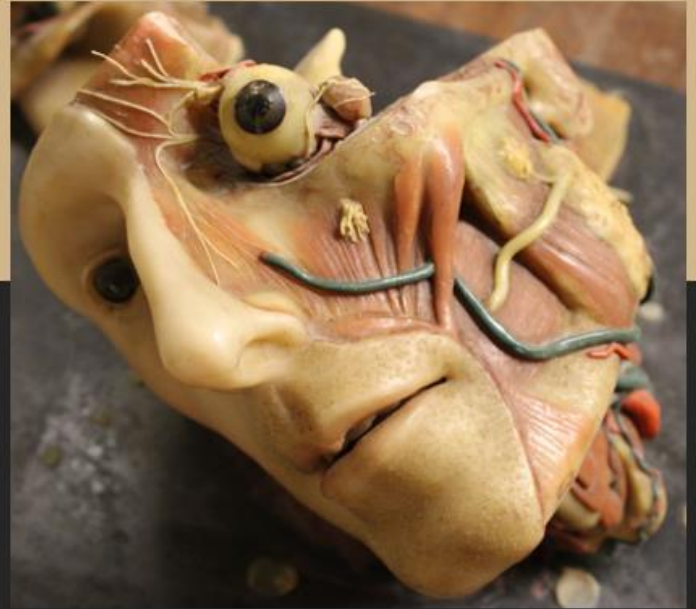


LVI REUNIÃO DA SOCIEDADE ANATÓMICA PORTUGUESA

ANATOMIA - PASSADO E FUTURO



Sábado, 20 de Abril de 2024

Andries J. van Dam

Anatomical Museum, Leiden University Medical Center

Jerry Middelberg

*Operation Manager – former Anatomy Manager –,
Amsterdam Skill Center*

Instituto de Anatomia

Faculdade de Medicina da
Universidade de Lisboa



Inscrição em:

<https://forms.gle/s7hSeA0MSp94HinR9>

9.00h Acolhimento

9.25h Cerimónia de Abertura

9.30h Comunicações Orais - submissão até 30 de março de 2024

11.00h *Coffee Break* - Pósteres

11.30h A new way of learning - the story of the
Amsterdam Skills Centre – Jerry Middelberg

12.15h Fluid preservation and preservation for post-
graduate courses – Fix for Life – Andries J. van Dam

13.00h Almoço

14.30h Assembleia Geral da SAP/AAP



LVI Reunião da Sociedade anatómica Portuguesa ANATOMIA - PASSADO E FUTURO

Sábado, 20 de Abril de 2024

**Instituto de Anatomia
Faculdade de Medicina da Universidade de Lisboa**



Comissão Científica:
Prof. Doutora Alexandra Brito
Prof. Doutor António Bernardes
Prof. Doutor Carlos Zagalo
Prof. Doutor Diogo Pais
Prof. Doutora Maria João Oliveira

Abstracts

Comunicações

9h30m - C1. The osteogenic potential of equine adipose tissue-derived stromal cells from the subcutaneous region

Carla Ferreira-Baptista^{1,2,3,4}, Rita Ferreira⁴, Maria Helena Fernandes^{2,3}, Pedro Sousa Gomes^{2,3}, Bruno Colaço^{1,3,5,6}

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Introduction: Adipose tissue-derived stromal cells (ADSCs) have gained particular interest in the field of veterinary medicine, particularly in bone tissue regenerative applications. These cells present a variety of promising characteristics, such as accessibility, abundance, rapid proliferation, and differentiation capacity. ADSCs can be obtained from adipose tissue in two main sites –subcutaneous and visceral regions. Among these, adipose tissue from the subcutaneous region is widely available and can be obtained in large quantities, as it is located under the skin and is abundant. While several studies have isolated and characterized ADSCs from the subcutaneous region, only a limited number have assessed their osteogenic capacity. Accordingly, the present study aims to evaluate the functionality and osteogenic potential of horse ADSCs isolated from subcutaneous region.

Methods: Adipose tissue from subcutaneous region was collected from 4 healthy horses. ADSCs were isolated through an enzymatic dissociation process and cultured in the presence of osteogenic inducers. The obtained cultures were characterized at different periods for proliferation, morphology, and osteogenic activity. Comparison between groups was performed using analysis of variance and Tukey post-hoc test ($p < 0.05$).

Results: ADSCs derived from subcutaneous tissue exhibit a high proliferation rate, elevated levels of ALP activity, and strong cytochemical staining of ALP and collagen, when compared to the basal condition.

Conclusion: Therefore, it can be concluded that in horses, ADSCs derived from subcutaneous tissue represent a potentially significant cell source for bone-related regenerative applications, due to their osteogenic capacity.

Funding: This work was supported by the projects UIDB/00772/2020 (Doi: 10.54499/UIDB/00772/2020) funded by the Portuguese Foundation for Science and Technology (FCT).

Keywords: horses, adipose tissue, osteogenic potential, bone regenerative applications

9h37m30' - C2. Cribriform plate morphological description in aged rats

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The global rise of neurological diseases is closely linked to rapidly aging populations, leading to a substantial emergence in healthcare expenses. Quantitative studies of cribriform plate (CP) in humans revealed a decrease of patent foramina with aging, due to obstruction caused by appositional bone growth, which may lead to impaired olfactory function and deficient cerebrospinal fluid drainage described in previous research, besides effectiveness of nose-to-brain pathway. However, characterization of CP in aged rats is lacking in literature. Our objective was to characterize the CP anatomy in aged rats. Fifteen female (Wistar) cadavers from healthy rats, ~2.5 years old were included. Skulls were cut along the horizontal line passing through the center of basisphenoid bone, for a complete access of cranial cavity, and CP were individualized, anatomically prepared by slow maceration and bleaching, and photographed using a Canon PowerShot G7 X Mark II camera. Parameters were measured using Image J software and analysed. No significant differences were found between right and left sides, so each side was considered independently for further analysis (N=30). The mean \pm standard deviation for the number of CP Foramina was 56 ± 3.3 , CP area was 12.0 ± 0.2 mm², and the percentage of the CP area occupied by foramina was 8.3 ± 0.6 . A mean percentage of $38.3 \pm 1.8\%$ for CP closed foramina was observed. Closed foramina were predominantly located dorsally, near Crista Galli. The CP anatomical characteristics described might indicate a decline in the effectiveness of solute transportation through the olfactory pathway. This decline could lead to impaired waste removal from the aging brain, consequently fostering neurotoxic substances accumulation, believed to play a role in age-related cognitive deterioration and development of neurodegenerative disorders. Interruption of nervous communication between olfactory epithelium and olfactory bulbs may lead to olfactory dysfunction, anosmia, and eventually reduced effectiveness of the nose-to-brain pathway. Further studies are necessary to clarify those aspects.

This work is supported by National Funds from FCT-Portuguese Foundation for Science and Technology, under the projects UIDB/04033/2020 (<https://doi.org/10.54499/UIDB/04033/2020>), UIDP/00772/2020 (<https://doi.org/10.54499/UIDB/00772/2020>), LA/P/0059/2020, Scientific Employment Stimulus-Institutional Call-CEECINST/00127/2018 UTAD, (<https://doi.org/10.54499/CEECINST/00127/2018/CP1501/CT0008>), and by research grant 2020.06947.BD.

Keywords: aging, neurological diseases, olfactory function, cerebrospinal fluid drainage

9h45m - C3. Development of a physiological and anatomically relevant human blood-brain barrier based on 3D tissue engineering

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The blood-brain barrier (BBB) represents an interface within the central nervous system (CNS), acting as a crucial guardian between the systemic circulation and neural tissues. This anatomical boundary is primarily composed of intricate microvessels characterized by a monolayer of specialized brain microvascular endothelial cells (BMECs) connected by complex junctional network, which strongly restricts its permeability, compared with peripheral endothelium. However, most of the existing BBB models fails to recapitulate the in vivo features like shear stress, permeability, cells-extracellular matrix (ECM) interaction, and cell architecture. Therefore, it is crucial to develop 3D tissue-engineered BBB models that incorporate these complexities to generate realistic and relevant models. This work aimed to establish a human 3D in vitro model of the BBB that mimics in vivo properties. A microfluidic platform was fabricated using a biocompatible elastomer, polydimethylsiloxane (PDMS), in which a cylindrical template rod (250 μm diameter) was inserted, serving as house for ECM and cells. Mimicking the ECM, a type-I collagen was introduced around a 150 μm diameter wire (microvessel template), and the formed channels previously coated (type-IV collagen/fibronectin) were perfused with iBMECs (derived from pluripotent stem cells-labelled zonula-occludens 1) and maintained at physiological shear stress by gravity. Then, the cells morphology, vessel geometry, junctions' integrity and permeability were evaluated and compared with non-brain ECs (human umbilical vein endothelial cells, HUVECs)-perfused microvessels. Confocal imaging of both vessels showed a cylindrical geometry with a uniform monolayer and well-defined junctions network after 2 days. Their functionality was assessed through permeability assay using two dextran dyes (10 and 500 kDa). The iBMECs vessels demonstrated very restrict permeability to both dyes ($< 5 \times 10^{-7}$ cm/s), similar to the in vivo BBB. Non-brain vessels showed similar permeability for the 500 kDa dextran but exhibited focal leaks in ECM. Additionally, there was a significant increase in permeability for small dyes ($\sim 60 \times 10^{-7}$ cm/s), highlighting the differences between peripheral and BBB endothelium.

These studies establish a 3D in vitro model of the BBB physiological and anatomically relevant, enabling the recapitulation of in vivo BBB function and properties, improving the robustness of studies at BBB level.

Acknowledgments: FCT scholarship 2020.07115.BD and institutional grants UIDB/04138/2020, UIDP/04138/2020, and Fulbright scholarship (PS00342203).

Keywords: Blood-brain barrier; tissue engineering; microfabrication; 3D microvessels; permeability; in vivo features

9h52m30' - C4. From the magician's hat to science: the anatomical value of the rabbit liver.

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Over the past decades, the European rabbit (*Oryctolagus cuniculus*) has been a valuable animal model to understand several human conditions. Indeed, knowledge on human on infectious and non-

infectious diseases, progress in therapeutics, disclosure of immunological features, and vaccines development, such as Louis Pasteur's 1881 rabies vaccine, were better reached due to the contribution of rabbits to science. Regarding infectious diseases, whether of viral, bacterial, or parasitic origin, rabbits provide a more reliable inference of human-pathogen interactions than rodents.

Associated with a high mortality rate, acute viral hepatitis is a disease of major concern in human medicine, lacking an animal model that can mimic pathogenesis and diagnosis. Rabbit hemorrhagic disease virus (RHDV) leads to fulminant hepatitis in rabbits with high mortality and transmissibility rates. A definitive rabbit hemorrhagic disease diagnosis can only be reached postmortem. RHDV-positive animals are promising models for understanding this unique condition and reaching new findings for other human liver viral diseases, such as hepatitis A, B, C, D and E.

Herein, our main objective is to present a novel diagnostic technique for RHDV to achieve a fast and reliable antemortem diagnosis supported in liver morphology. This technique merges a fine needle aspiration (FNA) of the liver with the cell tube block (CTB) methodology, which allows the generation of samples with equivalent histological quality as liver biopsies and, thus, with a strong diagnostic value. We obtained liver FNA from ten RHDV-positive rabbits. The needle content was rinsed in a saline solution, centrifuged, and converted into CTBs. Liver samples were also collected at necropsy. These, along with the CTBs, were routinely processed for paraffin embedding. Sections were stained with H&E and immunohistochemistry was performed for RHDV antigen. Both sample types produced positive results.

In conclusion, we believe that this diagnostic technique marks a significant advance in the field of acute viral hepatitis, with the possibility to be applied to human diseases with the same level of reliability of the results as in rabbits.

10h00m - C5. Is there Brain Atrophy? Anatomy and volume Assessment in MRI - Neuroradiologists Vs Artificial Intelligence

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Background and aims:

Qualitative and semi-quantitative scales are commonly used for the evaluation of brain atrophy in MRI. These scales allow neuroradiologists to visually assess anatomy and categorize the degree of atrophy, contributing for the diagnosis of different types of dementias. Although widely used in clinical practice, the application of scales has limitations, including inter-observer variability and subjectivity. Recently, artificial intelligence (AI) programs have shown to offer advantages over human observation in terms of efficiency and consistency in several medical conditions.

This study aims to present our preliminary results comparing MRI brain anatomy and volume assessment obtained through observation Vs an AI program.

Methods:

Thirteen patients with various neurological conditions were included. Brain MRI scans were acquired and analyzed by two neuroradiologists and an AI program. For qualitative/semi-quantitative analysis different scales were applied (Scheltens, Fazekas, Pasquier and Koedam). The AI program (Icobrain[®]) uses deep learning algorithms trained on large datasets to automatically segment anatomy and measure brain volumes. The time taken for interpretation/measurements was recorded for both methods.

Results:

The AI program significantly reduced the measurement time compared to human observation. The inter-observer agreement among neuroradiologists showed a good correlation coefficient. Comparing to the AI program, human observation tended to overestimate the atrophy grade across all scales.

Conclusions:

AI programs offer advantages over human observation evaluating brain volumes, in terms of efficiency and consistency. The reduced measurement time can enhance workflow in clinical practice. Its high consistency also reduces inter-observer variability. However, human observation offers the advantage of clinical context understanding and anatomical expertise. Therefore, a combined approach, where AI algorithms aid human observers in data processing and provide initial measurements for validation, is the promising direction for future research in this field.

10h7m30' - C6. Effect of high-fat and high-fat-high-sugar diets in the neuropeptide Y expression in young adult rats

Miguel Correia^{1,2,3}, Bárbara Mota^{1,2,3}, Varvara Kazak⁴, Francisco Sousa¹, Pedro Nogueira^{1,2,3}, Pedro A. Pereira^{1,2,3}, M. Dulce Madeira^{1,2,3}, Armando Cardoso^{1,2,3}

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Consumption of high-caloric diets in the human population is becoming predominant and induces deleterious effects in the brain, leading to an increase in neuropsychological disorders. Childhood and adolescence in humans are periods where the high-calorie diets are more consumed and is also an important period of brain development and maturation. Because of this, it is important to understand well all the potential alterations induced by high calorie diets. In the present study, we wanted to analyze and compare the effects of two different kinds of high-caloric diets, one rich in fat (high-fat, HF) and another rich in fat and sugar (high-fat-high-sugar, HFHS), both prevalent in human adolescents. In this study, we driven our attention on the GABAergic system, using the neuropeptide Y (NPY) as a marker of part of the GABAergic neurons. We focused in the hilus region of the hippocampus because it is known that the hippocampus plays a crucial role in learning and memory processes and is one of the brain regions most vulnerable to changes induced by high-calorie consumption, including impaired neurogenesis, synaptic function, neuronal growth, and dendritic integrity. Diets were administered during 3 months on male Wistar rats aged 3 months at the beginning of the experiment.

We observed a treatment effect. Indeed, it was verified that both diets (HF and HFHS) induced a significant reduction in the density of NPY-immunopositive cells in the hilus of the dentate gyrus of the hippocampus.

These results shows that chronic consumption of high-calorie diets in young adults induces reduction in the expression of NPY in the hilus of the hippocampus, independently of their fat/sugar composition. This reduction in the expression in NPY in the hippocampus may contribute to the impairment in the anxiety, learning and memory that was observed in animals that consumed these high-calorie diets.

Keywords: High-fat; High-fat-high-sugar; GABAergic system; Hippocampus; Neuropeptide Y

10h15m - C7. Effect of high-fat and high-fat-high-sugar diets in the expression of vesicular glutamate transporter 1 in aged rats

Pedro Nogueira^{1,2,3}, Bárbara Mota^{1,2,3}, Varvara Kazak⁴, Miguel Correia^{1,2,3}, Francisco Sousa¹, Pedro A. Pereira^{1,2,3}, M. Dulce Madeira^{1,2,3}, Armando Cardoso^{1,2,3}

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Consumption of high-caloric diets in human populations is becoming increasingly common and it is known that it may induce several deleterious effects on the human body, including the brain, and eventually contribute to an increase in neuropsychological disorders. However, these effects are underreported in the literature, particularly in the elderly population. Because of this, it is important to recognize well all the potential alterations induced by high-calorie diets in aging. Here, we wanted to analyze and compare the effects of two different kinds of high-caloric diets, one rich in fat (high-fat, HF) and another rich in fat and sugar (high-fat-high-sugar, HFHS) in aged rats.

In this study, we driven our attention on the glutamatergic system, using the vesicular glutamate transporter 1 (VGLUT1) as a marker glutamate transport. We focused in the glutamatergic system because it is known that the consumption of high-fat diets seems to be associated with neuronal plasticity deficits and cognitive disorders linked to the alteration of glutamatergic disorders in the hippocampus. However, the studies that analyze this in the elderly are scarce. We focused in the hilus region of the hippocampus because it is known that the hippocampus plays a crucial role in learning and memory processes and is one of the brain regions most vulnerable to changes induced by high-calorie consumption, including impaired neurogenesis, synaptic function, neuronal growth, and dendritic integrity. Diets were administered for 3 months to male Wistar rats aged 18 months in the beginning of the experiment.

We observed a treatment effect. It was verified that HF and HFHS diets induced a significant alteration in the density of the VGLUT1 terminals in the hilus of the dentate gyrus of the hippocampus.

These results shows that chronic consumption of high-calorie diets in aged rats induces alterations in the glutamatergic system in the hilus of the hippocampus. This alteration in the expression of VGLUT1 in the hippocampus may contribute to the impairment in the anxiety, learning and memory that was observed in animals that consumed these high-calorie diets.

Keywords: High-fat; High-fat-high-sugar; Glutamatergic system; Hippocampus; VGLUT1

10h22m30' - C8. Prevalence and risk factors of biopsied oral lesions in a Portuguese subpopulation: a retrospective cross-sectional study

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The aim of this study was to describe the prevalence and risk factors of oral lesions undergoing biopsy in a Portuguese subpopulation. This retrospective cross-sectional study used a subset of data from patients seeking dental care at a university dental clinic in the Lisbon metropolitan area. All patients included underwent biopsy and their anatomopathological report was analyzed. A total of 264 patients were included in the study (58.7% female and 41.3% male), aged 20-89 years. The prevalence of oral lesions was 10.25%. The mean age was 55 years. Cheek mucosa was the most commonly biopsied site (23.5%), followed by the gingiva (22.3%). Non-neoplastic lesions were the most common (75.0%) and within neoplastic lesions, the most common were mesenchymal lesions (58.5%). Fibroepithelial hyperplasia was the most common diagnosis in the total sample (36.7%), followed by inflammatory odontogenic cyst (7.2%). It is important to know and understand the lesions affecting the oral cavity, their prevalence and possible risk factors. The data obtained should be used to prepare future detailed epidemiologic studies and appropriate public health programs to be able to act more effectively in their prevention and development.

Keywords: Oral lesions, Oral cancer, Systemic Diseases, Epidemiology, Cross-sectional study

10h30m - C9. Dissection of the brain using the Klingler methodology by medical students and neurosurgery residents

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The spatial relationship between white matter fiber tracts is challenging to visualize in the brains ordinarily present in the anatomy laboratory. The Klingler methodology allows the isolation and visualization of the white matter fibers, providing a three-dimensional understanding of the structure of these fibers and their relation with the gray matter and the ventricular system.

This work aims to show the value of applying the Klingler technique performed by medical students and neurosurgery residents, evaluating their perceptions after dissecting and observing the brains.

Several formalin-fixed brains from donors were dissected using the Klingler methodology by 12 Medical students and 35 Neurosurgery residents in the scope of an optional chair of the medical curriculum of the Faculty of Medicine of Porto, Portugal (Functional Neuroanatomy) and a brain dissection course (Human Brain Dissection and Neuroanatomy) for neurosurgery residents of the first years from several hospitals of Portugal. Hand-made wooden spatulas were used to expose the major fiber tracts and to avoid artifacts and damage during the procedure. A 5-single item Likert-type survey was prepared to assess the subjective opinion about brain dissection and its importance in educational and clinical contexts.

The students and neurosurgery residents rated the dissection experience as highly positive, leading to a better understanding of the three-dimensional structure of the brain and the visualization of the white matter system of fibers.

The Klingler dissection technique is an excellent method for the dissection of the internal brain structures, allowing the observation of the fiber tracts and to characterize their orientation, depth, and relation to gray matter structures and the ventricular system. Students and neurosurgery residents were highly positive and indicated that performing the dissection increased their perception of the white matter system and of the three-dimensional perspective of the structure of the brain. Neurosurgery residents considered the experience to be extremely helpful for their training when planning the surgical trajectory. In fact, the knowledge of the location of white matter tracts was considered essential to help minimize the occurrence of postoperative deficits.

Performing brain dissections using the Klinger technique seems to improve both the neuroanatomical knowledge of the brain structure and the experience and skills from practice to training neurosurgery residents and medical students.

Keywords: Brain White matter fibers; Klinger dissection technique; Neuroanatomical Knowledge; White matter structure; 3-D Brain structure

10h37m30' - C10. Neurobehavioural effects on offspring due to Ketogenic diet

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A multitude of therapeutic effects had been attribute to ketogenic diets, including weight loss, cardiovascular health, microbiome disruption, diabetes and cancer. Likewise, there is evidence for the importance of maternal nutrition during pregnancy and lactation on individual's development and health. In fact, maternal lifestyle before conception is one of the long-lasting factors affecting foetal programming and neurodevelopmental outcomes. The aim of the present study was to evaluate how maternal nutrition, ketogenic diet intake, influences neurobehavioural development of offspring. Two-months-old male and female Wistar rats were randomly allocated to either a control chow or a ketogenic diet. Rats had free access to standard rat chow (4RF21/C Mucedola) or ketogenic chow (AIN-76A Bio-serv) and water ad libitum. Dams were randomly allocated in standard and ketogenic groups. All animals were monitored. Offspring were postnatally observed considering several neurodevelopmental reflex parameters to assess nervous system maturation. In some behaviours studied (rooting, ear twitch, eye opening, auditory startle, air righting) we identified the "first day of performance" while in others (surface righting, cliff aversion, negative geotaxis, forelimb grasp, olfactory discrimination and openfield) a measure of performance (time in seconds) was recorded. After weaning, offspring received the same diet as their dams for five months. At the end of the experimental period, behavioural studies were performed to evaluate changes in locomotor activity, learning and memory, and anxiety behaviour. Pups fed with ketogenic diet presented a reduced evolution in body weight compared with their counterparts. No differences were found in air righting and in cliff aversion between groups, but tactile sensitivity was achieved earlier in pups fed with standard chow. Grip strength appears to be increased a long time in pups fed with standard chow.

Reflex development sensitivity was achieved earlier in pups born from ketogenic diet progeny. Locomotor activity increased with age in both groups. A discrimination Index, allows discrimination between the novel and familiar objects, i.e., it uses the difference in exploration time for familiar object, but then dividing this value by the total amount of exploration of the novel and familiar objects. Taking this on consideration, the ability to discriminate a new object is lower in animals fed with ketogenic diet and there is no retention memory along time. Anxiety-like behaviour was evaluated in the open-field and in the elevated plus-maze. Ketogenic animals exhibit disinhibition as animals explore during more time the central area. No differences were found between groups regarding anxiety behaviour.

10h45m - C11. Libertação ecoguiada do ligamento transverso do carpo utilizando um fio de corte: vídeo-demonstração em cadáver.

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Introdução: A síndrome do túnel cárpico (STC) é a neuropatia compressiva mais comum, afetando aproximadamente 5% da população. O tratamento inicial da STC é conservador, e pode incluir modificação da atividade da vida diária, tratamentos de fisioterapia e de terapia ocupacional, ortótese de punho de uso noturno, medicação anti-inflamatória oral, infiltrações corticoanestésicas e hidrodisseção do nervo mediano. A libertação do ligamento transverso do carpo (LTC) pode estar indicada em doentes que não respondem às medidas conservadoras. Em 2015, Guo et al. descreveram uma técnica guiada por ecografia para libertação do LTC utilizando um fio de corte, modificada em 2017, para reduzir o número de secções incompletas do LTC.

Objetivos: Realizar uma demonstração ecográfica das estruturas anatómicas relevantes do túnel do carpo para a execução do procedimento em segurança, e vídeo-demonstração da libertação do LTC, incluindo orientações para a sua execução.

Material e métodos: Procedeu-se à libertação ecoguiada do LTC em oito punhos, de quatro cadáveres, no teatro anatómico da Faculdade de Medicina da Universidade de Lisboa (FMUL), utilizando a técnica modificada descrita em 2017 por Guo et al. Foi efetuado registo em vídeo de todo o procedimento. O material utilizado consistiu num ecógrafo da marca GE modelo Aplio i800, uma caneta para marcação cirúrgica e régua, uma agulha 30G 25mm, uma agulha 25G 40 mm, uma agulha Tuohy 19G 100mm, um fio de corte (Loop & Shear, 0.009-inch diameter; Ridge & Crest Company, Monterey Park, CA) e uma agulha 18G 25mm.

Resultados: Foi realizada de forma efetiva a libertação ecoguiada completa do LTC dos oito punhos, sem lesão de nenhuma estrutura neurovascular adjacente, nomeadamente o nervo mediano, o nervo Berretini, o arco superficial palmar e os nervos digitais comuns. O tempo médio de realização do procedimento foi de 25 minutos.

Conclusão: A libertação ecoguiada do LTC utilizando um fio de corte é uma técnica cirúrgica eficaz e segura no tratamento do STC. Segundo a literatura científica disponível, este procedimento diminui o tempo de recuperação e retoma laboral, e minimiza as complicações, quando comparado com a técnica cirúrgica por via aberta.

10h5230' - C12. Heart Failure with Preserved Ejection Fraction in Rats: behavior and cognitive function, hippocampal neurogenesis and apoptosis

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Heart Failure with preserved Ejection Fraction (HFpEF) is a subclass of Heart Failure primarily affecting older female individuals with multiple comorbidities. Heart failure association with cognitive impairment is well-known and patients exhibit learning, attention, and memory deficits. However, the underlying pathophysiological mechanisms of CI in HFpEF are poorly understood.

The present study aimed to characterize a cardiometabolic animal model of HFpEF in terms of behavior and cognitive function, and to study the effect of HFpEF on the neurogenesis, apoptotic pathways activation and neuronal vulnerability to apoptotic stimuli.

We used a well-accepted HFpEF animal model, which mimics its metabolic and cardiovascular features, the ZSF1-Obese, and ZSF1-Lean rats as corresponding controls. ZSF1-Obese animals develop overt HFpEF at 20 weeks of age. At 29 weeks of age, ZSF1-Obese and ZSF1-Lean animals were submitted to the Novel Object Recognition (NOR), Object Location Recognition (OLR) and Temporal Order Recognition (TOR) tests to assess short- and long-term memory, spatial memory and temporal-order memory, respectively. 30-weeks-old rats were sacrificed, brains were removed, immersed in 4% formaldehyde for 72h, transferred to a 30% sucrose solution and sectioned in the coronal plane for immunohistochemistry with doublecortin (DCX), BCL2 and BAX antibodies. In the hippocampus, cellular densities of DCX stained cells in the subgranular layer of the DG and of BCL2 and BAX in the CA3 subfield were estimated unilaterally using stereological procedures.

In NOR and ORL tests, ZSF1-Obese animals showed a tendency to have lower novel-object discrimination index at 1 hour and 24 hours and lower object-location discrimination index than ZSF1-Lean rats, respectively. However, the differences found in these tests were not statistically significant. In the NOR test at 48 hours, ZSF1-Obese and ZSF1-Lean rats exhibited similar discrimination indexes. In the TOR test, animals showed no differences regarding the discrimination index. Although not reaching statistical significance, our results showed that DCX-ir neurons density were lower in ZSF1-Obese animals. Regarding the BAX/BCL2 ratio, our preliminary results show no difference between groups.

The results obtained seem to indicate that this model of HFpEF might induce short-term memory impairment and reduce hippocampal neurogenesis. However, further studies are necessary to confirm this tendency, as we could benefit from increasing the number of animals studied. Further experiments are being carried out to study other cognitive domains and rats' behavior, namely anxiety and locomotor activity, and apoptotic pathways in other subfields.

Keywords: Cognition; Behavior; Memory; Heart Failure with Preserved Ejection Fraction; Neurogenesis; Apoptosis.

Pósteres

11h00m - P1. Development of digital and printed 3-dimensional models for teaching veterinary neuroanatomy

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Anatomy education has been facing challenges recently, particularly in the neuroanatomy field. In addition to the highly degradation characteristics of neurological tissue, the development of medical imaging created the need for more detailed knowledge adapted to nowadays first-day skills of future clinicians. Extensive advances have been made in the use of 3-dimensional (3D) visualization and printing in teaching Human neuroanatomy, with slower advances in veterinary medicine. The most commonly reported methods included segmentation from Magnetic Resonance Imaging, and Photogrammetry-based techniques which are less expensive but also laborious.

The objectives were, firstly, to obtain 3D brain models of different animal species. Secondly, to integrate the models in a 3D visualization platform, and finally to print the 3D models, for undergraduate anatomy education.

The brain specimens were digitized using a scanner Matter and Form 3D Scanner MFS1V2. Images collected were integrated into the UTAD e-learning platform for students to access. The pieces were also printed in 3D format, using an Original Prusa i3 MK3S+ 3D printer, to be manipulated by the students. The models created were subsequently evaluated by two anatomy teachers.

We were able to reproduce 3D brain models from different species for visualization on a 3D platform and 3D physical models for manipulation. However, visualization experience on the platform, and texture features of printed models, including detailed anatomical structures need to be improved.

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Keywords: Brain models, 3D anatomical perception, veterinary medical education, visual communication in medicine

11h04m - P2. Estudo piloto sobre uma técnica de preservação do encéfalo e preenchimento dos vasos encefálicos com látex colorido

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Neste estudo piloto descreve-se a aplicação de uma técnica de preservação do encéfalo e preenchimento das estruturas arteriais e venosas crânio-encefálicas. O estudo realizou-se numa peça anatómica de cabeça e pescoço do cadáver de um indivíduo adulto obtida através de uma secção ao nível da raiz do pescoço e imediatamente congelada.

Após descongelamento, e através de dissecação cuidadosa, identificaram-se, isolaram-se e canularam-se as artérias carótidas comuns e vertebrais e as veias jugulares internas. Em cada um destes vasos, e de modo sequencial, foi injetada água para lavar as estruturas vasculares. Após a lavagem, injetou-se ar nos vasos para remover o excesso de água. Seguidamente, injetou-se nos vasos uma solução de paraformaldeído 4%, deixando este fixador atuar durante 15 minutos. Após esse período, os vasos foram novamente injetados com água e ar. Em seguida, introduziu-se em cada vaso 30 mL de látex colorido, vermelho nas artérias e azul nas veias. Sempre que se observou a exteriorização do produto por vasos não canulados, foi feita a sua clampagem para a evitar perdas. No final deste processo a peça voltou a ser congelada. Após descongelamento de cerca de 24 horas, a peça foi abordada por dois neurocirurgiões através da realização de uma craniotomia pterional direita, sendo registada a sua opinião relativamente ao parênquima encefálico e às estruturas vasculares encontradas.

Em termos de consistência do parênquima encefálico, foi unânime a opinião de que se aproximava do ideal para treino neurocirúrgico. No entanto, idealmente o parênquima deveria estar um pouco mais consistente dado que quando se procedia à sua retração, este apresentava alguma friabilidade. Relativamente às estruturas vasculares observadas, apresentavam uma boa definição e excelente morfologia. Após esta abordagem a peça anatómica foi armazenada numa solução de paraformaldeído 4% durante 3 semanas. Findo este período, outro neurocirurgião observou o encéfalo e as estruturas vasculares através da abordagem previamente realizada e concluiu que as estruturas mantinham a sua morfologia, continuando a permitir o treino neurocirúrgico.

Este trabalho permitiu concluir que este método de fixação e preenchimento dos vasos pode permitir obter material de boa qualidade para o treino neurocirúrgico. Permitiu também concluir que se deverá continuar este estudo usando diferentes tempos de fixação e quantidades de fixador para tentar atingir uma consistência ideal do parênquima encefálico. Este tipo de técnicas reveste-se de inquestionável importância para a formação médica pré- e pós-graduada, apresentando um promissor potencial pedagógico para o treino neurocirúrgico.

Palavras-Chave: Estudo em Cadáver; Neuroanatomia, Neurocirurgia; Vascularização encefálica; Treino neurocirúrgico

11h08m - P3. Estudo em cadáver da fixação umeral do músculo grande peitoral numa amostra da população portuguesa

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O músculo grande peitoral origina-se da face anterior da metade esternal da clavícula (porção clavicular), da metade ipsilateral do esterno até ao nível das 6^a/7^a cartilagens costais, das 6/7 cartilagens costais mais superiores, da extremidade anterior da 6^a costela e da aponevrose do músculo oblíquo externo do abdómen (porção esternal). Estas duas cabeças unem-se lateralmente num tendão achatado que se insere no lábio lateral do sulco intertubercular do úmero. O objectivo deste trabalho foi estimar a dimensão craniocaudal do ponto de fixação umeral do tendão do músculo grande peitoral numa amostra da população portuguesa. O conhecimento detalhado deste ponto de fixação é relevante nos procedimentos cirúrgicos de tratamento de ruturas parciais ou totais deste tendão.

Para atingir o objectivo deste estudo, foram dissecados, na Unidade de Anatomia da Faculdade de Medicina da Universidade do Porto, 20 membros superiores de 10 cadáveres humanos portugueses preservados pela infusão de um líquido fixador através da rede arterial. Os cadáveres estudados são doados à Faculdade de Medicina da Universidade do Porto com consentimento informado assinado pelos próprios doadores (Decreto-Lei nº 274/99).

Foram usados instrumentos e técnicas de dissecação apropriados para atingir os objetivos deste trabalho. A porção distal do músculo grande peitoral foi identificada e isolada. O seu tendão foi identificado e cuidadosamente dissecado e foram definidos os seus limites de fixação superior e inferior no úmero. A medição da distância entre esses pontos foi determinada com recurso a um paquímetro digital por dois investigadores em simultâneo. Cada uma das medições foi efectuada apenas quando os dois observadores estavam de acordo quanto aos limites cranial e caudal da fixação de cada um dos tendões.

A dimensão craniocaudal média do ponto de fixação umeral do tendão do músculo grande peitoral é $67,75 \pm 6,88$ mm. O valor mínimo encontrado foi 52,60 mm e o valor máximo foi 79,51 mm. Em termos de lateralidade, no lado direito o valor médio é $66,26 \pm 8,71$ mm, e no lado esquerdo o valor médio é $69,24 \pm 4,37$ mm. O relativamente reduzido tamanho amostral é uma limitação deste estudo.

Em conclusão, observamos que, na nossa amostra, o tendão do músculo grande peitoral tem uma fixação ampla ao longo do lábio lateral do sulco intertubercular do úmero, sendo os valores encontrados relativamente similares aos observados noutras populações. A informação obtida é importante para os cirurgiões que necessitam de intervir na patologia associada com o tendão do músculo grande peitoral.

Palavras chave: População portuguesa; Estudo em cadáver; Dissecação anatómica; Músculo grande peitoral

11h12m - P4. Beyond teaching Anatomy: The Role of an Anatomy Professor promoting the History and Spolia of His Department

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Background and aims:

Departments of anatomy not only serve as pillars of scientific education but often possess a rich historical and cultural heritage that can greatly enhance the learning experience of students as well as external visitors. This work aims to highlight the importance of anatomy professors in uncovering the historical context of their institutes, preserving espolia, and utilizing this knowledge to enhance the educational experience and promote social accountability.

Methods:

The main extracurricular activities that are ongoing in our department such as archival investigations, preservation of spolia, creation of anatomical models and collaboration projects with other institutions were reviewed and the role of the anatomy professor highlighted.

Results and Conclusions:

The anatomy professor fosters a multidimensional learning experience, connecting present-day students and the general community with the legacy of the school. The presence of spolia enriches the learning environment and through research, publications, and collaborations with other universities, the department's cultural heritage and reputation is enhanced, extending the role of an anatomy professor far beyond the classroom.

11h16m - P5. Vascularização das glândulas paratiroides: estudo em cadáver

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Introdução

Para diminuir a incidência da hipocalcemia após a cirurgia da tiroide é fundamental a conservação in situ das glândulas paratiroides. Mais importante, ainda, é a preservação da sua vascularização para evitar a falência pós-operatória destas glândulas. Estudos realizados em cadáver, de 1974 a 2018, descrevem que as paratiroides são vascularizadas por um pedículo vascular com origem na artéria tiroideia inferior (ATI). Recentemente, tem-se recorrido à realização de angiografia com verde de indocianina durante a cirurgia da tiroide, para tentar identificar e preservar a vascularização das paratiroides, sugerindo-se que numa percentagem significativa de casos a vascularização provém de uma rede vascular em torno da glândula.

Este trabalho teve como objetivo estudar a vascularização das glândulas paratiroides em peças de cadáver, simulando a realização de angiografias e procedendo à disseção das peças.

Material e métodos

Foram usadas 21 peças de cadáver (órgãos cervicais anteriores) recolhidas em autópsias no Instituto Nacional de Medicina Legal, após consulta do RENNDA. Foram dissecados os pedículos vasculares tiroideus e identificadas as artérias tiroideias. Foram cateterizadas as artérias tiroideias e injetado um polímero de isopreno (latex líquido) de cor branca. Foi realizada a disseção das peças identificando-se os ramos da divisão das artérias tiroideias, as glândulas paratiroides e os respetivos pedículos vasculares, documentando-se a sua origem, calibre, comprimento, relação com o parênquima tiroideu, com o nervo recorrente e com a fásia pré-traqueal.

Resultados

Os dados preliminares deste estudo (n=21) mostram que na maioria dos casos a vascularização das glândulas paratiroides provém de um pedículo vascular e não de uma rede vascular. A origem do pedículo vascular das glândulas paratiroides superiores é maioritariamente o ramo posterior da divisão da ATI. A origem do pedículo vascular das paratiroides inferiores é o ramo anterior da divisão da ATI. Foram identificados casos de pedículos vasculares com 1, 2 ou 3 ramos para as paratiroides. O hilo das glândulas localiza-se na sua face posterior/lateral. O comprimento do pedículo vascular é variável e identificaram-se casos em que o pedículo vascular das paratiroides atravessa o parênquima tiroideu (mais frequentemente nas paratiroides inferiores).

Discussão/Conclusão

A vascularização das paratiroides provém de um pedículo com origem na ATI, na maioria dos casos, e poderá ser considerado como um ramo terminal. Durante a cirurgia da tiroide deve preservar-se o pedículo vascular das paratiroides, evitando a disseção do hilo das glândulas.

Palavras-chave: Paratiroides, tiroidectomia, vascularização, estudo em cadáver.

11h20m - P6. Impact of high-fat and high-fat-high-sugar diets in neurogenesis in young adult rats

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High-calorie diets induce several deleterious alterations in the human body, including the brain. Early life, covering childhood and adolescence in humans, is an important period of brain development and maturation. Experimental works in rodents have shown that high-caloric diets are particularly detrimental to young rats, affecting emotions and cognition. To better understand these potential alterations, in this study we aimed to analyze and compare the effects of two different kinds of high-caloric diets, one rich in fat (high-fat, HF) and another rich in fat and sugar (high-fat-high-sugar, HFHS), both prevalent in human adolescents. It is known that the hippocampus plays a crucial role in learning and memory processes and is one of the brain regions most vulnerable to metabolic changes induced by high-calorie consumption, including impaired neurogenesis, synaptic function, neuronal growth, and dendritic integrity.

In the present study, diets were administered during 3 months to male Wistar rats aged 3 months at the beginning of the experiment. We specifically analyzed the effects of these high-calorie diets on the neurogenic process, using doublecortin (DCX) as a marker.

We verified that there was a treatment effect. Both diets (HF and HFHS) induced a significant reduction in the density of DCX-immunopositive cells in the subgranular layer of the dentate gyrus of the hippocampus.

These results suggest that in young adults the high-calorie diets cause changes in neurogenesis when administered chronically, independently of their fat/sugar composition. This reduction in the neurogenesis may contribute to the impairment in the anxiety, learning and memory that was observed in animals that consumed these high-calorie diets.

Keywords: High-fat; High-fat-high-sugar; Neurogenesis; Hippocampus; Doublecortin

11h24m - P7. A Síndrome de Eagle e a importância da Anatomia na clínica

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A Síndrome de Eagle é uma patologia rara resultante do alongamento do processo estiloide do temporal ou pela calcificação do ligamento estilo-hióideo com consequente compressão dos nervos X, XI ou XII, artérias carótidas e inúmeras fibras simpáticas perivascularares. Esta variação anatômica pode condicionar sintomas incapacitantes como cefaleias, disfagia, odinofagia, acufenos, trismo, sensação de corpo estranho na faringe.

O diagnóstico requer alto grau de suspeição clínica, que implica um conhecimento presente de estruturas anatómicas e do emprego de meios complementares, como tomografia computadorizada. O tratamento conservador nem sempre permite resolver o quadro, pelo que, nessas circunstâncias, pode se optar pelo tratamento cirúrgico de acordo com o grau de desconforto do doente. Apresentamos dois casos da Síndrome de Eagle que demonstram a importância do conhecimento anatómico para o diagnóstico na prática clínica.