The supernumerary testis has its own epididymis and both epididymis of ipsilateral testes drain into a common vas (complete transverse division of genital ridge as well as mesonephron). This is considered to be type III according to Leung classification. We were interested in both macroscopical and microscopical aspects of the supranumerary testes. For establishing the morphofunctional integrity we used histochemical and immunohistochemical methods.
Conclusions:
Triorchidism remains a rare malformation. Despite the fact that it is not the elective site of malignant testicular tumor development, the macroscopical and microscopical study using the latest methods may represent a contribution to the literature.

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:36

Titel:A case with variant insertion of the coracobrcahialis muscle

Autoren: Sarikcioglu L.(1),Donmez B.(2),Ozsoy U.(1),Hizay A.(1),

Adressen:(1) Department of Anatomy| Akdeniz University, Faculty of Medicine|Antalya|Turkey; email:levent@akdeniz.edu.tr; (2) Department of Nutrition and Dietetics| Akdeniz University, School of Health |Antalya|Turkey

Abstract:
During dissection of right upper limb of a 55-year-old male cadaver we encountered variations of the coracobrachialis and biceps brachii muscles. The short head of the biceps brachii muscle had a broader origination from the coracoid process and capsule of the humeral joint. The coracobrachialis muscle had two heads. The superficial and deep heads of the coracobrachialis muscle had its origin from the coracoid process. However their insertion sites showed variation. The superficial head inserted to the short head of the biceps brachii muscle, medial epicondyle, medial head of the triceps brachii muscle. Additionally, the deep head of the coracobrachialis muscle inserted to the shaft of the humerus and medial head of the triceps brachii muscle. This insertion sites was discussed from clinical, embryological, and diagnostic points of view.

Key words: m. coracobrachialis, insertion variation, trapped n.ulnaris,

Kategorie: Poster

Rubrik: 4.Gross Anatomy/Clinical Anatomy
Abstract Nr.:37

Titel:Value of scintigraphy in the diagnosis of parotid cancer

Autoren: Moscu M.(1), Fatu Vascu A.M.(1), Vascu B.(1), Fatu C.(2)

Adressen:(1) U.M.F. “Gr. T. Popa”, Iasi, Romania; (2) Apollonia University, Iasi, Romania;

Abstract:
Scintigraphy is a modern method in early diagnosis of parotid cancer. We had in aim to capture the radionuclide by including the sulfur-colloid into the macrophages and reticulo-histiocytary tissue. Material and method: a number of 30 cases of parotid tumor were investigated before surgery and pathologic analysis. As radionuclide we used Tc-99, injected in the parotid tissue, and serial images were captured by a gamma-camera and recorded. The contamination risk was minimal, at a range value of 0,03 rad. Results: 10 of the studied cases had a low degree of radionuclide capture, minimal fixation being at 90 minutes after administration and maximal one at 120 minutes. After 180 minutes from the administration the radionuclide disappears from the scintigrams, demonstrating that were benign lesions in those cases. In cases of parotid cancer – 20 cases – we noticed a quick capture in relation with the degree of histopathological differentiation. The more non-differentiated is the lesion, the more rapid is the capture - in 20 minutes, with a peak at 50 minutes and the disappearance in 80 minutes. Conclusion: Scintigraphic method is easy to use, with low nocivity and accurately differentiates the benign conditions from malignancies.

Kategorie: Poster

Rubrik: 5.Experimental Morphology
Abstract Nr.:38

Titel:Apoptosis of smooth muscle cells and endothelial cells in varicose veins

Autoren: Arend A.(1),Lieberg J.(2),Aunapuu M.(3),

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Abstract:
Dysregulated apotosis has been associated with pathophysiology of varicose veins. The aim of this study was to detect apoptotic endothelial cells and smooth muscle cells together with determining expression of NF-kappaB (p105/p50) and Bax in varicose veins wall. Women (n=50) undergoing the excision of varicose veins were divided into 3 groups: younger than 35 years (I), 36-50 years (II), older than 50 years (III). Apoptosis was determined by the TUNEL method, NF-kappaB and Bax expression by immunohistochemistry. The percentage of apoptotic endothelial cells and smooth muscle cells in the layers of varicose vein wall increased in groups II and III. NF-kappaB expression had the lowest level in Group II with particularly low level in the media. Contrariwise, Bax expression levels in Group II were increased. In conclusion, the study revealed that in varicose veins apoptosis of endothelial cells and smooth muscle cells increased with advancing age. If increase in apoptosis during earlier stages of varicosities is probably regulated by the intrinsic pathway, then in older patients other signalling pathways may be involved.

Kategorie: Poster

Rubrik: 5.Experimental Morphology
Abstract Nr.:39

Titel:A view of the immune cell infiltrate and the cytokine pattern in four type 1 diabetes animal models in comparison with the human situation

Autoren: Jörns A.(1),Mathieu C.(2),Gysemans C.(2),Scott F.(3),Wang G.(3),Nakaya Y.(4),Harada N.(4),Marchetti P.(5),Marselli L.(6),Lenzen S.(1),

Adressen:(1)Hannover Medical School|Institute of Clinical Biochemistry|Hannover|Germany; email:joerns.anne@mh-hannover.de; (2)Catholic University of Leuven|Clinical and Experimental Endocrinology|Leuven|Belgium; (3)Ottawa Hospital Research Institute|Chronic Disease Program|Ottawa|Canada; (4)University of Tokushima Graduate School|Institute of Health Biosciences|Tokushima|Japan; (5)University of Pisa|Section of Endocrinology and Metabolism of Organ Transplantation|Pisa|Italy; (6)University of Pisa|Section of Endocrinology and Metabolism of Organ Transplantation|Pisa|Italy

Abstract:
To analyse the pathogenesis of human type 1 diabetes (T1D) the availability of good rodent animal models is necessary. The aim of the study was to compare the immune cell infiltrate composition and cytokine pattern in pancreatic islets in the four spontaneous animal models of human T1D, namely NOD mouse, BB, LEW.1AR1-idddm, and Komeda rats, with the human situation. Compared with healthy control pancreases diabetic pancreases from these animal models as well as from patients with T1D were analysed by immunohistochemistry and in situ RT-PCR. After T1D manifestation CD8 T cells, CD68 macrophages, and CD4 T cells were the main immune cell types with declining frequency in all pancreatic islets. The degree of the immune cell infiltrate was lower in the islets from the BB rat and patients with T1D. The main pro-inflammatory cytokines were IL-1beta and TNF-alpha expressed in the immune cells in NOD mice, BB and LEW.1AR1-iddm rats, as well as in humans with the exception of the Komeda rat expressing IFN-gamma and TNF-alpha. Additionally, the autoimmune IL-17 and the anti-inflammatory cytokines, IL-4, IL-10, and IL-13 were also expressed. Apoptotic as well as proliferating beta cells still remained after diabetes manifestation. In control pancreases there was no immune cell infiltration with any cytokine expression. In summary, immune cell composition and cytokine pattern of the infiltrate in the animal models mirror very well the situation in patients with T1D. Thus animal models of human T1D can contribute to the understanding of the disease processes in the human pancreas.

Kategorie: Poster

Rubrik: 5.Experimental Morphology
Abstract Nr.: 40

Titel:Changes in the extracellular matrix of varicose veins

Autoren: Aunapuu M.(1),Lieberg J.(2),Arend A.(3),

Adressen:(1)Anatomy|University of Tartu, Estonian University of Life Sciences|Tartu|Estonia; email:marina.aunapuu@ut.ee; (2)3Surgery Clinic|University of Tartu|Tartu|Estonia; (3)Anatomy|University of Tartu|Tartu|Estonia

Abstract:
Varicosis is a complex pathology which leads to abnormal dilatation of the vein wall. One of the possible mechanisms of the disease may involve alterations in the composition of the extracellular matrix. The aim of the study was to investigate the expression of collagen I, II, IV, laminin and elastin in the wall of varicose veins. Women (n=147) and men (n=42) undergoing surgery for varicosities were divided into three groups: group I (younger than 35 year); group II (35-50 years old); group III (older than 50 years). The control group included 17 women and 14 men. The expression of extracellular matrix proteins was estimated in the wall of veins by means of immunohistochemistry. The study demonstrated remodelling and fragmentation of elastic fibers in varicose veins. Collagen I and IV immunostaining was found to be weaker in the layers of the varicose vein wall. Weak to moderate expression of collagen II was seen only in the adventitial layer of varicose and control veins. Laminin content was found to be lower in varicose veins, in particular in male patients.
In conclusion, the study confirms that changes in the varicose vein wall are highly variable and both gender and age-related differences occur in the content of extracellular matrix proteins.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:41

Titel:Acetylation of histone 3 at lysine 18 in the dorsal horn of the spinal cord in response to peripheral inflammation – absence of sphingosine kinase 2

Autoren: Cierlitza M.(1), Holt P.(1), Wolf C.(1), Schäfer K-H.(2), Gibbins I-L.(1), Haberberger R-V.(1),

Adressen:(1)Centre for Neuroscience Flinders University|Adelaide|Australia; monikacierlitza89@web.de; (2)Department of Biotechnology University of Applied Sciences|Kaiserslautern|Germany;

Abstract:
Purpose & Methods: Differences in pain susceptibility and the development of pathological pain states might be connected by variations in the epigenetic regulation of nociceptive processing. We compared the patterns of histone H3 proteins that are acetylated on lysine 18 in spinal cord 3-7 days after induction of CFA-induced peripheral inflammation in C57/Bl6 wild-type and sphingosine kinase 2 deficient (Sphk2-/-) mice. H3K18ac is a marker of active chromatin. GFAP, Iba-1 and NeuN were used to label astrocytes, microglia and neurons; DAPI was used as a nuclear stain. Positive labelling was analysed using Image J. Sensitivity to mechanical stimuli was tested with von Frey hairs.
Results: Compared with C57/Bl6 wild-type (wt), Sphk2-/- mice showed a similar decrease in mechanical threshold on the inflamed side but surprisingly their threshold also decreased on the un-inflamed side (n = 6). Peripheral inflammation as indicated by paw size was similar between wt and Sphk2-/-mice. Multiple labelling immunohistochemistry showed the highest H3K18ac immunoreactivity (IR) in the nuclei of neurons, astrocytes and microglia in the dorsal horn compared to the remaining spinal cord in wt and Sphk2-/- mice. The overall number and the number of hyperacetylated H3K18ac-IR nuclei was higher in the contralateral spinal cord of Sphk2-/- compared to wt (n = 3-5). Sphk2-deficient mice showed an increased mechanical sensitivity in ipsi-and contralateral hindpaws in response to inflammation which was accompanied by higher H3K18 acetylation levels contralateral.
Conclusion: The results suggest a Sphk2-mediated modulation of H3 acetylation levels that modulate spinal cord pain processing.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:42

Titel:Anatomical connections between the auditory thalamus and cortex in the mongolian gerbil

Autoren: Saldeitis K.(1),Happel M.(2),Ohl F.(2),Scheich H.(1),Budinger E.(1),

Adressen:(1)Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany; email:Katja.Saldeitis@lin-magdeburg.de; (2)Systems Physiology of Learning|Leibniz Institute for Neurobiology|Magdeburg|Germany

Abstract:
The knowledge about the anatomical organisation of the auditory thalamocortical system is fundamental to understand auditory information processing in the brain. For the Mongolian gerbil (Meriones unguiculatus), a valuable model species in auditory research, the detailed anatomy of this system has not been worked out in detail yet.
Here, we investigated the projections arising from the three subnuclei of the medial geniculate body (MGB), namely its ventral (MGv), dorsal (MGd) and medial (MGm) division as well as several subdivisions, by pressure and iontophoretic injections of the anterograde tract tracer biocytin. The distribution of labelled axonal terminals in the auditory cortex was analysed qualitatively and quantitatively mainly by means of the Neurolucida system (MicroBrightField Europe).
Our data reveal highly specific features of the thalamocortical connections regarding their origin in one of the subnuclei of the MGB as well as their termination patterns in the auditory cortical fields and layers. Besides tonotopically organised connections we found a high number of axons diverging across the tonotopic gradients of the auditory cortical fields. There were also celltype-specific projections. For example, magnocellular neurons of the MGm project in a columnar fashion to several auditory fields thereby forming small- and medium-sized boutons in all but mainly infragranular cortical layers, but also forming hitherto unknown giant terminals.
The recent data, together with our knowledge about the corticothalamic and corticocortical circuitries, will be used for the establishment of an anatomically based model of information processing in the auditory cortex.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:43

Titel:Anatomy of subcortical auditory structures in the mongolian gerbil - a golgi-study

Autoren: Mylius J.(1),Scheich H.(2),Budinger E.(2),

Adressen:(1)Special Lab. Primate Neurobiology|Leibniz Institute for Neurobiology|Magdeburg|Germany; email:Judith.Mylius@lin-magdeburg.de; (2)Dept. Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany

Abstract:
Although established a century ago, the Golgi-Cox method still provides outstanding detailed neuroanatomical information, wherefore we investigated the anatomy of the subcortical auditory structures in the Mongolian gerbil, a common animal model in auditory research, by this method.
Our results confirm a tripartition of the medial geniculate body into a ventral (MGv), dorsal (MGd) and medial (MGm) division. The MGv constitutes of a rostral pole, a laminated lateral and a circular medial part, all harboring mainly (bi-)tufted and stellate cells. The MGd comprises a deep dorsal subdivision with tufted cells and the suprageniculate nucleus with large stellate neurons. The MGm harbors typical magnocellular cells.
The reticular thalamic nucleus contains round, multipolar and fusiform neurons forming sheet-like laminae.
The inferior colliculus comprises a laminated central nucleus with disk-shaped and stellate cells and a dorsal and external cortex, both 3-layered and containing bipolar, multipolar and triangular neurons.
There are three nuclei of the lateral lemniscus: a spherical dorsal nucleus with multipolar and elongated cells, an intermediate nucleus with multipolar and horizontal cells and a bipartited ventral nucleus containing multipolar and vertically elongated cells.
Within the superior olivary complex, the lateral and medial superior olive, medial nucleus of the trapezoid body and superior periolivary nucleus are most conspicuous.
The cochlear nuclear complex constitutes of a 4-layered dorsal part, containing diverse neurons and an antero- and posteroventral nucleus with octopus, spherical and globular bushy cells.
The present study substantially extends the knowledge about the laminar and cellular organization of the gerbil\'s subcortical auditory pathway.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:44

Titel:Aromatase activity is essential for the maintenance of hippocampal synapses in females but not in males

Autoren: Vierk R.(1), Zhou L.(1), Glassmeier G.(2), Rune G.(1)

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Abstract:
Inhibitors of aromatase, the final enzyme of estradiol synthesis, are suspected of inducing memory deficits in women. In previous experiments, we found hippocampal spine synapse loss in female mice that had been treated with letrozole, a potent aromatase inhibitor. In this study, we therefore focused on the effects of letrozole on long-term potentiation (LTP), which is an electrophysiological parameter of memory in the CA1 region of the hippocampus. In acute slices of letrozole-treated female mice with reduced estradiol serum concentrations, impairment of LTP started as early as after 6 h of treatment and progressed further, and after 1 week of letrozole-treatment theta-burst stimulation failed to induce LTP. The effects were confirmed *in vitro* by using hippocampal slice cultures of female mice. The sequence of effects in response to letrozole were similar in ovariectomized female and male mice, with, however, differences as to the degree of downregulation. Unlike in females LTP impairment did not result in synapse loss, neither *in vivo* nor *in vitro*. The differences seen between males and females suggest that hippocampus-derived estradiol is exclusively relevant for hippocampal synapse density in females.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:45

Titel:Characterization of human ipsc derived neurons of diseased or control donors

Autoren: Pfänder S.(1),Liebau S.(1),Grabrucker A.(2),Boeckers T.(1),

Adressen:(1)Institute for Anatomy and Cell Biology|Ulm University|Ulm|Germany; email:stefanie.pfaender@uni-ulm.de; (2)Neurocenter|Ulm University|Ulm|Germany

Abstract:
ProSAP/Shank molecules are important scaffolding proteins in the postsynaptic compartment of excitatory synapses. They build platforms linking components of the postsynaptic signaling apparatus to the actin-based cytoskeleton. Thus, they build a framework for the formation of the postsynaptic density (PSD). Interestingly, two of the three ProSAP/Shank family members are targeted to and regulated at the PSD via their sterile alpha motif which is essential for protein assembly by binding to zinc ions.
A role for ProSAP/Shank proteins in neurodegenerative diseases was first proposed when a deletion in the q13 region of chromosome 22, where the ProSAP2 gene is located, was identified as the main genetic cause for Phelan-McDermid Syndrome (PMS). This syndrome is characterized by features of autism spectrum disorders along with hypotonia and mental retardation. Intriguingly, an association of autism spectrum disorders with zinc deficiency in children was already shown and imbalances in zinc homeostasis have been associated with multiple brain disorders.
Thus, here, we investigate the effects of zinc supplementation and depletion on the differentiation and synaptogenesis of neurons differentiated from human induced pluripotent stem cells. Moreover, we will use PMS patient derived stem cells to evaluate, if zinc supplementation could be a possible treatment strategy for PMS. In a first set of experiments we therefore evaluated expression of zinc homeostasis proteins of neurons differentiated from patient derived and control stem cells. Thus, indeed, zinc seems to be an important factor in neuro- and synaptogenesis and future stem cell based experiments will hopefully provide further evidences.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:46

Titel:Crossmodal thalamocortical and corticocortical connections of primary sensory cortices in the mongolian gerbil

Autoren: Henschke J.(1),Scheich H.(1),Budinger E.(1),

Adressen:(1)Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany

Abstract:
Recent anatomical and electrophysiological studies in animals as well in humans have suggested that the integration of multisensory information on cortical levels not only takes place in “higher-order” association cortices but also in primary sensory cortices like A1 (auditory), S1 (somatosensory) and V1 (visual). Among them are several studies, which demonstrated also very short-latency responses in these cortices, which were elicited by stimuli of other than the own sensory modality. Here, we investigated the possible anatomical pathways for these short latency responses in A1, S1 and V1, which we suppose to be mediated by direct crossmodal inputs from other sensory thalamic and cortical areas.

In order to examine the thalamocortical and corticocortical connections of A1, S1 and V1 we used the retrograde axonal transport of neuronal tracers. Following simultaneous or single injections of FDA (fluorescein-labeled dextran amine) and TMRDA (tetramethylrhodamine-labeled dextran amine) into A1, S1 and V1 we found overlapping clusters of single FDA- and TMRDA-labeled as well as double-labeled cell bodies in several sensory thalamic nuclei like MGD, MGM, SG, LP, LD, Po, VPL, VPM and VL. This indicates that there are individual thalamic nuclei as well as individual neurons, which project in a divergent manner to more than one primary sensory area. Furthermore, we found direct connections between A1, S1 and V1 with strongest projections from V1 to S1.

In summary, there are indeed multiple crossmodal thalamic afferents and corticocortical connections, which might provide the anatomical basis for short-latency multisensory integration processes at a very early cortical level.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:47

Titel:Deficit in PRG1 gene leads to increased locomotor activity and reduced anxiety related behavior accompanied by morphological changes in mice

Autoren: Petzold S.(1),Sommer B.(1),Schwegler H.(1),Nitsch R.(2),Vogt J.(2),Roskoden T.(1),

Adressen:(1)Institut of Anatomy|Otto-von-Guericke-University|Magdeburg|Germany; (2)Institut für Mikroskopische Anatomie und Neurobiologie|Universitätsmedizin der Johannes Gutenberg-Universität Mainz|Mainz|Germany; email:thomas.roskoden@med.ovgu.de

Abstract:
Plasticity-related gene1 (PRG1) is an integral membrane protein located in postsynaptic glutamatergic synapses. It controls signaling pathways of phosphorylated lipid substrates by lysophosphatidate (LPA) receptors, located in the presynapses. A lack of PRG1 reduces processing of sensory information whereas juvenile PRG1 deficient mice suffer from epileptic seizures.
To analyze the effects of PRG1 on locomotor and anxiety-related behavior we used homozygous PRG1-knockout (KO) and their wild type littermates (WT). We measured locomotor activity in the open field and anxiety/fear related behavior in the elevated plus maze and fear sensitized acoustic startle response (FS-ASR). Afterwards we analyzed several morphological markers within the amygdala and the hippocampus using immunohistochemistry.
The deficient PRG1KO showed significantly higher locomotor activity. Stereotype behaviors were observed in the PRG1 deficient mice. Furthermore, reduced anxiety in the elevated plus maze and fear response in the FS-ASR of PRG1KO compared with WT were measured. We also found morphological differences between both groups. In the amygdala the number of NPY- and parvalbumin (GABAergic)-immunopositive neurons is reduced in PRG1 deficient mice and in the hippocampus the density of mossy fibers is reduced of PRG1KO. In contrast, the number of NPY- immunopositive neurons was increased in the dentate gyrus. No differences were found in the number of parvalbumin-immunopositive neurons in the hippocampus.
Reduced number of NPY- and GABAergic neurons in the amygdale may indicate a compensation of higher excitability or a sign of reduced number of inhibiting neurons in anxiety/fear pathways.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:48

Titel:Detection of Pax2 protein during human embryo neurogenesis

Autoren: Namm A.(1),Arend A.(1),Aunapuu M.(1),

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Abstract:
Development, regional specification and neurogenesis of the human brain seem to be controlled by Pax2 proteins family. There are increasing evidences that members of Pax2 genes family exhibit distinct and spatial patterns during mammalian neurogenesis. However data about developmental role of Pax2 protein in human nervous system formation are limited. Therefore the aim of the study was to determine spatial and temporal expression of Pax2 protein during early stages of the developing spinal cord and brain in human embryos. In this study, Pax2 protein was examined by the method of immunohistochemistry. 35 human embryos were obtained after legal abortions in Carnegie stages 10-20. The study was approved by the Ethics Review Committee on Human Research of the University of Tartu. The embryos were fixed in 4% paraformaldehyde and embedded in paraffin according to standard methods. Tissue blocks were cut serially in transversal direction, the sections were incubated with the primary antibody Pax2 (4 µg/ml dilution in PBS) and in the next day sections were incubated with the universal secondary antibody (Vectastain ABC Universal Kit). The labeling was expressed by a subjective scale ranging from 0 to 4. On the basis of our data we can presume that during early human development Pax2 protein is involved in the regionalization and formation of neural tube. Pax2 expression was seen in the developing forebrain, midbrain, hindbrain and in the wall of developing spinal cord.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:49

Titel:Effect of melatonin signaling on POMC expression in the arcuate nucleus and hypophysis

Autoren: Fischer C.(1),Müller T.(2),von Gall C.(3),Korf H.(1),

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Abstract:
Pro-opiomelanocortin (POMC), a precursor molecule for many biologically active neuropeptides, is widely expressed in the neuroendocrine system. In the arcuate nucleus (ARC) POMC is an anorexigenic signal and its expression shows day/night variation. To investigate whether melatonin signaling mediates this variation, Pomc expression was analyzed in ARC and the pars distalis (PD) of wildtype (WT) C3H mice and mice with targeted deletion of the MT1 (MT1ko) at midday and midnight by means of in situ hybridization (ISH). The acute effect of melatonin on Pomc expression was analyzed in WT and MI1ko after a single melatonin injection during daytime. Data from ISH were complemented by demonstration of POMC immunoreaction (Ir). In ARC and PD of WT Pomc expression was higher at night than at day, whereas in MT1ko it was equally low at both timepoints. The intensity of the POMC immunosignals in ARC and PD of both mouse strains did not change between day and night. However, at both time points investigated, lower numbers of POMC immunoreactive perikarya were found in WT as compared to MT1ko mice. The results show that melatonin-signaling is involved in the control of the POMC system in ARC and PD via the MT1 receptor. They suggest that activation of the MT1 receptor stimulates pomc expression in these regions. The immunocytochemical data suggest that deletion of MT1 is associated with the inhibition of POMC release and thus provide further evidence for a stimulatory role of MT1 receptor mediated signaling on the POMC system in ARC and PD.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:50

Titel:Morphometric features and the bending angle of the human supraspinatus tendon

Autoren: Grosse-Buening S.(1),Witt M.(1),Wree A.(1),

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Abstract:
Sliding tendons like the supraspinatus tendon evolve a fibrocartilage zone where pressure takes effect. This avascular region is known to be predestined for tears. In this study we investigated the “bending angle” (first described) morphometrically and tendon parameters like width, length and thickness data. Forty-one supraspinatus were dissected totally from fixed cadavera and investigated macroscopically. The data was gained digitally by Solid Works® from photographs. Bending angles ranged from -3.5° to 65.9°, with a mean of 18.4° ± 12.8° (standard deviation SD), with no significant difference between ruptured and non-ruptured muscles (P=0.377). Interestingly, the ratio “medio-lateral extent” (extent in transversal axis) to “total tendon length” (longitudinal axis of the tendon itself) was significantly higher in tendons with tears (P=0.004). Moreover, lower “width” values of tendons presented tears more often (P=0.058). No differences in the bending angles were found in non-ruptured female (20.8° ± 10.8°; n= 5) and non-ruptured male tendons (20.0° ± 12.7; n= 20) or in ruptured female (15.6° ± 11.7; n= 10) and ruptured male tendons (15.5° ± 13.5; n= 6). Our study shows that the tendon measures itself could obviously dispose for the occurrence of tears. Thus our investigations can be a hint to a better understanding of vulnerable dispositions in supraspinatus tendon tears.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:51

Titel:Expression pattern of epigenome modifying enzymes in sensory neurons in response to peripheral inflammation

Autoren: Wolf C.(1),Vilimas P.(1),Schäfer K.(2),Haberberger R.(1),

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Abstract:
Understanding the development of chronic pain is important since about 40 % of the general population suffer from chronic pain. Recently it has been shown that epigenetic modifications may also determine gene expression and the susceptibility to develop chronic pain. Sphingosine kinase 2 (Sphk2) has been shown to modulate epigenome modifying enzymes. The aim of this study was to determine the expression pattern of epigenome modifying enzymes in murine dorsal root ganglia (DRG) in response to peripheral inflammation.

Complete Freund's Adjuvant (CFA) was unilaterally injected into the hind paw of wild-type mice (C57/Bl6) and mice deficient in SphK2-/- to elicit inflammation (n = 4-6). After dissection of the ipsi- and contralateral DRGs at the level L3-5 2&3 and 7 days after CFA injection, the RNA was extracted and expression levels determined using qRT-PCR and PCR arrays.
We could detect significant changes in mRNA expression in response to peripheral inflammation in ipsi- and contralateral DRG from wt and Sphk2-/- DRG. The expression patterns were significantly different between strains for eleven epigenome modifying enzymes after 2-7 days in ipsilateral DRGs. Changes were not restricted to the injured side. The methyltransferase Setd6 was down regulated in ipsi- and contralateral DRG of wt but not Sphk2-/- mice. DRGs of Sphk2-/- mice showed changes in the expression pattern after 2&3 days but no regulation of enzymes after 7days.
This is the first demonstration of changes in epigenome modifying enzymes in response to peripheral inflammation and of the possible impact of Sphk2 in this response.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:52

Titel:Frequency-related topography of corticofugal connections arising from the primary auditory cortex in the mongolian gerbil

Autoren: Budinger E.(1),Brosch M.(2),Scheich H.(1),Mylius J.(2),

Adressen:(1)Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany; email:budinger@lin-magdeburg.de; (2)Primate Neurobiology|Leibniz Institute for Neurobiology|Magdeburg|Germany

Abstract:
We investigated the frequency-related topography of the connections of the primary auditory cortex (field AI) in the Mongolian gerbil with subcortical structures of the auditory system by means of the axonal transport of two bidirectional tracers. These were simultaneously injected into regions of AI with different best frequency representations (BFs).
AI projects in a topographic (i.e. frequency-matched tonotopic) way to the ipsilateral ventral (MGv) and dorsal divisions (MGd) of the medial geniculate body (MGB), reticular thalamic nucleus and dorsal nucleus of the lateral lemniscus as well as to the ipsi- and contralateral central nucleus and dorsal cortex of the inferior colliculus (IC). AI receives tonotopic inputs from MGv and MGd.
Projections from different BF regions of AI terminate in a non-tonotopic (overlapping) way in the ipsilateral medial division of the MGB (MGm), suprageniculate thalamic nucleus (SG) and brachium of the IC (bic) as well as in the ipsi- and contralateral external cortex and pericollicular areas of the IC. The anterograde labeling in the intermediate and ventral nucleus of the lateral lemniscus, parts of the superior olivary complex and divisions of the cochlear nucleus was generally sparse, thus no clear topographic arrangement of the labeled axons was evident although conceivable. AI receives non-tonotopic inputs from the ipsilateral MGm, SG and bic.
In conclusion, AI contributes to the tonotopic as well as non-tonotopic corticofugal system. Tonotopic connections of AI may serve for a conservation of frequency-specific information in the respective target structures whereas non-tonotopic connections could be involved in frequency-integration processes.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:53

Titel:Impairment of endosome-to-lysosome trafficking and gradual expansion of glutamate receptor fields at the aging Drosophila neuromuscular junction

Autoren: Wagner N.(1),Dittmann U.(2),Heckmann M.(3),Asan E.(1),Neuser K.(3),

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Abstract:
Age-related changes in synaptic plasticity are a focus of attention within neuroscience. Recent data provide evidence that age-related neuronal dysfunction involves subtle pre- and postsynaptic changes that result in altered neurotransmission and synaptic plasticity. Analyzing ultrastructural changes of synaptic morphology and distribution of synaptic key molecules during aging may therefore provide important clues to understand the molecular mechanisms of age-related synaptic dysfunction. Here we introduce the Drosophila neuromuscular junction (NMJ) of the abdominal ventral longitudinal muscle (VLM) as a model to study synaptic plasticity during aging. The combination of fluorescence and electron microscopy revealed striking morphological changes of aging NMJs: (1) Bouton size and complexity increases with proportionally rising number of active zones (AZs). (2) Synaptic vesicle (SV) density at AZs is increased in old flies, indicating impairment of efficient SV release. (3) Late endosomes, cisternae and multivesicular bodies (MVBs) accumulate in the presynaptic terminal during aging, indicating impairment of endosome-to-lysosome trafficking. In addition, vesicles accumulate between perisynaptic membranes and membranes of the subsynaptic reticulum, indicating fusion of MVBs with the plasmamembrane and release of intralumenal vesicles into the extracellular space. (4) The electron-dense pre- and postsynaptic apposition is expanded in aging NMJs, which is accompanied by an expansion of the postsynaptic glutamate receptor fields. On the basis of our morphological findings, it is now possible to design and interpret further electrophysiological and biochemical studies into altered function of aging synapses in Drosophila and to perform comparative studies of normal aging phenomena and pathological alterations in neurodegeneration.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:54

Titel:Interneuronal subpopulations in the mouse lateral and basolateral amygdala nuclei: studies on serotonin receptor expression and serotonin transporter deficiency

Autoren: Renninger C.(1),Schwert H.(1),Steinke M.(2),Schmitt A.(3),Asan E.(1),

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Abstract:
Monoaminergic afferents and inhibitory interneurons are important modulators of emotional stimulus processing in the lateral (La) and basolateral (BL) amygdaloid nuclei. Serotonin receptor (5-HTR) expression in pyramidal neurons and interneuron subpopulations was documented in rat La/BL indicating direct impact of serotonin on these neurons. To provide a basis for investigations in mouse models for emotional dysregulation, the present study was designed to extend information on 5-HTR expression in the mouse La/BL. Additionally, analysis of La/BL interneuron subpopulation densities was performed in adult wildtype and 5-Htt-deficient mice to assess possible consequences of altered serotonin homeostasis. In situ hybridization (ISH) using mouse-specific probes documented low expression of 5-HT1A mRNA and moderate expression of 5-HT2C mRNA in numerous mouse La/BL neurons. Differences in density of 5-HT2C mRNA-reactive neurons between La and BL were not as notable as observed in rat. 5-HT3 mRNA was strongly expressed in individual neurons of both nuclei. Dual ISH documented that 5-HT3 mRNA-expressing neurons were inhibitory interneurons coexpressing glutamate decarboxylase (GAD) mRNA but lacking neuropeptide Y (NPY) mRNA. A reduced density of La/BL NPY-immunoreactive(-ir) interneurons was found in 5-Htt-deficient compared to wildtype mice while no significant difference was observed for parvalbumin-ir interneurons. The results document similarities and subtle differences in 5-HTR expression between mouse and rat La/BL, and indicate that life-long imbalance in serotonergic transmission in 5-Htt-deficient mice specifically affects the presumably anxiolytic subpopulation of NPY-ir interneurons, a finding of particular interest in view of the enhanced anxiety observed in this mouse model for depression and anxiety disorders.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:55

Poster wurde zurückgenommen

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:56

Titel:Morphological and TMT-fear behavior deficits in PRG1 knockout mice rescued by deficit in LPA2 receptor knockout

Autoren: Heger R.(1),Schneider P.(1),Schwegler H.(1),Nitsch R.(2),Vogt J.(2),Roskoden T.(1),

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Abstract:
Plasticity related gene1 (PRG1) is an integral membrane protein located in postsynaptic glutamatergic synapses. It controls signaling pathways of phosphorylated lipid substrates by lysophosphatidate (LPA) receptors. The LPA2 receptor is located in the presynapses, induceded hyperexcitation and regulated several second messengers. A lack of PRG1 reduces processing of sensory information whereas juvenile PRG1 deficient mice suffer from epileptic seizures.
We used a double knockout (dKO) of PRG1/LPA2 receptor and expected rescue of the deficits in morphology and behavior of the PRG1KO. To analyze a difference between the PRG1KO and the PRG1/LPA2dKO mice, we studied fear-related behavior and the morphology of related brain areas. We exposed the animals to the predator odorant 2,5-dihydro-2,4,5-trimethylthiazoline (TMT) in a box (45x45cm) and measured the behavioral reactions. Afterwards we analyzed c-fos activation in brain areas associated with olfaction using immunohistochemistry.
The PRG1-deficient mice shows significantly lower freezing and an enhanced locomotor activity than WT animals. In the olfactory pathway we found an enhanced number of c-fos immunopositive neurons in PRG1KO compared to WT after TMT-exposure. These differences were most pronounced in the olfactory bulb, olfactory tubercle and mediodorsal thalamus. No differences were found in amygdala and hippocampus.
In contrast, in the PRG1LPA2dKO no differences were found in the behavioral and morphological markers studied here.
These results indicate a rescue in TMT-induced fear behavior and associated morphology of PRG1 deficient mice in the LPA2 receptor KO mice induced in PRG1KO.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:57

Titel:Phenotypes and probable function of autonomic neurons of cardiac ventricles

Autoren: Pauza A.(1),Rysevaite K.(2),Ruksenas O.(1),Pauza D.(2),

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Abstract:
The function of neurons distributed on cardiac ventricles is unknown so far. Therefore, chemical phenotype of epicardial nerve cells was demonstrated employing double labeling for tyrosine hydroxylase (TH), choline acetyltransferase (ChAT), substance P (SP), calcitonin gene related peptide (CGRP) and protein gene product 9.5 (PGP) in order to identify the sympathetic, parasympathetic and sensory neural structures, respectively. Ventricular ganglionic cells positive for PGP were found within epicardium both in birds and mammalians. The examined epicardial neurons in mammals were positive for ChAT, TH or were biphenotypic (i.e. immunoreactive for ChAT and TH), while in birds they were immunoreactive for ChAT exclusively. On cardiac ventricles of mammals, there were identified numerous SIF cells. Ventricular epicardial nerves and nerve bundles possessed nerve fibers, but not somata, immunoreactive for CGRP and SP. Morphology of autonomic ganglia on ventricles of birds differed from those on mammalian ventricles as ganglionic cells in birds were smaller in size and distributed more compactly within ganglia compared with mammalians. Ventricular neurons immunoreactive for PGP, but negative for cholinergic, adrenergic and peptidergic neuronal markers, were found in birds only. In conclusion, the present findings demonstrate that ventricular ganglia distributed up to the heart apex possess the ChAT(+), TH(+) neurons and CGRP(+), SP(+) nerve fibers. In mammals, ventricular ganglionic cells are presumably involved both in parasympathetic and sympathetic control of ventricles, but role of many ventricular ganglionic cells in birds remains unclear and deserve further investigations.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:58

Titel:Regulation of mossy fiber development by the transcription factor Bcl11b/Ctip2

Autoren: Huzurudin B.(1),Schwegler H.(2),Simon R.(1),Britsch S.(1),

Adressen:(1)Institute of Molecular and Cellular Anatomy|Ulm University|Ulm|Germany; (2)Anatomical Institute|Otto-von-Guericke-University|Magdeburg|Germany

Abstract:
Major functions of the hippocampus include its ability to integrate and process learning and spatial memory information as well as modulation of emotional behavior. The structural basis of these functions involves the generation of new hippocampal neurons, their cell type specific differentiation and functional integration. The correct wiring of granule cell neurons of the dentate gyrus to pyramidal cells of the CA3 region of the cornu ammonis via the moss fiber system is a critical step for the functionality of the mature hippocampus. Previously we demonstrated that the zinc finger-transcription factor Bcl11b/Ctip2 is essential for postnatal development of the dentate gyrus. Ablation of Bcl11b/Ctip2 in the mouse leads among others to defects in the development of the mossy fiber tract as well as highly reduced spatial learning capacities in the adult animal (Simon et al, 2012). At this point it is not known how Bcl11b/Ctip2 regulates the development of the mossy fiber tract and which molecular signaling pathways are involved. In a first step to elucidate the functions of Bcl11b/Ctip2 in this process we carried out a detailed histochemical and morphological analysis of the development of the mossy fiber tract during sequential postnatal stages. The data, as well as our comparative transcriptome studies suggest that Bcl11b/Ctip2 controls mossy fiber development through modulation of guidance cues.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:59

Titel:Role of the internal plexus of the sciatic nerve

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Abstract:
Purpose:Peripheral nerves are so susceptible to ischemia and have developed a dynamic vascular plexus in all layers. Two integrated but functionally independent systems, the extrinsic and intrinsic have formed well-developed collaterals between layers and different segments of the nerves. In the present study we aimed to determine the ultrastructural appearance and functional properties of the sciatic nerve after deterioration epineurial vessels. Methods: A total number of 40 rats were used. Animals were divided into four groups (Control, Sham, Group 1, 2). Group 1, epineurial vessels contributing to the nourishment of the sciatic nerve were extirpated. Group 2, in addition to the extirpation, the epineurial vessels were ligated. Six weeks after induction of the ligation and extirpation, the functional analyses were done. Then sciatic nerve samples were collected and proceeded to ultrastructural analysis.
Results:sciatic nerve samples had oedematous appearance in Group 1. In Group 2, subperineurial demyelinization and myelin residues were observed.
Conclusions: Vascularization of the sciatic nerve from internal plexus has a great importance in nourishment of the sciatic nerve.
Keywords: Sciatic nerve, epineurial vessels, stripping,

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:60

Titel:Spatial patterns of neuronal activity in rat cerebral cortex during slow-wave sleep - a thallium uptake study

Autoren: Wanger T.(1),Wetzel W.(2),Scheich H.(3),Ohl F.(1),Goldschmidt J.(1),

Adressen:(1)Systems Physiology of Learning|Leibniz Institute for Neurobiology|Magdeburg|Germany; email:tim.wanger@lin-magdeburg.de; (2)Behavioral Pharmacology|Leibniz Institute for Neurobiology|Magdeburg|Germany; (3)Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany

Abstract:
Slow-wave sleep (SWS) is accompanied or characterized by profound changes in behavior, EEG-signals and metabolic rates of oxygen and glucose in cerebral cortex. This indicates likewise profound changes in the way cortical microcircuits operate in slow-wave sleep as compared to the waking state, but very little is known about how patterns of neuronal activity in SWS are organized with respect to cortical columns, layers and cell types.
Here we used thallium-autometallography (Tl-AMG), a recently developed method for single-cell resolution mapping of neuronal and astrocytic potassium uptake, for analyzing the spatial patterns of neuronal activity in SWS of adult rats. Tl-AMG is a tracer technique similar in rationale to the 2-deoxyglucose method, and is based on the fact that in neurons the uptake of potassium (K+) or potassium analogues like thallium (Tl+) is mediated to a large degree by the Na,K-ATPase, the activity of which is closely coupled to neuronal activity.
While local Tl+-uptake relative to global Tl+-uptake does not differ between SWS and wakefulness for most cortical areas, distinct changes in laminar activity patterns were observed for primary sensory areas as well as higher association areas. Furthermore, we found periodicities in the spatial organization of Tl+-uptake in large parts of cerebral cortex including the hippocampus.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:61

Titel:The localization and complete extent of the newly defined preganglionic edinger-westphal nucleus (EWpg) in human

Autoren: Valeanu L.(1),Barnerssoi M.(1),Messoudi A.(1),Horn A.(2),

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Abstract:
Traditionally the Edinger-Westphal nucleus (EW) had been considered as the location of preganglionic neurons of the ciliary ganglion, but was recently shown to contain two functionally different neuron populations. Accordingly, a new nomenclature was introduced with the EWpg refering to peripherally projecting cholinergic preganglionic neurons (PG), and the EWcp describing centrally projecting peptidergic neurons (Kozicz et al. 2011).
Here the full extension of the PG population in the human EWpg was investigated and compared to the location of urocortin-positive neurons of EWcp. Neighbouring paraffin (20µm) sections of four human midbrains (immersion-fixed in 4% paraformaldehyde) were immunostained for choline-acetyltransferase and non-phosphorylated filaments to identify EWpg, and urocortin to identify EWcp, respectively. Immunostaining for perineuronal nets (chondroitin sulfate proteoglycan or aggrecan) was used to distinguish between motoneurons of extraocular muscles and PG.
The EWpg neurons appear at midlevel of the oculomotor nucleus as a group of few scattered neurons dorsomedial to the urocortin-positive EWcp, which in human corresponds to the traditional cytoarchitecturally defined EW. The density of EWpg neurons increases further rostrally, and at the level of the rostral end of the oculomotor nucleus, the EWpg neurons form a rather compact cell group on each side dorsomedial to the vertically oriented cell columns of the EWcp. The perineuronal net staining pattern ensured that the cholinergic neurons of the EWpg do not represent oculomotor neurons.
In conclusion the present study provides the neuroanatomical basis for clinico-pathological post-mortem analysis addressing the EWpg in cases with pupillary or accommodation dysfunction. (Supported by DFG Ho-1639/4-3)

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:62

Titel:The use of thallium diethyldithiocarbamate (tlddc) for high resolution mapping of ischemic damage in acute focal cerebral ischemia

Autoren: Stöber F.(1),Reymann K.(2),Schröder U.(2),Scheich H.(3),Wunder A.(4),Goldschmidt J.(3),

Adressen:(1)Institute for Experimental Neurology|Charité University Medicine Berlin|Berlin|Germany; (2)Project Group Neuropharmacology|Leibniz Institute for Neurobiology|Magdeburg|Germany; (3)Department for Auditory Learning and Speech|Leibniz Institute for Neurobiology|Magdeburg|Germany; (4)Experimental Neurology|Charité University Medicine Berlin|Berlin|Germany

Abstract:
Imaging or mapping irreversibly damaged tissue in acute focal cerebral ischemia has remained challenging both in clinical routine in humans as well as in animal models. Current histochemical techniques used in rodents are insensitive for mapping damage earlier than several hours after onset of ischemia. In humans irreversible damage is routinely imaged using diffusion weighted MRI, but the validity of this method has been questioned.
We here present a novel approach for mapping damage in cerebral ischemia using the K+-probe thallium (Tl+). Tl+ has long been used for single-photon emission computed tomography (SPECT) imaging of reduced K+-uptake and breakdown of K+-gradients in myocardial infarction. Tl+ has, however, been of little use for studying cerebral K+-metabolism because of the poor blood-brain barrier (BBB) K+-permeability.
We recently found a way to non-invasively pass the BBB using the lipophilic chelate complex thallium diethyldithiocarbamate (TlDDC). We here injected rodents with TlDDC at different time points after onset of focal cerebral ischemia and mapped the brain Tl+-distribution histochemically with single-cell resolution and in vivo using SPECT-imaging.
Histochemically we found areas of reduced Tl+-uptake already 15 minutes after onset of ischemia, the earliest time point investigated in this study. With SPECT-imaging we found continuous loss of Tl+ from the lesioned area reflecting lesion growth. The results indicate that TlDDC is a useful tracer for histochemical mapping and in vivo imaging of ischemic damage in acute cerebral ischemia.

Kategorie: Poster

Rubrik: 6.Neuroanatomy/Neurobiology
Abstract Nr.:63

Titel:VGLUT3-ir afferents of the lateral septum: anatomical evidence for a modulatory role of glutamate

Autoren: Stöber F.(1),Miettinen R.(2),Richter K.(3),Riedel A.(4),Budinger E.(1),

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Abstract:
Through its extensive connections with various brain regions the lateral septum (LS) participates in processing of cognitive, emotional and autonomic information and in the generation of behavioral responses according to environmental demands. Modulatory afferents (e.g. dopaminergic, serotonergic) of the brain stem play a role in the adjustment of these behavioral responses. Recently, a population of vesicular glutamate transporter 3 (VGLUT3)-immunoreactive (-ir) afferents, which terminate in a layer-like fashion that is very typical for modulatory afferents, was described throughout the entire rostrocaudal extent of the LS (Herzog et al., 2004). At the light microscopic level, these VGLUT3-ir structures form prominent pericellular basket-like structures, which ensheath the somata and proximal dendrites of their target neurons. Employing pre-embedding immunostaining for electron microscopy in the rat brain, we showed that the VGLUT3-ir puncta outlining LS neurons represent axonal terminals that are entirely filled with VGLUT3-ir vesicles and form primarily symmetrical synapses with somata and proximal dendrites of their target neurons. Incidentally, we also found VGLUT3-ir terminals that make canonical asymmetric synapses on distal dendrites and spines. Thus, VGLUT3-ir boutons in the LS form two different populations of synaptic contacts. Combining retrograde tract tracing with Cholera toxin B subunit and VGLUT3-fluorescence labeling, we showed that neurons located in the median and dorsal raphe nuclei of the brain stem are one source of origin of the VGLUT3-ir LS afferents. In summary, our data support the hypothesis that VGLUT3-expressing neurons — in contrast to canonical glutamatergic neurons expressing VGLUT1 and VGLUT2 — employ glutamate as a modulator or co-transmitter.

Kategorie: Poster

Rubrik: 7.Neuroimmunology
Abstract Nr.:64

Titel:Blockade of tnf-α in experimental autoimmune encephalomyelitis reveals differential effects on the antigen-specific immune response and central nervous system histopathology: a possible reason for its failure in MS

Autoren: Kuerten S.(1),Batoulis H.(1),Recks M.(1),Thomalla F.(1),Holland F.(1),Williams R.(2),Addicks K.(1),

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Abstract:
In a variety of autoimmune diseases, anti-TNF-alpha treatment has been shown to reduce both clinical disease severity and T helper cell type 1 and 17 responses. In experimental autoimmune encephalomyelitis (EAE), however, the role of TNF-alpha has remained unclear. Here, C57BL/6 mice were immunized with myelin oligodendrocyte glycoprotein (MOG) peptide 35-55 and treated with anti-TNF-alpha or vehicle. Mice were scored daily for clinical symptoms. We performed ELISPOT assays in order to analyze the antigen-specific TH1/TH17 response in spleen and spinal cord. The extent of myelin and axonal pathology was analyzed by electron microscopy to evaluate the neuroprotective potential of anti-TNF-alpha treatment. Our results demonstrate that anti-TNF-alpha treatment reduces the incidence and delays the onset of EAE, but has no effect on the disease severity once EAE has been established. Whereas anti-TNF-alpha treatment induced an increase in splenic TH1/TH17 responses, there was no treatment effect on the antigen-specific TH1/TH17 response in the spinal cord. Accordingly, the degree of CNS histopathology was comparable in control and anti-TNF-alpha treated mice. In conclusion, anti-TNF-alpha treatment had neither immunosuppressive effects on the TH1/TH17 response in the CNS, nor histoprotective properties in EAE, while enhancing the myelin-specific T cell response in the immune periphery.

Kategorie: Poster

Rubrik: 7.Neuroimmunology
Abstract Nr.:65

Titel:Role of antimicrobial peptide CRAMP in inflammation and neuronal apoptosis after bacterial meningitis

Autoren: Eugenia K.(1),Höß J.(1),Pufe T.(1),Tauber S.(2),Brandenburg L.(1),

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Abstract:
Antimicrobial peptides (APs) are an important part of the innate immune system of many organ systems, yet little is known about their expression and function in the brain. The expression of the antimicrobial peptide cathelicidin cathelin-related antimicrobial peptide (CRAMP) is up-regulated after bacterial meningitis and the CRAMP deficiency resulted in a higher lethality after infection, but the consequence of cathelicidin expression and function for progression of inflammation and apoptosis are far from clear.
Therefore, we used CRAMP-deficient mice to investigate the role of antimicrobial peptide CRAMP in inflammation and apoptosis after pneumococcal meningitis. We analysed the inflammation and apoptosis in the cortex and hippocampus using immunohistochemistry and realtime RT-PCR. Furthermore, we investigated the apoptosis in neuronal cell culture using Western blotting.
Our results showed a higher inflammation response in vivo after bacterial meningitis for CRAMP-deficient mice compared to wildtype mice. The higher lethality correlated with increased bacterial growth in the brain and neutrophil granulocytes immigration. Furthermore, we were able to show a higher apoptosis of CRAMP deficient neuronal cells after infection.
Altogether, the results suggest that antimicrobial peptide CRAMP plays an important part in the innate immune response against pathogens in CNS bacterial infections.

Kategorie: Poster

Rubrik: 7.Neuroimmunology
Abstract Nr.:66

Titel:TLR2 and TLR4 in the brain of wistar rat: in vitro studies with LPS and LTA

Autoren: Zhang Q.(1),Obal J.(1),Schöniger S.(2),Nürnberger(1),

Adressen:(1)Dr. Senckenbergische Anatomie, FB Medizin|J.W. Goethe-Universität|Frankfurt am Main|Germany; email:q.zhang@em.uni-frankfurt.de; (2)Department of Pathology and Infectious Diseases|The Royal Veterinary College|Northmymms, Hatfield, Herts|UK

Abstract:
Toll-like receptors (TLRs) are well known pattern-recognition receptors (PRR) in the mammalian innate immune system, which play a very import role in recognition of pathogen-associated molecular patterns (PAMPs). TLR2 and TLR4 can be activated by lipoteichoic acid (LTA; a component of the cell wall of gram-positive bacteria) and Lipopolysaccharide (LPS; a component of gram-negative bacteria), respectively. Subsequent to activation, TLRs induce antimicrobial defence mechanisms, inflammation, adaptive immunity or apoptosis. In the present study brain slices were exposed to LPS and LTA in the culture medium, the expression and regulation of TLR2 and TLR4 were investigated immunocytochemically. An upregulation of TLR4-expression was observed in the ependyma of the ventricular system, habenular nuclei and leptomeninges of the brain slice after application of LPS. The immunoreactivity of TLR4 in subfornical and subcommissural organ was generally weak, it could be detected only after treatment with LPS. LTA was less efficient on the expression of TLR4. In contrast, the expression of TLR2 was upregulated mainly by LTA in ventricular ependyma, habenular nuclei and subcommissural organ. In choroid plexus the epithelial cells showed always strong immunostaining for both receptors, no obvious changes were observed after the treatment with LPS or LTA. Our results show that both receptors exist in most areas of the circumventricular system, where potential invasion of pathogens may occur. The expression of both receptors can be upregulated by the corresponding ligands. This may indicate the role of TLR4 and TLR2 in the interface areas for the innate immunity of the brain.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:67

Titel:Characterization of human ipsc derived neurons of diseased or control donors

Autoren: Pfänder S.(1),Liebau S.(1),Grabrucker A.(2),Böckers T.(1),

Adressen:(1)Institute for Anatomy and Cell Biology|Ulm University|Ulm|Germany; email:stefan.liebau@uni-ulm.de; (2)Neurocenter|Ulm University|Ulm|Germany

Abstract:
ProSAP/Shank molecules are important scaffolding proteins in the postsynaptic compartment of excitatory synapses. They build platforms linking components of the postsynaptic signaling apparatus to the actin-based cytoskeleton. Thus, they build a framework for the formation of the postsynaptic density (PSD). Interestingly, two of the three ProSAP/Shank family members are targeted to and regulated at the PSD via their sterile alpha motif which is essential for protein assembly by binding to zinc ions.
A role for ProSAP/Shank proteins in neurodegenerative diseases was first proposed when a deletion in the q13 region of chromosome 22, where the ProSAP2 gene is located, was identified as the main genetic cause for Phelan-McDermid Syndrome (PMS). This syndrome is characterized by features of autism spectrum disorders along with hypotonia and mental retardation. Intriguingly, an association of autism spectrum disorders with zinc deficiency in children was already shown and imbalances in zinc homeostasis have been associated with multiple brain disorders.
Thus, here, we investigate the effects of zinc supplementation and depletion on the differentiation and synaptogenesis of neurons differentiated from human induced pluripotent stem cells. Moreover, we will use PMS patient derived stem cells to evaluate, if zinc supplementation could be a possible treatment strategy for PMS. In a first set of experiments we therefore evaluated expression of zinc homeostasis proteins of neurons differentiated from patient derived and control stem cells. Thus, indeed, zinc seems to be an important factor in neuro- and synaptogenesis and future stem cell based experiments will hopefully provide further evidences.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:68

Titel:Effect of compressive spinal cord injury and whole body vibration on the morphology of the rat femur

Autoren: Pick C.(1),Stein G.(2),Eisel L.(3),Rachida H.(3),Schempf G.(3),With F.(3),Ozsoy O.(4),Ozsoy U.(5),Irintchev A.(6),Angelov D.(3),Koebke J.(1),

Adressen:(1)Department of Anatomy II|University of Cologne|Cologne|Germany; (2)Department of Orthopedics and Traumatology|University of Cologne|Cologne|Germany; (3)Department of Anatomy I|University of Cologne|Cologne|Germany; (4)Department of Physiology|Akdeniz University|Antalya|Turkey; (5)Department of Anatomy|Akdeniz University|Antalya|Turkey; (6)Ear-Nose-Throat Department|University of Jena|Jena|Germany; email:angelov.anatomie@uni-koeln.de

Abstract:
Whole-body vibration (WBV) is a relatively novel therapy for patients with neurological disorders. It has been only barely tested in animal models of SCI.
We performed severe compression SCI at low-thoracic level (Th8) in 32 adult female Wistar rats which was followed by daily WBV therapy starting 7 or 14 days after injury and continued over a 12-week post-injury period. Intact rats (no SCI) and rats with SCI but no WBV (sham) served as controls.
Locomotor rating and numerical assessment of plantar stepping and skilled limb movements revealed no significant effects of WBV versus sham treatment during the observation time period. In accordance with these findings, plantar H-reflex measurements were not significantly affected by WBV at 12 weeks after SCI. However, compared with sham-treated rats, WBV14 but not WBV7 significantly improved body weight support during ground locomotion and overall recovery by 6 – 12 weeks after SCI. These findings provide first evidence for positive functional effects of WBV in an animal SCI model and warrant further preclinical investigations on WBV as a potential rehabilitation therapy for neurological disorders.
Another aim of the study was to analyze the influence of SCI and WBV on the morphology of the femur (length, weight, thickness, densitometry, histomorphometry). Unexpectedly, our measurements revealed no differences in these parameters between the four experimental groups. One possible explanation is that the preserved axons in the white substance after SCI provide enough trophic support for muscles and bones.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:69

Titel:Glio-neuronal precursors in the adult human trigeminal ganglion participate in the sheaths built-up by satellite glial cells

Autoren: Rusu M.(1),Manoiu S.(2),Mirancea N.(3),

Adressen:(1)Division of Anatomy|Faculty of Dental Medicine, Carol Davila University of Medicine and Pharmacy|Bucharest|Romania; email:anatomon@gmail.com; (2)Department of Cellular and Molecular Biology|National Institute of Research and Development for Biological Sciences|Bucharest|Romania; (3)Department of Vegetal and Animal Cytobiology|Romanian Academy - Institute of Biology Bucharest|Bucharest|Romania

Abstract:
There are few studies to demonstrate in various species, except humans, that the number of the neurons within the trigeminal ganglion (TG) increases with age through a later differentiation of a pool of precursors present in the ganglion. It was thus aimed to evaluate whether or not glio-neuronal precursors (GNPs) are present in the human adult TG. Autopsy samples of trigeminal ganglia were obtained from eight human adult cadavers. Samples were immunolabeled with nestin, which is characteristic for neural stem cells, and were also evaluated in transmission electron microscopy (TEM). In light microscopy, nestin-positive cells were found in the neuronal sheaths built-up by satellite glial cells (SGCs). In TEM there were identified undifferentiated cells, ultrastructurally different from SGCs, closely related to TG neurons within the SGCs sheaths. Therefore, it can be assumed that GNPs exist in human adult TG.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:70

Titel:Modeling disease specific induced pluripotent stem cells of patients with developmental defects of the nervous system

Autoren: Klingenstein M.(1),Raab S.(1),Pfaender S.(1),Achberger K.(1),Liebau S.(1),

Adressen:(1)Institute for Anatomy and Cell Biology|Ulm University|Ulm|Germany;
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Abstract:
Amyotrophic Lateral Sclerosis (ALS) is a lethal neurodegenerative disease affecting the motor neurons which results in progressive weakness and muscle atrophy. Most of the cases are sporadic, but cases with familiar background also occur. These involve modifications and mutations in different genes, the most common one being an expansion of a repetitive region found in the C9ORF72 gene. To examine these special mutations stem cell technology is an essential method.

Human induced pluripotent stem cells (hiPS) already play a crucial role in the analysis of patients with neurodegenerative diseases. Keratinocytes from plucked human hair can be used for reprogramming of human induced pluripotent stem cells. This method is a well established non invasive possibility to gain patient cell samples for reprogramming compared to the widely used method with human skin fibroblasts. There are different protocols to increase and optimize the efficiency of reprogramming patient keratinocytes such as the use of different feeder layers.

For ALS the differentiation of hiPS into motor neurons is of particular interest. But other species of neurons can also be induced to compare the morphology and function of neuronal cells. For a better understanding of neurodegenerative diseases the protocols for reprogramming and especially differentiation into different cell types have to be improved.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:71

Titel:Modeling disease specific induced pluripotent stem cells of patients with developmental defects of the nervous system

Autoren: Klingenstein M.(1),Raab S.(1),Pfänder S.(1),Achberger K.(1),Liebau S.(1),

Adressen:(1)Institut for Anatomy and Cell Biology|University Ulm|Ulm|Germany;
email:stefanie.raab@uni-ulm.de

Abstract:
Amyotrophic Lateral Sclerosis (ALS) is a lethal neurodegenerative disease affecting the motor neurons which results in progressive weakness and muscle atrophy. Most of the cases are sporadic, but cases with familiar background also occur. These involve modifications and mutations in different genes, the most common one being an expansion of a repetitive region found in the C9ORF72 gene. To examine these special mutations stem cell technology is an essential method.

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For ALS the differentiation of hiPS into motor neurons is of particular interest. But other species of neurons can also be induced to compare the morphology and function of neuronal cells. For a better understanding of neurodegenerative diseases the protocols for reprogramming and especially differentiation into different cell types have to be improved.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:71

Titel:N-arachidonoyl – dopamine (NADA) is a novel neuroprotective endocannabinoid.

Autoren: Grabiec U.(1),Koch M.(2), Kraft R.(3),Ghadban C.(1),Merkwitz C.(2),Hill K.(4), Dehghani F.(1),

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Abstract:
Endocannabinoids exert numerous effects in the CNS under physiological and pathological conditions. The aim of the present study was to examine whether the novel endocannabinoid N-arachidonoyldopamine (NADA) may protect neurons in excitotoxically lesioned organotypic hippocampal slice cultures (OHSC). OHSC were excitotoxically lesioned by application of N–methyl–D–aspartate (NMDA, 50 µM) for 4 h and subsequently treated with different NADA concentrations (0.1 pM – 50 µM) alone or in combination with cannabinoid receptor antagonists. NADA protected dentate gyrus granule cells and caused a faint reduction in the number of microglial cells. The number of degenerated neurons significantly decreased between 100 pM and 10 µM NADA ($p<0.05$). To identify the responsive receptor type of NADA-mediated neuroprotection, we applied the cannabinoid (CB) receptor 1 (CB1) inverse agonist/antagonist AM251, CB2 inverse agonist/antagonist AM630, abnormal-cannabidiol (abn-CBD)-sensitive receptor antagonist O-1918, transient receptor potential (TRP)V1 antagonist 6-iodonordihydrocapsaicin and TRPA1 antagonist HC-030031. Neuroprotective properties of low (1 nM) but not high (10 µM) NADA concentrations were solely blocked by AM251. O-1918, 6-iodonordihydrocapsaicin and HC-030031 showed no effects at all used NADA concentrations. Our findings demonstrate that NADA protects dentate gyrus granule cells by acting upon CB1. NADA reduced the number of microglial cells at distinct concentrations. TRPV1 was not involved in NADA mediated neuroprotection. Thus, our data implicate that NADA-mediated activation of neuronal CB1 may serve as a novel pharmacological target to mitigate symptoms of neuronal damage.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:72

Titel:Osteopontin (OPN) expression and associated OPN receptor regulation of integrins and CD44 on the RGC5 Cell Line.

Autoren: Lehmann J.(1),Garreis F.(1),Neumann C.(1),Hemmerlein M.(1),Paulsen F.(1),Scholz M.(1),

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Abstract:
By modulating the metabolism of neuronal cells, OPN, an age-dependent increased aqueous humor factor, significantly associated with degenerative changes of the optic nerve and the retina, may contribute to wound healing, neovascularization, neuroprotection and remodeling of extracellular matrix in the eye. In this study, we analyzed *in vitro* the effect of OPN on murine neuronal precursor cells (RGC5) after induction of oxidative stress by different methods. Western Blot analyses and immunofluorescence were performed to confirm expression of all investigated receptors on protein level. With the help of RT-PCR, we analyzed the basal expression of OPN as well as the expression of integrins and the cell-surface glycoprotein CD44. By Real Time-PCR, the regulation of OPN receptor expression after stress induction with H_2O_2 (150 µM) was analyzed. The metabolic cell activity of OPN treated RGC5 cells was estimated by using a CellTiter 96 Aqueous MTS Assay. In addition we described for the first time the physiological and morphological eye phenotype of the $OPN^{-/-}$ mouse at different ages in comparison to age-matches DBA2/J and C57/Bl6 mice by intraocular pressure detection, ERG measurements and light-/electron microscopy.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:73

Titel:Patient specific dopaminergic neurons from ips cells as a human in vitro model of pd associated with mutations in the LRRK2

Autoren: Raab S.(1),Klingenstein M.(1),Pfänder S.(1),Liebau S.(1),

Adressen:(1)Institute for Anatomy and Cell Biology|Ulm University|Ulm|Germany; email:stefanie.raab@uni-ulm.de

Abstract:
Parkinson's disease (PD) is the second most common neurodegenerative disease in Germany with about 300-400.000 affected patients. The main features of this disease result from the loss of dopaminergic neurons in the substantia nigra pars compacta. This leads to movement related symptoms like shaking, slowness of movement, difficulty with walking and gait. Later cognitive and behavioural problems may arise with dementia.
Genetic mutations in leucine-rich repeat kinase 2 (LRRK2) are responsible for both inherited and sporadic PD. The LRRK2 protein contains several distinctive structural and functional motives like a GTPase and kinase domain. But the function of this multi domain protein is widely unknown. As a possible mechanism for the neurodegenerative mechanism in the LRRK2 mediated Parkinson genesis the increased toxicity of the kinase activity of LRRK2 is widely discussed. Published data show a correlation between the mutation of the kinase domain and reduced axonal length and number of neurites.
As a model for the in-vitro analysis of patient specific mutations we want to generate induced pluripotent stem (iPS) cells from hair keratinocytes and differentiate them to dopaminergic neurons. In particular the maturation of these neurons and their synaptic contacts will be analysed in detail to examine the impact of the changed kinase activity as well as neurodegenerative mechanism. An additional focus will be set on initiating signals of cell death to find potential interventions of neuronal degradation.

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:74

Titel:Tau pathology in motoneurons of extraocular muscles in progressive supranuclear palsy (psp)

Autoren: Feige J.(1),Zeeh C.(2),Roeber S.(3),Arzberger T.(3),Kretschzmar H.(3),Horn A.(4),

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Abstract:
Progressive supranuclear palsy (PSP) is a primary tau-pathology characterized by neuronal and glial inclusions of hyperphosphorylated tau protein in different brain regions. The main clinical symptom, a vertical gaze palsy, is in later stages accompanied by horizontal eye movement deficits ending up in a complete palsy. These observations have been correlated with degeneration in premotor vertical and horizontal gaze centers, the rostral interstitial nucleus of the medial longitudinal fascicle (RIMLF) and paramedian pontine reticular formation (PPRF), previously. To study a possible correlation between eye movement deficits and the spread of the disease along the projections to motonuclei of extraocular muscles paraffin brainstem sections of 8 archival PSP cases (Munich Brain bank) with different eye movement deficits were immunostained for hyperphosphorylated tau protein (AT8).
In all PSP cases more or less tau-pathology was noted in the RIMLF and PPRF correlating with the observed eye movement deficits. The quantitative analysis of AT8-positive profiles in the motonuclei revealed that in PSP-cases with no or minor oculomotor deficits only few scattered AT8 were present in the motonuclei, whereas in PSP-cases with a complete gaze palsy numerous AT8-positive neurons and glial cells were found in all three motonuclei. Thereby a correlation between the clinical symptoms of eye movement deficits in PSP and degeneration of not only premotor gaze centers, but the complete oculomotor pathways to the motoneurons was found. The more severe degeneration of premotor centers compared to motoneurons in PSP-cases with minor oculomotor deficits indicate a spread of the disease along the projections in an anterograde fashion. BMBF (IFB-01EO0901, Brain-Net-01GI0505)

Kategorie: Poster

Rubrik: 8.Neuroregeneration/Neurodegeneration
Abstract Nr.:75

Titel:The temporal dynamics of glyoxalase 1 expression in hypoxic neuronal injury.

Autoren:Pieroh(1),Koch(2),Wagner(3),Boltze(3),Ehrlich(2),Ghadban(1),Hobusch(2),Birkenmeier(4),Dehghani(1),

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Abstract:
In the process of enhanced glycolysis elevated levels of the toxic metabolite methylglyoxal (MG) are formed and contribute to the loss of protein-function, metabolic imbalance and cell death.
Neurons were shown being highly susceptible for MG toxicity. Glyoxalase 1 (Glo-1) as ubiquitous endogenous detoxification system catabolises MG. Glo-1 underlies changes in ageing and neurodegeneration. However, there is little known about Glo-1 in hypoxic neuronal lesions.
We analysed the temporal and spatial dynamics of Glo-1 distribution and expression by immunohistochemistry and Western Blot analysis in excitotoxically (NMDA, 50µM) lesioned organotypic hippocampal slice cultures (OHSC; 5 minutes to 72 hours) and rat cortex after permanent middle cerebral artery occlusion (pMCAO; 75 minutes to 60 days).
We found i) the predominant localisation of Glo-1 in endothelial cells in non-lesioned brains ii) a time-dependent up-regulation and re-distribution of Glo-1 in neurons and astrocytes and a strong increase in Glo-1 dimers after injury (24h-72h) when compared to monomers of the protein during hypoxic neuronal damage.
In conclusion, the high dynamics in Glo-1 distribution and expression during the process of hypoxic neuronal injury represent Glo-1 as important player in the process of secondary neuronal injury after hypoxic insult.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:76

Titel:Characterization and localization of pref-1+ cells in human subcutaneous adipose tissue

Autoren: Zwierzina M.(1),Bitsche M.(1),Blumer M.(1),Mattesich M.(2),Mitterberger M.(3),Rostek U.(3),Zwerschke W.(3),Fritsch H.(1),

Adressen:(1)Department of Anatomy, Histology and Embryology|Division of Clinical and Functional Anatomy|Innsbruck|Austria; (2)Department of Plastic, Reconstructive und Aesthetic Surgery|Innsbruck Medical University, Austria|Innsbruck|Austria; (3)Institute for Biomedical Aging Research|University of Innsbruck|Innsbruck|Austria; email:helga.fritsch@i-med.ac.at

Abstract:
Purpose: Only recently scientists discovered adipose tissue as a source for multipotent cells, adipose-derived stem cells (ASCs), which show the capacity to differentiate into several lineages such as mesenchymal stem cells. Compared to bone marrow, adipose tissue represents an easily accessible source for these cells with low donor-site morbidity and therefore became a subject of increasing interest in regenerative medicine. The characterization of these ASCs is mainly based on molecular biological studies describing these cells as CD34 positive and CD31 negative. Morphological, in particular ultrastructural, studies are missing so far.
Aim: The aim of our study is to further characterize the phenotype and morphology of these precursor cells and to investigate their localization in human subcutaneous adipose tissue.
Material and Methods: Subcutaneous adipose tissue from different body regions was removed from either fresh female cadavers or during elective surgery. Sections were examined by immunohistochemistry and immunofluorescence according to their expression of Pref-1, CD31, CD34 and Leptin. Fresh tissue samples were incubated with Pref-1, CD31, CD34 and α-SMA and investigated using electron microscopy.
Results: Our results demonstrate that Pref-1 positive cells preferentially reside in perivascular niches but also appear more peripherally without a relation to blood vessels. These same cells express CD34, but do not exhibit the endothelial marker CD31. Electron microscopic observations demonstrated that these cells are characterized by remarkably long cytoplasmic processes.
Conclusions: Due to our findings Pref-1 appears to be a proper marker to describe adipose-derived stem cells. Our results provide evidence that two types of cells are present around microvessels. On one hand fibroblasts and on the other Pref-1 positive cells which are suggested to be ASCs.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.77

Titel:Esophageal telocytes

Autoren: Jianu A.(1),Nicolescu M.(2),Lighezan R.(3),Manoiu V.(4),Paduraru D.(5),Rusu M.(6),

Adressen:(1)Anatomy and Embryology|Victor Babes University of Medicine and Pharmacy|Timisoara|Romania; email:adelina.jianu@gmail.com; (2)Cellular and Molecular Medicine|Carol Davila University of Medicine and Pharmacy|Bucharest|Romania; (3)Histology|Victor Babes University of Medicine and Pharmacy|Timisoara|Romania; (4)Cellular and Molecular Biology|National Institute of Research and Development for Biological Sciences|Bucharest|Romania; (5)Anatomy|Grigore T. Popa University of Medicine and Pharmacy|Iasi|Romania; (6)Anatomy|Carol Davila University of Medicine and Pharmacy|Bucharest|Romania

Abstract:
Telocytes (TCs) are actually defined as being stromal cells with specific long and thin prolongations, called telopodes (Tp). They were positively identified in various tissues up to now. We report here for the first time the presence of TCs in the structure of esophagus. Such cells were identified under transmission electron microscopy (TEM) in esophageal samples of Wistar rats (N=5) and were found beneath the basal epithelial layer, in submucosa, closely related to smooth as well as striated muscular fibers, and also in adventitia. They were closely related to mast cells, macrophages, and microvessels. Hybrid morphologies of stromal cells processes were found: fibroblastic processes continued distally in a telopodial fashion. Telopodes alone may not be enough for a safe diagnostic of TCs in TEM; a larger set of specific standards (such as the telopodial emergence, and the sizes of the cell body and telopodes) should be considered to differentiate TCs to various species of fibroblasts. The morphological and ultrastructural specific features should make the difference between TCs and interstitial cells of Cajal in the digestive tract.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:78

Titel:Heterotopic and orthotopic autologous chondrocyte implantation using a rabbit osteochondral and a minipig chondral defect model

Autoren: Lohan A.(1),Marzahn U.(1),El Sayed K.(1),Haisch A.(2),Müller R.(1),Kohl B.(1),Stölzel K.(2),Ertel W.(1),John T.(3),Schulze-Tanzil G.(1),

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Abstract:
Implantation of non-articular (heterotopic) chondrocyte-based implants might be an alternative approach to improve articular cartilage repair. In this study, we compared joint cartilage defect healing after implantation of heterotopic auricular and orthotopic articular chondrocytes in osteochondral defects in rabbits and chondral defects in minipigs.
Poly-glycolic acid (PGA) three-dimensional constructs seeded with autologous rabbit-derived or minipig-derived articular and auricular chondrocytes were implanted into critical sized osteochondral defects in rabbits or into chondral defects in minipigs. Empty defects served as controls to assess the intrinsic healing response. Defect healing of osteochondral defects was monitored 6 and 12 weeks and of chondral defects 6 month post implantation using a macroscopical and microscopical score systems and, in case of chondral defects, biomechanical analysis.
Neo-cartilage was formed in PGA constructs seeded with rabbit-derived or minipig-derived articular and auricular chondrocytes in vitro and in vivo. In osteochondral defects, autologous articular chondrocytes led to a superior and auricular chondrocytes to an inferior cartilage repair quality compared with the other groups at the macroscopical and histological level. In chondral defects, the auricular chondrocytes-based implants showed a macroscopical slightly inferior repair quality, but a histological superior healing response when compared with the other groups. However, biomechanical analysis revealed a higher stiffness in repair tissues produced by auricular chondrocyte implantation compared with the other groups. Elastic auricular chondrocytes might maintain some tissue-specific characteristics when implanted into joint cartilage defects which limit its repair capacity. Deduced from these results, articular chondrocytes represent the preferable cell source for implantation.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:79

Titel:Knockout of the mitochondrial rhomboid protease parl causes sarcopenia via impaired respiratory chain expression

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Abstract:
Sarcopenia, the age – related loss of muscle mass mainly by fiber shrinkage rather than destruction, is a major medical and economic problem of countries with an aging population. The pathomechanisms causing this potentially crippling condition are only incompletely understood. Among others, loss of myofiber nuclear domains, satellite cell dysfunction and defective mitochondria are currently debated.
Mice deficient for PARL, a rhomboid family protease of the inner mitochondrial membrane, develop a severe sarcopenia – like phenotype starting around weaning, causing death during week 12, without detectable apoptotic loss of myofiber nuclei. Ultrastructural data reveal normal muscle fiber and mitochondria morphology, with only a minor preterminal loss of these organelles. Thereby, the nDNA/mtDNA ratio remained unaltered at different postnatal timepoints, arguing against a mechanism related to a mtDNA loss syndrome.
However, analysis of respiratory chain proteins via Western Blot revealed a significant selective reduction of especially SDHA / complex II and ATP synthase B parallel to an impaired activation of the ATP sensor AMPK, indicative of a defective regulation of ATP production.
Our data show a critical role for PARL in muscle fiber maintenance during adulthood and point towards an hitherto unknown role of this protease in respiratory chain function, possibly exerted via the role of PARL as a crista neck regulator. Moreover, our data point towards a crucial role of an even temporary respiratory chain deficit in the pathogenesis of sarcopenia and provide a monogenic model for the further investigation of its pathogenesis.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:80

Titel:Microchips housing cell cultures

Autoren: Fischer R.(1),Stubenrauch M.(1),Fröber U.(2),Voges D.(1),Schilling C.(1),Hofmann G.(3),Hoffmann M.(4),Witte H.(1),

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Abstract:
“Micro” titer plates for cell cultivation following ANSI/SLAS Microplate Standards own volumes of minimally 0.1 ml, keeping some 10^7 cells under static conditions without flow. To detect regional and local effects, we developed micro systems (BioMEMS – bio-micro-electro-mechanical systems) capable of housing lower number of cells, starting with the 10^1-10^2 cells used for seeding, under steady microscopic control. Cells are nutrified by controlled perfusion of substrates; the eluate thus also steadily provides products for analysis and further processing. For application of substances and gaining of probes, access via additional micro channels as well as adapted micro robots are possible. Like in standard MEMS, sensors and actors may be integrated in such a system. Size and shape of cultivation chambers may be chosen, at present we perform our experiments in circular chambers with a diameter of 3 mm and a height of 500 µm. Due to an open architecture as one variant feasible, the content of the cylindrical volume may be manipulated from top or bottom – e.g. we placed scaffolds for the cultivation of cartilage cells (solution is patented). Biocompatibility could be proven for a variety of cells, results for osteoblasts and fibroblasts already have been published, more have been tested in yet unpublished studies.
The systems yet are non-commercial developments of a university, thus exploration of their properties is open for additional scientific cooperation, e.g. for cell biology in anatomy.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:81

Titel:The c-kit receptor in human adult retina

Autoren: Rusu M.(1),Vrapciu A.(1),Didilescu A.(2),Voinea L.(3),

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Abstract:
CD117/c-kit is a type III protein tyrosine kinase receptor. The ligand of c-kit is the Stem Cell Factor (SCF). Various cells, such as progenitor cells, mast cells, melanocytes, interstitial cells of Cajal, neurons and glia, are known as expressing the c-kit receptor. Imatinib mesylate (IM) is a protein tyrosine kinase inhibitor. The intraocular toxicity of many antineoplastic drugs, including IM, is largely unknown. Moreover, the specific sites of action of IM, such as the ocular structures positive for the c-kit receptor, are still overlooked. Thus, we aimed at evaluating the specific presence of this receptor in human adult retina, by use of CD117/c-kit antibodies. Four human adult eviscerated eyes were used, sampled from patients with painful secondary glaucomas. In the central retina strong immune positive reactions were detected for the amacrine cells, the fiber layer of Henle, and in the outer nuclear layer and the outer limiting membrane. Also, c-kit positive interstitial networks were detected in the ganglion cell layer and the nerve fiber layer. In the peripheral retina c-kit positive labeling was poor in the four inner retinal layers, and abundant in the outer nuclear layer. Seemingly, c-kit signaling was more related to macula lutea. This could explain the macular impairment which is known to occur after IM administration.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:82

Titel:The human submandibular gland: immunohistochemical analysis of SNAREs and cytoskeletal proteins

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Abstract:
Submandibular acinar glands secrete numerous proteins like digestive enzymes and defense proteins on the basis of the exocrine secretion mode. Exocytosis is a complex process including a SNARE-mediated membrane fusion of vesicles and target membrane and the additional activation of cytoskeletal proteins. Relevant data are available predominantly for animal salivary glands, especially of the rat parotid acinar cells. We investigated the secretory molecular machinery of acinar (serous) cells in the human submandibular gland by immunohistochemistry and immunofluorescence and found diverse proteins associated with exocytosis for the first time. SNAP-23, syntaxin-2, syntaxin-4, VAMP-2 were localized at the luminal plasmamembrane, syntaxin-2 and septin-2 were expressed in vesicles in the cytoplasm. Double-staining of syntaxin-2 and septin-2 revealed a colocalization on the same vesicles. Lactoferrin and alpha-amylase served as marker for secretory vesicles and were labeled positively together with syntaxin-2 and septin-2 in doublestaining procedures. Cytoskeletal components like actin, myosin II, cofilin and profiling are concentrated at the apical plasma membrane of acinar submandibular glands. These observations complement the understanding of the complex exocytosis mechanisms.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:83

Titel:Tissue engineering strategies to establish the ligamentous part of the anterior cruciate ligament using biodegradable embroidered scaffolds

Autoren: Hoyer M.(1),Lohan A.(2),Meier C.(2),Breier A.(3),Heinrich G.(4),Rentsch C.(5),Ertel W.(2),Garbe L.(6),Schulze-Tanzil G.(2),

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Abstract:
A tissue engineered triphasic (bone/cartilage-ligament-cartilage/bone) anterior cruciate ligament (ACL) substitute based on biodegradable embroidered scaffolds could possibly be advantageous for the implantation into the bone, but requires a site-directed seeding strategy for the three compartments. The aim of this study was to identify a seeding strategy suitable for the central ligamentous part of the construct using lapine ACL cells. Therefore, two seeding techniques for the ACL compartment on embroidered polycaprolactone (PCL) and polydioxanone (PDS) scaffolds with thread sizes of 6-0 and 7-0 were compared in this study. A statical seeding strategy was applied to colonize the scaffolds with 3.75x103/mm3 lapine ACL cells embedded into a type I collagen hydrogel with a 7d statical culture. A second strategy was the site-directed application of spheroid cultures consisting of lapine ACL cells that adhered to the scaffolds and grew out during a 7d rotation culture. Cell vitality, construct histology and collagen expression were assessed after cultivation.
Both seeding strategies were suitable for the site-directed seeding of embroidered PCL and PDS scaffolds since ACL cells remained in the constructs and most of them survived.
The spheroid based technique seemed to be more advantageous since it allowed formation of cell-fiber contacts in contrary to the hydrogel, where cells were able to elongate but mostly did not interact with the scaffold. The different thread diameters (6-0 versus 7-0) had no major influence on seeding success.
Therefore, the spheroid technique will be optimized by collagen barriers for the temporary separation of the cell types in the construct.

Kategorie: Poster

Rubrik: 9.Cell Biology
Abstract Nr.:84

Titel:Uveal interstitial cells in humans

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Abstract:
In the gastrointestinal tract interstitial Cajal cells (ICCs) are implicated in rhythmicity and neural control of the smooth muscle layers. It is actually known that ICCs can be labeled with antibodies for CD117/c-kit, DOG1, CD44 and CD105. We aimed to evaluate the presence of ICCs in the human uveal tract, by use of these antibodies, and in TEM. Bioptic eye samples were obtained by surgical enucleation from 5 patients. Additional antibodies for vimentin and CD34 were used. Stromal cells (sCs) positive for all antibodies above were found in iris, ciliary body and choroid. Stromal networks positive for CD117, DOG1, CD44 and CD105 were present within the vascular layer of the chroroid, and were better represented beneath the anterior border layer of iris. CD34 antibodies also labeled endothelial tip cells, thus processes of sprouting angiogenesis were assessed. In TEM, sCs with telocitary morphologies were found, and had an ICC-like ultrastructure. The results gathered here strongly support the presence of uveal ICC-like cells in humans. Funding: POSDRU/107/1.5/82839.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:85

Titel:ATOH8, a regulator of skeletal myogenesis is influenced by notch signaling pathway

Autoren: Böing M.(1),Balakrishnan-Renuka A.(1),Wang B.(1),Yusuf F.(1),Patel K.(2),Otto A.(2),Morosan-Puopolo G.(1),Brand-Saberi B.(1),

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Abstract:
An orchestrated act of transcription factors and signaling pathways guarantees a balanced and progressive differentiation of myogenic progenitors in skeletal muscle development during embryogenesis and in maintenance of muscle stem cell populations for regeneration and growth of adult muscle. The transcription factor Atonal homolog 8 (ATOH8) is implicated in the specification and differentiation of cell lineages in neurogenesis and in the development of kidney, pancreas, and retina. Previous studies in our research group showed that ATOH8 is also substantial for regulation of myogenic progenitors during embryonic myogenesis, as evidenced by the silencing of ATOH8 in chicken somites, which resulted in a blockage of differentiation.We also showed that the ATOH8 is expressed during satellite cells differentiation in vitro and adult skeletal muscle regeneration in vivo. ATOH8 is also expressed in cultured C2C12 mouse myoblasts and dramatically decreases in differentiating myoblasts.

Furthermore the expression of ATOH8 is influenced by one of the most discussed signaling pathway, in relation to myogenesis, the Notch pathway. Notch signaling pathway is a highly conserved signaling transduction mechanism and controls cell fate decisions, affects proliferation or maintenance of progenitor cells and generation of satellite cells during skeletal myogenesis. We demonstrate that the ventrolateral lip of the dermomyotome gives rise to the hypaxial myotome through asymmetrical cell division dependent on asymmetrically localized Numb. Inhibition of Notch signaling by Numb in myotome results in an early initiation of ATOH8 expression, whereas Notch overexpression results in a disordered expression of ATOH8.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:86

Titel:Bilateral brachyury expression domains after rho-kinase inhibition in the mammalian embryo

Autoren: Halacheva V.(1),Viebahn C.(1),

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Abstract:
Intraepithelial cell movements are known to be controlled by the planar cell polarity (PCP) pathway and play a fundamental role during primitive streak morphogenesis in the chick. In the mammalian embryo, however, these cell movements follow a different pattern and their regulation is still unknown. In this study we interfered with cell movements by blocking Rho-kinase involved in actin stabilization downstream of the PCP pathway in 6-days-old rabbit blastocysts. After adding the Rho-inhibitor Y-27632 embryonic discs grew more in width than in length (as compared to the controls). Moreover, using a dilution series of the Rho-inhibitor a dose-dependent effect on the primitive streak morphology was observed, i.e. bilateral epiblast cell accumulations coinciding with Brachyury expression domains were found at different distances from each other on either posterolateral borders of the embryo. Time-lapse movies of treated embryos revealed that cells moved away from the normal primitive streak area and the actin cytoskeleton was disturbed in the posterior gastrula extension area, only. To look for a specific effect of the Rho-inhibitor on the PCP pathway, latrunculinA (LatA) was applied to block actin polymerizing directly. Embryos treated with LatA revealed a normal form of the embryonic disc, however, an abnormal hypoblast cell accumulation in the centre of the embryo was observed and Brachyury in situ hybridization showed a single widened expression domain, only; the actin cytoskeleton was disturbed in the whole embryo. In conclusion, an intact Rho-kinase dependent PCP pathway seems to be important for the formation of a single primitive streak.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:87

Titel:C-kit positive cells and networks in tooth germs of human midterm fetuses

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Abstract:
Extensive studies attempt to characterize the dental pulp stem cells. However, studies performed on prenatal human tissues were not performed to evaluate the in situ characterization and topography of progenitor cells. We aimed to perform such a study by use of antibodies for CD117/c-kit and multiplex antibody for Ki67+caspase 3. Antibodies were applied on samples dissected out from five human midterm fetuses. Positive CD117/c-kit labeling was found in mesenchymal derived tissues, such as the dental follicle and the dental papilla. Epithelial tissues, such as the dental lamina, the enamel organ and the oral epithelia also displayed isolated progenitor cells which were CD117/c-kit positive. Interestingly, CD117/c-kit positive cells of mesenchymal derived tissues were sending multiple prolongations building networks; the most consistent such networks were those of the dental follicle and the perivascular networks of the dental papilla. However, the mantle of the dental papilla was also positive for CD117/c-kit positive stromal networks. The CD117/c-kit cell populations building networks appeared mostly with a Ki67 negative phenotype. It appears so that CD117/c-kit progenitor cells of the prenatal tooth germ tissues are involved in intercellular signaling.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:88

Titel:Defective body wall segmentation caused by PSEN1 deficiency is strictly region – specific and accompanied by impaired PNS development

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Abstract:
Notch receptors and ligands and their processing secretases are established key players during somite segmentation and body wall development. A re-evaluation of vertebral bone development surprisingly revealed a strictly region – specific pathomorphology not explained by a uniformly defective Notch – driven oscillator mechanism.
PSEN1 deficient and WT embryos were investigated by light and electron microscopy using marker antibodies for somite derivatives and PNS neurons.
Vertebral column development features an absence of the atlas / C1, but well preserved cervical vertebrae 2 – 7. In contrast, thoracic vertebra and sacral bone were virtually fragmented, separated by mass of completely fused lumbar vertebrae.
While spinal nerve development commenced on schedule in PSEN1 deficient mice, rootlets leave the spinal cord in a continuous row without clear segmentation, but still organized into individual nerves laterally, albeit with an impaired fasciculation. Caudal to the anterior limb bud, nerve outgrowth in most cases terminated after leaving the spinal cord. At the same level, peripheral ganglia were reduced in size and inconstantly absent. In contrast to spinal nerves, development of cranial nerves was basically unaffected, except for inconstant irregular anastomoses between individual nerves and size variations of ganglia.
While defective fasciculation of peripheral nerves occurs in mice deficient for Notch target genes hes1 and hes5, defective rootlet separation at spinal cord level calls for additional mechanisms. Candidate mechanisms underlying the striking region specificity of vertebral defects will be discussed.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:89

Titel:Sirenomelia-case report

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Abstract:
Sirenomelia is an extremely rare congenital malformation, with a frequency of 1 to 100.000 in which the lower limbs are fusioned. The developmental problem is thought to affect the mesoderm. Other researchers think that sirenomelia results from the presence of an abnormal artery in the abdomen, which diverts blood flow away from the lower areas of the developing fetus. Many scientists think that the cause of sirenomelia is a combination of abnormal mesoderm development and decreased blood flow to the caudal areas of the fetus.
The present case is that of a 30 week, weighing 1300 gr., and undetermined gender in the clinical neonatal exam, plurimalformed, deceased intrapartum.
During the necroptic examination the gender could not be established presenting internal and external sexual organs agenesia, fetal distal pole malformation, most likely sirenomelia presenting fusion of the lower limbs.
The fetus presents multiple malformations of the internal organs of the caudal pole such as: hypoplastic kidneys without fetal lobulation, agenesia of the urinary bladder, hypoplastic aspect of the small intestine, distended large intestine in the distal third part with the aspect of megacolon and the absence of the anal orifice.
The placenta and the umbilical cord were examined macroscopically and microscopically that brought valuable information regarding vascular changes that led to hypoxia.
Also the imagistic exam proved to be enlightening regarding the severe congenital birth defect as being sirenomelia.
Key words: congenital malformation, sirenomelia, feto-placental unit.

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:90

Titel:The immunohystochemical expression of vascular changes at placental level using antibody anti-VEGF

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Abstract:
Purpose: To evaluate the structural vascular changes on the placental level on placenta provided from births with newborns with multiple malformations the VEGF antibody was used. Vascular endothelial growth factor (VEGF), also known as vascular permeability factor (VPF) and VEGF, is a potent mediator of both angiogenesis and vasculogenesis in the fetus and adult. It is a member of the platelet-derived growth factor (PDGF) As its name implies, VEGF activity has been mostly studied on cells of the vascular endothelium.
Methods: The Immunohystochemical (IHC) expression of VEGF marker was studied on placental fragments from 106 births with newborns presenting malformations ,mainly incompatible with life and 30 normal births with normal newborns delivered on term.
Results:IHC reaction for VEGF indicates abnormal diameters of blood vessels, associated with perivascular oedema, conglomerates of villous system and many syncytial buds. VEGF marker has positive expression in trophoblastic epitelium on the pathological placental level. We found that VEGF is strongly expressed in villous cytotrophoblast cells and subsequently in Hofbauer cells .
Conclusions: the hereby results present that in placental fragments from births with newborns that have presemted malformations, there are multiple pathologic vascular modifications. .All these alterations will lead to several hypoxic repercussions on the product of conception whose development will be eventually altered.. The sequential expression of growth factors in different cell types may point to the fact that placental vasculogenesis and angiogenesis are clearly distinct events.
Key words: IHC,placentae, hypoxia, antibodyVEGF

Kategorie: Poster

Rubrik: 10.Developmental Biology
Abstract Nr.:91

Titel:The male urethra: spatiotemporal distribution of molecular markers during its early development

Autoren: Pechriggl E.(1),Bitsche M.(1),Blumer M.(1),Fritsch H.(1),

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Abstract:
The organogenesis of the male human urethra and its contributing germ layers is still a subject of controversial discussion. Although, many studies were conducted, the mechanisms of urethral development still need further analysis to clarify open questions concerning the sequences in its development. Our aim was to elucidate the spatiotemporal distribution of immunohistochemical relevant indicators during development of the male urethral epithelium as well as the adjacent mesenchyme. Therefore, we analysed male human embryos and foetuses between the 6th and 15th week after fertilization by using histological and immunohistochemical methods. Monoclonal antibodies raised against cytokeratins (CKs) 7, 8, 13 and 17 as well as Ki67, E-Cadherin, p63, uroplakin III, smooth muscle actin (SMA) and Vimentin were used. Our results revealed that the epithelial differentiation already starts before the rupture of the cloacal membrane occurs. At week (W) 8 - 9 the epithelium became transitional over the whole length of the elongating urethra. The urothelial staining pattern of uroplakin III retired constantly, and at the end of W 11 it was proximally retracted to the bladderneck comparable to the epithelial appearance of adults. The urogenital sinus epithelium provided p63 - positive cells to the Wolffian duct, which leads to the suggestion that the development of the male inner genitals needs a cellular stimulus of this very epithelium. CK 17 - positive cells, which were described as epithelial stem cells could be found in the extending urethral plate. This facilitates a new insight into the pathogenesis and treatment of hypospadias, which is one of the most common malformations in male newborns.

Kategorie: Poster

Rubrik: 12.Reproductive Biology
Abstract Nr.:92

Titel:Distribution of neuroendocrine cells during prostate development

Autoren: Szczyrba J.(1),Wandernoth P.(1),Aumüller G.(2),Mannowetz N.(1),Wennemuth G.(1),

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Abstract:
Prostate carcinoma is the most commonly diagnosed male cancer worldwide. It is mainly slow-growing, featuring late metastatic potential but also aggressive forms with androgen-independent growth, like pure neuroendocrine tumors (small-cell carcinoma) or tumors with extensive neuroendocrine differentiation (carcinoid/carcinoid-like tumors).
Neuroendocrine cells have several functions, e.g. epithelial cell growth induction and androgen-independent differentiation via production of mitogens and other cell-stimulating substances. The histogenesis of this cell population is still unclear. The discussed prostatic NE cell origins are, on the one hand, the pluripotent prostatic stem cells and, on the other hand, the migrating neural crest cells.

In this study, we performed immunohistochemical chromogranin-A stainings of human fetal prostates of 18/25 gestation weeks and a subsequent 3D reconstruction. We discovered that NE cell distribution differs according to development stage. The 18 GW prostate shows a diffuse NE cell distribution in prostatic stroma and epithelium in the cranial part, whereas most NE cells are situated in extraprostatic paraganglia. The fetal prostate from GW 25 contains, in contrast, hardly any stromal NE cells in the cranial part and only a few cells in the epithelial compartment. The middle parts of the investigated prostates show an increasing number of NE cells in the epithelium. Additionally, NE cells are found exclusively in glandular and urethral epithelium in the caudal parts of the both prostates.
These results, describing stromal NE cell loss during prostate development, indicate NE cell putative migration from paraganglia to epithelial structures inside the prostate, possibly elucidating the origin of prostatic neuroendocrine cells.

Kategorie: Poster

Rubrik: 12.Reproductive Biology
Abstract Nr.:93

Titel:Expression of endothelial progenitor markers in defined stages of the bovine corpus luteum

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Abstract:
Follicle development and regression in the ovary is not possible without intense blood vessel formation. Vasculogenesis is the de novo generation of blood vessels by differentiation of endothelial progenitor cells (EPC) to endothelial cells. In an earlier study, the presence of EPC in the bovine ovary was confirmed by immunohistochemical and molecular biological methods. It was shown that quantity of EPC is related to certain luteal stages, with highest values of EPC-markers being expressed during the developmental phase of the corpus luteum.
The aim of the present study was to investigate the expression of Estrogen-Receptor-1 (ESR-1) and the expression of EPC-markers CD34 and VEGF-R2 in the ovary at defined luteal stages.
Ovaries were collected at the abattoir and macroscopically classified into the following luteal stages: development, mature, regression, and pregnancy. All primers were designed using Primer3 software. Reference genes that had been validated in an earlier study were used. Evaluation of gene expression was performed using the software qbasePlus (Biogazelle NV, Zwijnaarde, Belgium). Results demonstrate a distinct relationship of the presence of ESR-1 and the EPC-markers CD34 and VEGF-R2 for all stages.

Kategorie: Poster

Rubrik: 13.Pheripheral and vegetative nervous system
Abstract Nr.:94

Titel:EsVEGFR2, an endogenous inhibitor of lymphangiogenesis, is expressed in human embryonic tissues and down-regulated in advanced neuroblastoma

Autoren: Becker J.(1),Wilting J.(1),

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Abstract:
Tumor blood- and lymphatic vessels are the main routes for tumor metastasis. Hemangiogensis and lymphangiogenesis are the driving events in tumor vascularization. They are regulated by members of the vascular endothelial growth factor (VEGF) family and their receptors (VEGFR). An important regulatory component of the VEGF-system are soluble receptor fragments released by shedding from the cell surface into body fluids. Recently, a splice variant of VEGFR-2 was identified in mouse and human, termed endogenous soluble VEGFR-2 (esVEGFR-2) (Albuquerque et al. 2009). Most unexpectedly esVEGFR-2 does not bind hemangiogenic VEGF-A, like the membrane-bound receptor, but rather VEGF-C, the key inducer of lymphangiogenesis. The molecule is a potent inhibitor of lymphangiogenesis in vitro and in vivo.
We show here that esVEGFR2 is expressed in embryonic tissues such as sympathetic and spinal ganglia and the adrenal medulla, indicating its contribution to normal development of sympatho-adrenal organs. These tissues are the origin of neuroblastoma (NB), an embryonic tumor of early childhood, originating from the neural crest. Clinically, NB of advanced stages are often accompanied by infestation of regional or distant lymph nodes. Therefore we investigated the expression of esVEGFR-2 in 49 untreated primary NB. We demonstrate that the expression of the lymphangiogenesis inhibitor is down-regulated in progressed stages, whereas treatment of NB cells with ATRA, a drug used in the clinic to induce differentiation, leads to increased levels of esVEGFR-2 in vitro. Our work shows that esVEGFR-2 is a potent developmental regulator of lymphangiogenesis and may have an impact on tumor metastasis.

Kategorie: Poster

Rubrik: 13.Pheripheral and vegetative nervous system
Abstract Nr.:95

Titel:Innervation of the muscularis mucosae (mm) in non-chagasic colon and chagasic megacolon.

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Abstract:
Megacolon is a sign of chronic Chagas' disease. Numerous studies focused on the related myenteric neuron loss and the hypertrophied external muscle layers. Here, we addressed the muscularis mucosae (MM) and related structures.
From seven megacolonic samples, each three sets of cryosections (from oral, megacolonic and anal zones) were immunhistochemically stained for alpha smooth muscle actin (SMA), synaptophysin (nerve fibre marker), c-kit (marker of interstitial cells of Cajal, ICC) and S100 (glia marker). We estimated the thickness of the MM and measured the areas of stained profiles within the sectional area of the MM. These values were compared with age-matched, non-chagasic control samples.
MM layer thickness increased in chagasic samples from oral to anal (control: 51µm, oral: 133µm, mega: 166µm, anal: 272µm). The muscular density (SMA profile area related to the MM sectional area) was least in the megacolonic segments (control: 70%, oral: 60%, mega: 41%, anal: 53%) whereas both nerve fibre and glial densities were least in the anal segments (control: 3.1%, oral: 1.8%, megacolonic: 1.1%, anal: 0.6%).
Additional immunohistochemical staining of mucosal and submucosal wholemounts showed that submucosal nerve cell bodies and nerve fibres of the plexus of the MM in both non-chagasic and chagasic specimens contain vasoactive intestinal peptide (VIP) and calretinin (CALR).
In contrast to the external muscle layers, we were unable to identify ICCs by c-kit staining associated with the MM. This virtual absence in both non-chagasic and chagasic colon raises the question of how smooth muscle contraction impulses are generated within the MM.

Kategorie: Poster

Rubrik: 13.Pheripheral and vegetative nervous system
Abstract Nr.:96

Titel:Real-time PCR of trigeminal receptor mRNAs in human nasal biopsies

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Abstract:
Previous research suggests that chemosensory stimuli mediated by branches of the trigeminal nerve are perceived differentially dependent on the location within the nasal cavity. The aim of this study was to acquire data on the occurrence of various trigeminal receptor mRNAs in different locations of the nasal mucosa using real-time PCR.
Biopsies of 12 healthy individuals (mean age: 37.8 years) were taken from the insertions of the middle and inferior turbinates, as well as anterior ventral and posterior dorsal septum. Real time-PCR was performed using primers for TRPA1 (ankyrin-like receptor with transmembrane domain I), ACCN3 (acid-sensing ion channel), TRPV1 (transient receptor potential vanilloid receptor 1), TRPM8 (transient receptor potential receptor M8), and CALCB1 (calcitonin gene-related product). As housekeeping gene, HMBS was used. All primers were positively tested in a human trigeminal ganglion.
Strongest expression of all receptor genes was shown for TRPV1 and ACCN3, especially in septal regions of male individuals, TRPM8 was not detected. TRPA1 mRNA was more strongly expressed in anterior septal areas of female subjects in comparison to males. Younger subjects presented stronger receptor mRNA expressions than older ones.
Present data of this small group tend to show a stronger expression of TRPV1 and ACCN3 in anterior septal areas of the nasal cavity compared to posterior and lateral locations. Supporting previous electrophysiological data, the results fit to guarding functions of the trigeminal system at anterior entry sites of the respiratory tract.

Kategorie: Poster

Rubrik: 14.Central nervous system/signal transduction and connections
Abstract Nr.:97

Titel:Spared axonal bundles after spinal cord compression provide sufficient trophic support to prevent hindlimb muscle atrophy

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Abstract:
Knowledge on the morphological grounds of motor deficits after traumatic spinal cord injury (SCI) is crucial for understanding the mechanisms of functional recovery. In the present study we looked for correlations between objective functional (single-frame video motion analysis) and morphological (hind-limb muscle atrophy) parameters after SCI compression injury in rats.
We performed severe compression SCI at low-thoracic level in adult female Wistar rats and subjected them to whole-body vibration (WBV) therapy. WBV is a novel form of exercise used to improve neuromuscular performance in healthy individuals. Its usefulness as a therapy for patients with SCI, has been barely explored in clinical settings and not tested in animal models. WBV training was performed daily starting 1, 7, 14 and 28 days after injury and continued over a 12-week post-injury period. Intact rats (no SCI), rats with SCI but no WBV training (sham) and rats subjected to manual locomotion therapy (MLT) served as controls.
Recovery of locomotion was analyzed using video recordings of beam walking and inclined ladder climbing. We correlated functional results with the degree of atrophy of the soleus muscle. To our astonishment, regardless of the postlesional treatments applied, neither of these values were changed at 12 weeks after SCI, there were no signs of muscle atrophy at all.
We conclude that the spared axonal bundles, which remained intact after the compression injury, provided sufficient though indirect trophic support to the hindlimb muscles to prevent atrophy and degeneration.

Kategorie: Poster

Rubrik: 14.Central nervous system/signal transduction and connections
Abstract Nr.:98

Titel:Whole-body vibration attenuates microglial activation in the chronically injured rat spinal cord in an onset-dependent manner

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Abstract:
As inflammation after spinal cord injury (SCI) is a damaging factor, we examined whether whole-body vibration (WBV) would provide neuroprotection by reducing the activation of microglial cells.
Following compressive SCI at low-thoracic level, adult Wistar rats were subjected to WBV starting 7, 14, or 28 days after injury (WBV7, WBV14, WBV28 respectively). Therapy was performed daily and continued over a 12-week post-injury period. Rats with SCI but no WBV training (sham) as well as rats subjected to manual locomotion therapy (MLT) served as controls. Recovery of locomotion was analyzed using video recordings of beam walking and inclined ladder climbing. H-reflex was analyzed at 1, 3, 6, 9, and 12 weeks after SCI. Finally, microglial activation (intensity of fluorescence according to a gray scale) was determined in transverse sections of the lumbar enlargement of the spinal cord after immunostaining with IBA1 (SySy, 234003) and Cy3-conjugated IgG (Sigma, C2306).
Evaluation of BBB-locomotor rating, plantar stepping, body weight support and skilled hind limb movements revealed that WBV14 had the most beneficial effects. Accordingly, electrophysiological parameters showed an enhancement of the H-wave and the frequency dependent rate depression of the H-reflex. Compared to sham and WBV28, the ventral and dorsal horns of the spinal cord in WBV14 rats showed significantly less activated microglia in the lumbar enlargement.
These findings show that beneficial effects of WBV in our rat SCI model are onset-dependent. WBV starting 14 days after SCI promotes best locomotor recovery possibly due to the associated decrease in microglia activation thus providing neuroprotection.

Kategorie: Poster

Rubrik: 14.Central nervous system/signal transduction and connections
Abstract Nr.:99

Titel:Whole-body vibration therapy applied two times daily fails to improve hind limbs motor recovery in spinal cord-injured rats

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Abstract:
Whole-body vibration (WBV) is a novel therapy for patients with neurological disorders, in particular spinal cord injury (SCI). Based on earlier results indicating positive effects of WBV on neurological recovery after SCI, we tested in this study whether a more intensive treatment with WBV, e.g. two times daily would improve the restoration of motor function further.
We performed severe compression SCI at low-thoracic level in adult female Wistar rats and subjected them to WBV-training twice a day starting 14 days after injury (2 x WBV14). This therapy was performed daily and continued over a 12-week post-injury period. Rats with SCI but no WBV-training (sham) and rats with WBV-training once a day (WBV14) served as controls. BBB-locomotor rating, foot stepping angle (FSA), rump-height index (RHI) and correct ladder steps (CLS) were analyzed at 1, 3, 6, 9, and 12 weeks after SCI using video recordings of beam walking and inclined ladder climbing.
Locomotor rating and the numerical assessments of plantar stepping and skilled limb movements revealed no significant effects of 2 x WBV14 versus sham treatment. Accordingly, at the end of the experiment the BBB score, FSA, RHI, CLS were even worse than that measured for the WBV14 rats.
These findings provide important evidence that positive functional effect of WBV in our rat SCI model is intensity dependent. Unbiased improvement of hind limbs motor performance can be thus expected only when this potent rehabilitation therapy is applied as often as once a day.

Kategorie: Poster

Rubrik: 14.Central nervous system/signal transduction and connections
Abstract Nr.:100

Titel:Whole-body vibration therapy applied two times daily does not alter motoneuron excitability in spinal cord-compression injured rats

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Abstract:
Previous studies have shown that the plantar H-reflex is a useful tool to assess motor neuron excitability after spinal cord injury (SCI). Specifically, recovery of better locomotor abilities is associated with enhanced H- but not M-wave and attenuated frequency dependent depression of the H-reflex.
We performed compression SCI in adult Wistar rats. Based on earlier results indicating a positive effect of WBV on neurological recovery after SCI, we tested whether a more intensive treatment would improve restoration of motor function. This is why we subjected rats to WBV-training two times a day starting 14 days after injury (2 x WBV14). This therapy was performed daily and continued over a 12-weeks post-injury period. Rats with SCI but no WBV-training (sham) and rats with WBV-training once a day (WBV14) served as controls. H-reflex was analyzed at 1, 3, 6, 9, and 12 weeks after SCI. Several variables were measured at baseline stimulation frequency (0.1 Hz): maximum M- and H-wave amplitudes and H/M ratios, as well as M- and H-wave latencies.
None of these parameters showed differences among the treatment groups. In addition, we analyzed the alterations of the M- and H-waves upon incrementally increasing the stimulation frequency from 0.1 to 5 Hz. In contrast to the M-wave, which showed no frequency-dependent depression, a marked rate depression was found for the H-wave. However, this depression was similar in all experimental groups.
These findings indicate that WBV did not influence the spinal reflex excitability as estimated here for the plantar motor neuron pool.

Kategorie: Poster