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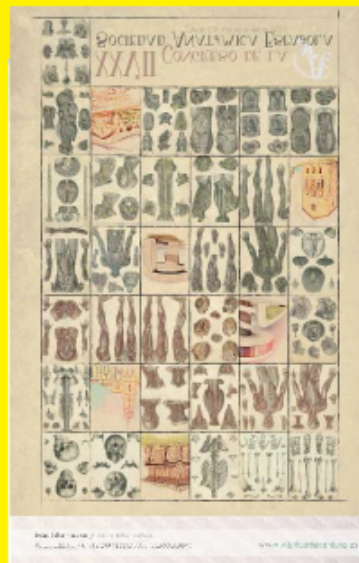
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XXVII CONGRESS OF THE SPANISH ANATOMICAL SOCIETY

ABSTRACTS



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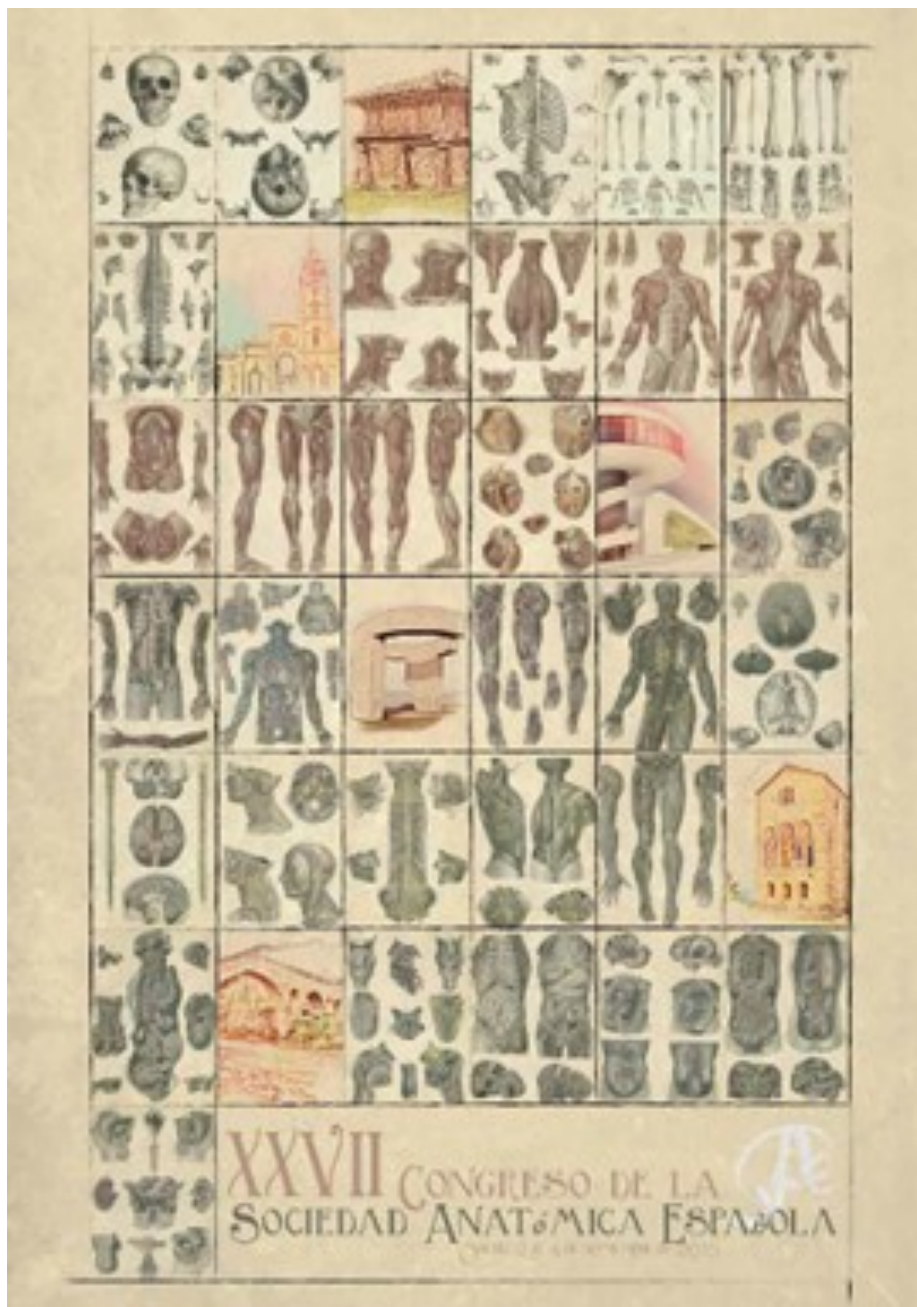
IBECS/Índice Bibliográfico Español en Ciencias de la Salud

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Oviedo, 2-4 September, 2015

ABSTRACTS of the XXVII CONGRESS OF THE SPANISH ANATOMICAL SOCIETY

Oviedo, 2-4 September, 2015, Spain



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SCIENTIFIC PROGRAM

Wednesday, 2nd SEPTEMBER 2015

9:00-9:30 h: Registration and delivery of documentation

9:30-11:30 h: Oral Communications Session 1

Moderators: Profs. Francisco Pérez Moltó and Ofelia González Sequeros

9:30 Desarrollo del tendón de la cabeza larga del bíceps braquial (LHBT). Estudio de la inserción de origen.

D. José Ramón Mérida Velasco. Universidad Complutense de Madrid.

9:50 Técnicas electrónicas para la utilización del cadáver humano en la exploración física y de técnicas de imagen.

D. Francisco Sánchez del Campo. Universidad Miguel Hernández, Elche.

10:10 Development of the scalene muscles: embryological explanations of the variations of the scalene triangle.

D. José Ramón Mérida Velasco. Universidad Complutense de Madrid.

10:30 Influencias mesenquimales y nerviosas en el desarrollo de la glándula salivar submandibular.

D. José Ramón Mérida Velasco. Universidad Complutense de Madrid.

10:50 Seguidor de mirada; aplicaciones en la anatomía humana.

D. Francisco Sánchez del Campo. Universidad Miguel Hernández, Elche.

11:10 Pseudo sangre: un fluido para recirculación sanguínea en cadáveres.

D. Francisco Sánchez del Campo. Universidad Miguel Hernández, Elche.

11:30-12:00 h: Coffee break

12:00 h: Transfer to the Aula Magna / University of Oviedo

12.30-14.30 h: Opening Ceremony of the XXVII Congress of the SAE

Invited Lecture: Los Neandertales de El Sidrón (Piloña – Asturias)

Prof. Marco de la Rasilla Vives

Facultad de Geografía e Historia, Universidad de Oviedo

Interventions by the authorities.

Visit to the University of Oviedo.

18:00 h Visit to the Exhibition "Human Bodies".

Sala de Exposiciones SabadellHerrero

Tuesday, 3rd SEPTEMBER 2015

9:00-11:15 h: *Oral Communications Session 2*

Moderators: Profs. Francisco Doñate Oliver and Eduardo Puelles Martínez de la Torre

9:00 *Hallazgos histopatológicos del sistema de conducción cardiaco y su vascularización en consumidores crónicos de cocaína víctimas de muerte súbita.*

D. Damián Sánchez Quintana. Universidad de Extremadura, Badajoz.

9:20 *Papel de las conexinas durante la morfogénesis temprana del cerebro de mamíferos.*

D. Diego Echevarría Aza. Universidad Miguel Hernández, Elche.

9:40 *Variaciones neuronales en la amígdala cerebral en el ratón castrado.*

D. Agustín Castañeyra Perdomo. Universidad de La Laguna, Tenerife.

10:00 *Coexpression de TRPC6 y TRPV4 en corpúsculos de Meissner humanos.*

D. Roberto Cabo Pérez. Universidad de Oviedo.

10:20 *La composición de la matriz extracelular de los corpúsculos de Meissner y Pacini de la piel digital.*

D. Olivia García Suárez. Universidad de Oviedo.

10:40 *Distribution of relaxin3 fibers from the nucleus incertus reveal a role in emotional processing.*

D. Francisco Olucha Bordonau. Universidad Jaime I, Castellón.

11:00-11:30 h: *Coffee break*

11:30-14:00 h: *Oral Communications Session 3*

Moderators: Profs. Manuel Lahoz Gimeno and Tomás Sempere Durá

11:30 *Desarrollo embrionario y mecanismos de guía del fascículo retroflejo.*

D. Eduardo de Puelles Martínez de la Torre. Universidad Miguel Hernández, Elche.

11:50 *Mutaciones en el gen NTRK1 (TRKA) en humanos y ratones: fenotipo dentario.*

D. Ángel González Salvador. Universidad de Oviedo.

12:10 *Expresión y localización de la periostina en el diente y tejidos de soporte.*

D^a. Teresa Cobo Díaz. Universidad de Oviedo.

12:30 *Estudio ecográfico-anatómico de la inervación sensitiva de la rodilla.*

D^a. Marian Lorente Gascón. Universidad Internacional de Cataluña.

12:50 *Anatomic-radiological mapping of vascular variations as a source of knowledge for surgical planning.*

D. Tomás Sempere Durá. Universidad Rovira i Virgili, Tarragona.

13:10 *Aromatase P450 could be involved in the maintenance of the population of LH-positive pituitary cells in mice.*

D. José Carretero González. Universidad de Salamanca.

13:30 *Aprendiendo anatomía con redes neuronales.*

D^a. Ofelia González Sequeros. Universidad de Murcia.

Friday, 4th SEPTEMBER 2015

9:30-11:30 h: *Poster Session*

11:30-12:00 h: *Coffee break*

12:00-13:00 h: *Poster Discussion*

Moderator: Prof. José Antonio Vega Alvarez

13:10-14:00 h: *Invited Lecture:*

Células troncales en el Sistema Nervioso.

Prof. Isabel Fariñas Gómez

Dpto. de Biología Celular, Universidad de Valencia.

17:00 h: *General Assembly of the Spanish Anatomical Society.*

21:30 h: *Closing Dinner.*

Restaurante De Labra.

ORAL COMMUNICATIONS

ORAL COMMUNICATIONS SESSION 1

DEVELOPMENT OF THE LONG HEAD OF THE BRACHIAL BICEPS (LHBT): A STUDY OF THE INSERTION OF ORIGIN

C. de la Cuadra, L.A. Arráez, M.E. Herrero, J. Murillo, J.A. Mérida-Velasco*, J.R. Mérida Velasco

*Departamentos de Anatomía de las Universidades Complutense de Madrid y *Granada*

Numerous descriptive studies provide a solid foundation on the development of the glenohumeral joint. However, few studies that analyze the insertion of origin of the long head of the brachial biceps. Classically described the long head of the brachial biceps (LGBT) originates from the glenoid labrum and scapula (Standring, 2008). Some studies deny the direct origin of the tendon in the glenoid (Gigis et al., 1995), while others consider that originates exclusively in the latter in the 6,4% of the cases (Demondion et al., 2001). They have been studied bilaterally with conventional optical microscope, histological preparations of 22 human embryos (7-8 weeks of development) and 43 human fetuses (9-12 weeks of development). The LGBT, the glenoid labrum and the joint capsule forms of the articular interzone. It is difficult to identify the origin of LGBT in the scapula during the embryonic period. During the fetal period was observed in 50 cases (58%), the LGBT originated in the glenoid labrum and scapula; while in 36 cases (42%) is originated only in the glenoid labrum. LGBT variations have been classified based on their anatomy: partial or full mesotenon with complete capsular adhesion, divided and absent (Dierickx et al., 2009). In our study, the LGBT was free in the articular cavity, attached to the joint capsule through a mesotenon. Our study may explain some variations have been described in the literature.

ELECTRONIC TECHNIQUES TO USE CORPSE ON PHYSICAL EXAMINATION AND IMAGING TECHNIQUES

F. Sánchez del Campo, M.L. Sánchez Ferrer, M. Sánchez Ferrer, F. Sánchez Ferrer, A. Sánchez dela Blanca, P. Ortuño

Universidad Miguel Hernández, Elche (Alicante), Spain

The corpse preservation with Thiel technique maintains color, elasticity, compliance and friability as the body of living man. So it is possible to do physical examination including joints examinations. As well as we can do some diagnostic tech-

niques such as endoscopy, laparoscopy, ultrasound or ultrasound-guided puncture or imaging techniques as CT or MR or others. We prepare corpses through electronic mechanism in order to change into a body we can do physical exploration, both normal and pathological or obtain anatomical images for diagnosis. Methodology: We have used SmartTags NFC (Near Field Communication). These tags are equipped with antenna and microchips which are previously programmed and can be activated by radio-frequency and recognized by a sensor. The tags are implanted in the subcutaneous tissue through a minimal incision and sutured by adhesive. So you cannot see the target. Each tag has a number in a program in the computer which has a library of sounds, images and graphics. You can program each target to recreate a pathology or health state. When the target is picked up by the sensor, this connected to the computer. Medical specialists have used these corpses and they have valued this material as a really good for simulation, teaching and evaluation of the students. Conclusions: These corpses are suitable for practical teaching of Medicine. Especially are really useful for learning surgical techniques previous to act on living patients.

DEVELOPMENT OF THE SCALENE MUSCLES: EMBRYOLOGICAL EXPLANATIONS OF THE VARIATIONS OF THE SCALENE TRIANGLE

L. Quirón Terron, J.V. Sanz, I. Sánchez-Montesinos, J. Murillo, J.A. Mérida-Velasco*, J.R. Mérida Velasco

*Departamentos de Anatomía de las Universidades Complutense de Madrid y *Granada*

Thoracic outlet syndrome corresponds to neurovascular compression (brachial plexus and subclavian vessel), which may be present in three areas: the interscalene triangle, costoclavicular space and subcoracoid or pectoralis minor space. With a conventional optical microscope, we examined 27 human embryos between 14 and 28 mm GL (CS 18-23; 6- 8 weeks of development) and 30 human fetuses between 30 and 100 mm GL (9-13 weeks of development). In our study of the scalene region, we analyzed the development of scalene muscles and their relationship with the neurovascular structures of the region. Our results help to explain the disposition of this space as well as possible variations of the scalene muscles that condition anomalous trajectories of the neurovascular structures.

MESENCHYMAL AND NERVE INFLUENCES IN THE DEVELOPMENT OF THE SUBMANDIBULAR SALIVARY GLAND

L. Quirón, J.V. Sanz, I. Sanchez-Montesinos, J. Murillo, J.A. Mérida-Velasco*, J.R. Mérida-Velasco

*Departamentos de Anatomía de las Universidades Complutense de Madrid y *Granada, Spain*

The submandibular salivary gland originates from a proliferation of epithelium floor of the mouth, at the level of the medial groove paralingual. However, some aspects of development are not yet clarified. We try to descriptively analyze events in human embryos checking the possible influences during the development of mesenchymal and neural factors in the different stages of morphogenesis. It is developing the submandibular gland in human embryos of stage 21 Carnegie (EC) 16-23 (6-8 weeks of development) and the NHK-1 expression as a marker of mesenchymal origin crestoneural and nervous E14 rat embryos is studied -19. Our results identify 5 phases during the embryonic period: 1st Phase of epithelial condensation (placode) EC16; 2nd Phase of epithelial polarization (EC17) and reaching the lingual ganglioneural invagination complex (EC18); 3rd Phase of organizing invaginated epithelium (EC19); 4th light phase formation in the excretory duct (E20-21); 5th stage light glandular acini and innervation of them. Final glandular topography (EC22). These results suggest that the epithelial placode marks the site of sublingual salivary papilla. From soil epithelial glandular parenchyma mouth and conduit originates; the mesenchyme crestoneural will lead to glandular stroma. Relations with the complex glandular outline ganglioneural lingual mark ganglioneural complex portion of the epithelial invagination be bliss itself that the excretory gland and conductor.

"TOBII GLASSES" EYE TRAKER FOR USE IN HUMAN ANATOMY

M.D. Grima, F. Sánchez Ferrer, F. Sánchez del Campo, M.L. Sánchez Ferrer, M. Sánchez Ferrer, E. Fernández

Facultad de Medicina, Universidad Miguel Hernandez, Elche, Alicante

When the anatomist performs a dissection, the student may be displaying a similar field, but unless you are told or point, probably he not focusing on the detail that the dissector is concentrated. It would be good on a screen pointer mode so the student could see from the point of view of the anatomist the image and see his visual field and in a circle. The specific macular vision in which the dissector is in every moment doing more interesting teaching dissection. To be able to point at him the element of interest at every moment and have the same vision that the dissector (same angle and panorama). Recording later viewing and analysis by frequency of the elements that have had mayor fixing and time looking. The use of the system "Tobii glasses" allows us to gaze eye traker every moment from the perspective of the person who takes them. Image and sound were transmitted in

less than 1 second delay for any computer system or wireless projector. It also allows recording and subsequent analysis of various data such as the frequency where each point is observed. Results: We have such a system used in reading radiological images, in anatomical models, in the cadaveric dissection, or laparoscopic. There are techniques such as orotracheal intubation, spinal taps or certain dissections, where only the person positioned correctly and this view is unique, that is why in the learning or as the control technique of students or residents is very useful. The application of this system in this field let us to be in the eyes of the person who takes, to know where he is fixing the view, hear his voice and also a posterior analysis.

PSEUDO SANGRE: UN FLUIDO PARA LA RECIRCULACIÓN SANGUÍNEA EN CADÁVERES

F. Sanchez del Campo, M.L. Sánchez Ferrer, M. Sánchez Ferrer, A. Sánchez de la Blanca Mezas, P. Ortuño Martinez

Facultad de Medicina, Universidad Miguel Hernandez, Elche, Alicante

The Thiel method with fluid circulation through peristaltic pumps and catheters have become corpses in a very good material to learn and teach medicine and surgical techniques. Especially, to practice minimal incision surgery, laparoscopy, thoracoscopy or arthroscopy. Working with corpses results better than working with animals. It is cheaper. We do not require anesthetist. Besides, of course, corpse's anatomy is nearer to Human Anatomy of leaving body. Our aim is to prepare a fluid similar to blood in color, density and viscosity. It must not stain tissues or optical of laparoscopes or arthroscopes. At the same meaning, it is important this fluid allow use mono or bipolar electric scalpel to get vessel hemostasis or use radiofrequency or ultrasound machine. We have tested some products to achieve our objectives. We have used rheological behavior of non-newtonian fluid. As well as, we have mixed some antiseptics, bactericides, fungicides and mineral salts to preserve turgidity and elasticity of tissues. Finally, we have a fluid with the characteristics mentioned before. Furthermore, it is easy and cheap to prepare it. It is a stable fluid. All of this allow us use this pseudo blood in corpse circulation in order to use in training of actual or experimental surgical medical techniques. In conclusion, we have developed a fluid, pseudo blood, which allow us see vessel circulation in corpses preserved by Thiel method.

ORAL COMMUNICATIONS SESSION 2

HISTOPATHOLOGIC FINDINGS OF THE CARDIAC CONDUCTION SYSTEM AND ITS ARTERIAL BLOOD SUPPLY IN COCAINE ABUSERS VICTIMS OF SUDDEN DEATH

D. Sánchez Quintana, S. Alama Carrizo, Y Gañán Presmanes, D. Macías Rodríguez, Y. Macías Gañán, J. Rodríguez León

Departamento de Anatomía, Biología Celular y Zoología, Facultad de Medicina de Badajoz, Universidad de Extremadura.

Sudden death (SD) of cocaine abusers is an important and increasing general health problem. In this population, different types of cardiac arrhythmias have been described; some of these arrhythmias may cause SD. Histologic examination were performed in 50 cocaine abusers (group A) under 35 years of age and in 23 control patients (group B), 21 to 43 years old. In each case, a forensic autopsy and toxicological analyses were performed at the Institute of Toxicology and Forensic Sciences of Coimbra (Portugal), including different types of analysis as a means to establish chronic drug use in general, and cocaine, use in particular. The conduction system and its arterial blood supply were examined histologically.

Our results are based on findings observed in subjects selected of group A according to the following criteria: chronic abuse of cocaine and cocaine-related death in the absence of median-severe coronary atherosclerosis ($\leq 10\%$ of lumen-diameter reduction) and any other potentially fatal disease. The most frequent lesions found in group A were: fatty and/or fibrous tissue replaced sinus node (SN) tissue in 21 cases (42%) and AV node in 50% of cases. Fibromuscular dysplasia in branches of the SN artery and AV arteries was found in 22 cases (44%) and 40 cases (68%), respectively. In the group A, microscopic foci of inflammatory infiltration was detected in 14 cases (28%). The left bundle branch of His was replaced by fatty and/or fibrous tissue in 40 cases (68%) and the right bundle branch in 22 cases (44%). In all cases of the group A the intramyocardial arterioles of the papillary muscles of the left ventricle reveals thickening or lysis of the tunica media and severe luminal stenosis with microscopic scarring at the level of the subendocardium. The authors conclude that pathological lesions in the conduction tissue may play a role in the occurrence of SD attributed to atrioventricular and intraventricular conduction disturbances consecutive to cocaine ingestion.

CONTRIBUTION OF CONNEXINS DURING EARLY MORFOGENESIS OF THE MAMMALIAN BRAIN

A. Andreu, D. Echevarría

Instituto de Neurociencias (UMH-CSIC), Universidad Miguel Hernández de Elche

Facultad de Medicina, Alicante

GAP junctions (GJs) are a communication system between cells, formed by channels through which ions, metabolites, secondary messengers and in general small molecules of less than 16Å size. GJs in the mammalian brain were first described by Constantino Sotelo and Sandorf Palay in 1967. Since then, we know that GJs allow the transmission of information much faster between cells and between the entire brain in comparison to the electric transmission between presynaptic and postsynaptic domains. The embryonic brain it is found 2 connexins (Cx; the transmembrane component of GJs) Cx36 and Cx43. The latter has an expression pattern profile very similar to the expression pattern of morphogen fibroblast growth factor 8, our protagonist molecule of the present work.

During early brain patterning, this morphogen, others and a big cocktail of transcription factors do play a pivotal role in the subdivision specification, differentiation and proper brain development. These signal molecules are secreted to the extracellular matrix and function along great neuroepithelial distances, creating a morphogenetic gradient. The time consumed and the space of action to create the molecular gradient in vertebrates (zebrafish) does not correspond to the experiments done in mammalian brain (mice). Thus, we started new research experiments in order to search for new contributors of signal transmission of the Fgf8 along the developing brain.

NEURAL CHANGES IN THE AMYGDALA IN CASTRATED MICE

Agustin Castañeyra-Perdomo, Paula Soberón, Rosa J. Tejera, Barbara A. Valenzuela, Leandro Castañeyra-Ruiz, Emilia M^a Carmona Calero.

Departamento de Ciencias Médicas Básicas, Universidad de La Laguna, Tenerife

Neural changes in the amygdala in castrated mice
The amygdala is located in the medial temporal lobe and among other functions, is associated with the sexual and aggressive behaviors. In male rats the medial amygdala contributes to sexual arousal without sexual contact. The aim of this study is to analyze the neuronal variations between the different nucleus in amygdalae complex in castrated and control mice of 5, 35 and 85 days of age. We have used a control group and two experimental groups consisting of newborns castrated mice (CAS RN) and prepubertal castrated mice (Cas PP). After perfused with Bouin, the brains were cut into two parallel series of 8 microns thick. In A series Klüver-Barrera method was used and in B series immunohistochemical method was performed

using Anti-NeuN (specific nuclear protein neurons called NeuN) as primary antibody. In mice gonadectomized, the neuronal density of the medial nucleus of the amygdala is very high at 5 days of age, which subsequent and significantly decreased at 35 days and maintain the same values up to 85 days of age. In general, the neuronal density in medial nucleus of the amygdala in the castrated mice at newborns age has similar values to the controls, except at 35 days of age where values significantly decrease, and neuronal nuclei have a minor diameter. In conclusion, the number of neurons in the nuclei of the amygdala increase during puberty in controls, an increase that is not manifested in the castrated. Castration produces more cellular changes during development in the nuclei of the amygdala related to sexual behavior and reproductive behavior, than in the amygdala nuclei related to other functions.

THE POLYMODAL ION CHANNEL TRPC6 IS PRESENT IN MEISSNER CORPUSCLES CO-EXPRESSED WITH TRPV4

R. Cabo, P. López, I. San José*, F. Pastor*, A. Gago, G. Vázquez, R. Cobo, O. García-Suárez, J.A. Vega

*Departamento de Morfología y Biología Celular, Universidad de Oviedo; *Departamento de Anatomía, Universidad de Valladolid*

The mechanoreceptors are the places where the process of transformation of the mechanical impulses into electric signal takes place. Consistently some types of mechanoreceptors, both in vertebrates and not vertebrates, express potential mechanoproteins directly involved in the mechanotransduction. Among putative mechanoproteins are some ion channels belonging to TRP and Deg/ENa+C families. In this research we have investigated using double immunofluorescence the expression of the mechanoproteins TRPC6 (transient receptor potential canonical 6) and TRPV4 (transient receptor potential vanilloid 4) in Meissner corpuscles of human and *Macaca fasciculata* glabrous digital skin. Both TRPC6 and TRPV4 are related to the mechanoreception, and co-expression of both has been associated to mechanical algia. The immunoreactivity for TRPC6 and TRPV4 was co-localized with axonal markers, and never with specific markers for lamellar cells, in the axons of Meissner corpuscles, in both species. In addition, TRPV4 has also axonal localization, and co-localized with TRPC6. These results demonstrate the presence and co-expression of two putative mechanoproteins in Meissner corpuscles and probably this fact is at the basis of poly-modal role of Meissner corpuscles.

THE COMPOSITION OF EXTRACELLULAR MATRIX IN MEISSNER AND PACINIAN CORPUSCLES IN HUMAN DIGITAL SKIN

O. García-Suárez, J. García-Piqueras, L. Cárcaba, E. Viña, J.L. Cobo, F.J. Pérez-Moltó*, J.A. Vega

*Departamento de Morfología y Biología Celular, Universidad de Oviedo; *Departamento de Anatomía, Universidad de Valencia*

The extracellular matrix of the sensory corpuscles plays a key role in both development and regeneration processes of these sensory structures. However, the information available about the protein composition of the extracellular matrix in sensory corpuscles is very limited, focuses on the Pacinian corpuscles, and almost inexistent in humans. Here we have investigated using double immunofluorescence associated to laser-confocal microscopy the distribution of different components of the extracellular matrix, including basal membrane, in Meissner and Pacini corpuscles from digital human glabrous skin. In Meissner corpuscles immunoreactivity for collagen IV, biglican and lumican was observed located between the lamellae of the lamellar cells. In the Pacinian corpuscles the detected extracellular matrix components were collagen IV (in all the structures of the corpuscle), chondroitin sulfate (forming a layer between the inner core and outer core), biglican (between the laminae of the inner core) and lumican (inner core). These results demonstrate for the first time the occurrence and distribution of some of the components of the extracellular matrix in the cutaneous mechanoreceptors, and provide evidence of a separation between the nervous and not nervous compartments in Pacini corpuscles.

DISTRIBUTION OF RELAXIN3 FIBERS FROM THE NUCLEUS INCERTUS REVEAL A ROLE IN EMOTIONAL PROCESSING

F.E. Olucha-Bordonau, A. García-Avilés, H. Albert-Gascó, A.M. Sánchez-Pérez

Departamento de Medicina, Universitat Jaume I, (UJI), Castellón de la Plana, Spain

Modulation of amygdala function depends on ascending subcortical projections. Amongst these, an important regulatory projection arises from the nucleus incertus (NI) located in the brainstem, innervate the amygdala using GABA and peptide relaxin 3 (RLN3) neurotransmitter. We have already shown that the lesion of the NI impairs extinction of amygdala-dependent conditioned fear. Thus, the detailed distribution of RLN3 in the amygdala may provide an anatomic background for NI modulation of specific amygdala functions. In this work, we have studied in detail the specific distribution of NI projections and RLN3 positive fibers over the amygdala complex using the pattern of neuronal

calcium binding protein labeling as an anatomic reference. We show that the distribution pattern of fibers from anterograde tracer injections in the NI and RLN3 ICC positive fibers were almost identical. The highest density of anterograde and RLN3 positive fibers concentrated in the endopiriform nucleus, the medial amygdala and medial divisions of the bed nucleus of the stria terminalis. There was a particular accumulation in the caudal lateral amygdala. On the contrary, only disperse labeling occurred in other amygdala nuclei. Double labeling for RLN3 and calcium binding proteins showed consistent putative contacts between RLN3 fibers and soma and dendrites of parvalbumin, calbindin and calretinin positive neurons. Double immunofluorescence for RLN3 and synaptophysin indicates that in all nuclei studied, RLN3 fibers made synaptic contacts with amygdala neurons. These results indicate an important projection of NI over specific nuclei of the amygdala, suggesting a putative modulator role of this system over amygdala dependent social and emotional behaviors.

ORAL COMMUNICATIONS SESSION 3

EMBRYONIC DEVELOPMENT AND GUIDE MECHANISMS OF THE RETROFLEX TRACT

J.A. Moreno, E. de Puelles

Universidad Miguel Hernández, Elche, Alicante

The habenula (Hb) is constituted by two main nuclei, the medial and lateral. This nucleus is in the dorsal part of the alar plate of prosomere 2, as postulated by the prosomeric model. Hb receives projections from the basal forebrain, via the stria medullaris, and projects to basal midbrain and pre-pontine hindbrain through the retroflex tract. mHb projects primarily to the interpeduncular nucleus where axons cross repeatedly the rhombomere1 floor plate. This system connects the limbic forebrain with midbrain and rostral hindbrain. This circuit is involved in diverse functions, such as control of the dopaminergic and serotonergic systems. Despite the functional importance of this system, little is known about the mechanisms necessary for the proper formation of this circuitry. By using the prosomeric model as an interpretative paradigm we concluded that this tract is topologically bent 90 degrees in the thalamic caudal tegmentum. Where it navigates longitudinally through the basal plate 1 of prosomere 1 and midbrain to reach their target nuclei in the rostral hindbrain.

The trajectory of the retroflex tract showed us four key steps for axonal guidance mechanisms: First, a dorsoventral growth where Netrin1-DCC interaction is partially responsible. Then axons avoid the floor plate by a mechanism dependent on the Slit2-Robo1 interaction. After that axons begin a rostrocaudal navigation mediated by the substantia nigra pars compacta, which acts as an intermediary target for these axons generating a rostrocaudal gradient via Netrin1-DCC that attracts these axons towards the caudal region. Finally the last step consists in the innervation of the target nucleus whose mechanism is yet to be unveiled.

Work supported by "Ministerio de Economía y Competitividad" BFU2013-48230-P (FEDER Funds).

MUTATIONS IN THE *NTRK1* (*trkA*) GENE IN HUMAN AND MICE: THE DENTAL PHENOTYPE

A. Gago¹, T. Cobo^{2,3}, J. Torres⁴, I. Menéndez³, L.M. Junquera², O. García-Suárez¹, J.A. Vega¹

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Congenital insensitivity to pain with anhidrosis (CIPA) is an autosomal recessive disorder caused by mutations in the *NTRK1* (also known as *trkA*)

gene, which is the high-affinity signaling receptor for nerve growth factor (NGF). The most characteristic symptoms of patients with CIPA are the insensitivity to pain and absence of sweat, both associated with a defective development of small nociceptive TrkA-positive neurons and of postganglionic sympathetic neurons. Therefore, it can be speculated that also other tissues derived from neural crest cells may not develop normally in these patients. Since teeth contain tissues derived from neural crest cells (Hall and Ekanayake, 1991) and express TrkA (Woodnutt et al., 2000), we studied the hypothesis that the tooth pulp and odontoblasts, which are derived from neural crest ectomesenchyma, do not develop normally in patients with CIPA. To pursue this hypothesis we analyzed the structure and innervation of the primary teeth in a 22 months old child clinically diagnosed with CIPA, and we compared the results with those obtained from the teeth of TrkA-deficient mice. In CIPA and TrkA-deficient mice the dental pulp lack nociceptive nerve fibers and no perivascular nerve profiles were observed. Moreover, there was abnormal arrangement of aberrant odontoblast. These results support that neurotrophin signaling in teeth is required for normal development of dental innervation, and development of odontoblasts.

OCCURRENCE AND LOCALIZATION OF PERIOSTIN IN HUMAN TOOTH, PERIODONTAL LIGAMENT AND GINGIVA

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The periostin is a matricellular protein expressed in collagen-rich tissues which is up-regulated in part by mechanical forces and growth factors. No data are available about the localization of periostin in adult tooth tissues or gingiva, while its presence in the periodontal ligament is rather well known. Here we used Westernblot and immunohistochemistry to study the distribution of periostin in adult human tooth, gingiva and in periodontal ligament. By Westernblot a protein band with an estimated molecular mass of 94 kDa was observed. Periostin immunoreactivity was detected in the subdental zones below the odontoblasts layer, apparently in the so-called cell-free zone of the dental pulp, in the extracellular space of the periodontal ligament forming a meshwork, and at the epithelial-connective tissue junction, or among the fibers of the periodontal ligament, in the gingiva. Periostin never co-localized with cytokeratin or vimentin thus suggesting it is an extracellular protein. These results demonstrate the occurrence the localization of periostin in adult human tooth, gingiva and periodontal ligament and can serve as a baseline for future studies in pathological conditions.

ULTRASOUND AND ANATOMICAL STUDY OF THE SENSORY INNERVATION OF THE KNEE

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The sensory innervation of the knee is a matter of current controversy. Its simplification when undertaking different clinical approaches (blockages, acupuncture, radiofrequency), has made the results achieved are diverse and in many cases unsatisfactory. Our goal is to determine the sensitive innervation of the knee through an echographic exploration and later anatomical dissection. The innervation of this joint comes from the lumbar plexus and sacral plexus. The lumbar plexus contributes through the Femoral Nerve and the Obturator Nerve. Femoral nerve: through the different branches to the bellies of the quadriceps (nerve to the vastus medial muscle, nerve to the vastus intermedius muscle, nerve to the vastus lateralis muscle and nerve to rectus femoralis muscle). These branches are of the mixed type: motor innervation to the muscle that gives their names, and sensitive one to different sections of the knee. Saphenous nerve is the sensory branch of the femoral nerve and is involved in a fundamental way with the sensory innervation of the joint through its infrapatellar branch. Obturator nerve: it is directly involved in the joint innervation through its posterior branch. Through his previous branch, it is involved in the innervation of the skin of the anteromedial part of the knee. Sacral plexus. It is involved in innervation through the branches of the tibial and peroneal nerves. The tibial nerve is involved through the tibial recurrent branch, and gives innervation of the inner face of the joint. The peroneal nerve contributes through its recurrent branch and the retinacular nerve to the innervation of the lateral face and the lower end of the joint and the tibia. The variability between individuals of these structures is important, making of the knowledge of them a truly important factor for the clinical management of the joint in case of pain.

ANATOMIC-RADIOLOGICAL MAPPING OF VASCULAR VARIATIONS AS A SOURCE OF KNOWLEDGE FOR SURGICAL PLANNING

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The knowledge of the vascular anatomy and its variations is critical to the anatomist, the radiologist and surgeon. The incorporation in hospitals of Multidetector Computed Tomography (MDCT) has made possible a detailed study of the vascular patterns, both arterial and venous, as a minimally invasive way, through CT angiography (angioCT). This technique allow us detect possible diseases or vascular malformations, as well as to identify the frequent anatomical variations of the arterial and venous system. The volumetric representation of the data obtained by the angioCT as reformatted type Volume Rendering (VR) provides us a three-dimensional approximation of the vascular anatomy to aid in the diagnosis and spatial understanding of possible diseases, malformations or anatomical variations. Today it has become an indispensable resource in clinical practice and pre-operative studies for vascular or laparoscopic surgery, allowing us a better planning of surgery. Our aim is to demonstrate the role of MDCT in the detection of the most common anatomical variations of the vascular system at the brain, neck, thorax and abdomen. The database of the last 15 years of a secondary hospital were retrospectively reviewed to know the anatomical variations and documented vascular malformations. Later, reconstructions of CT angiography, in those studies in which such findings were observed, were performed in workstations by reformatting VR, obtaining 3-D images of vascular variations and malformations. We present 3-D images of the 44 vascular malformations and anatomic variations most commonly observed, as three-dimensional images obtained from CT angiography. Encephalic vessels: Circle of Willis, Carotid and Vertebrobasilar systems and venous system of the encephalon (6) Cervical vessels (4) Aortic arch and supraaortic trunks (6) Pulmonary vessels (4) Superior vena cava system (2) Azigos vein system (3) Aortic hiatus and celiac trunk (6) Hepatic vascularisation (3) Renal vessels (5) Iliocaval venous axis (2) Portal-splenic-mesenteric axis (3) The CT angiography is a minimally invasive technique that provides us a detailed vascular study, allowing detecting possible variations and malformations. The use of reconstructions employing a three-dimensional view VR allows facilitating the understanding of the variations of the vascular anatomy, which makes this technique an indispensable tool for surgical planning and for anatomical study.

AROMATASE P450 COULD BE INVOLVED IN THE MAINTENANCE OF THE POPULATION OF LH-POSITIVE PITUITARY CELLS IN MICE

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To determine the relevance of aromatase in the modulation of pituitary function, mainly associated with reproduction, a study of LH-positive cells in the pituitary of female and male mice knocked-out (KO) for aromatase was carried out. On considering all the LH-positive cells, significant increases in the cellular, nuclear and cytoplasmic areas were found in the ko animals with respect to the wt. Moreover, LH-positive cells were more abundant in the KO than in the WT mice. In all regions of the gland, LH-positive cells in the KO mice were characterized by a higher intensity of cytoplasmic reaction than in the WT mice. In general, LH-positive cells were more polygonal and exhibited more short and thick cytoplasmic prolongations in the KO than in the WT mice. Moreover, the LH-positive cells showed a greater proliferative rate in the KO than in the WT mice. All the findings observed are signs of morphological cellular hyperactivity, associated with an increase in the size of the cell and nuclear areas and an increase in the percentage of LH-positive cells. They suggest that the local production of estradiol mediated by pituitary aromatase is necessary for the regulation of LH gonadotropic cells, exerting an inhibitory autocrine regulation. The results obtained in this study suggest that, by means of the aromatization of testosterone to estradiol, aromatase modulates the pituitary population of LH-positive cells in males, and perhaps also in females, and could explain the higher pituitary aromatase expression in male than in female mice.

LEARNING ANATOMY BY USING A NEURAL NETWORK: EMPYRICAL STUDY

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An audience response system called SIDRA was integrated with neural network-based data analysis (i-SIDRA) to understand the students' learning behaviors (responses to Multiple Choice Questions, MCQs) and to design diagnostic feedback for guided learning and customized to each student.

Our objective was to test the educational effectiveness on a formative mobile-based assessment approach to provide students with intelligent diagnostic feedback. A total of 200 medical students enrolled in a General and Descriptive Anatomy of the Locomotor System course were exposed to two teaching methods. Ninety students in an experimental group used intelligent SIDRA (i-

SIDRA), whereas 110 students in the control group received the same training but without employing i-SIDRA.

We compare the differences in the four MCQs tests between the scores in the first submission (at the beginning of the experiment) and the scores in the last submission (at the end of the experiment). Statistically significant difference was found between the students that used i-SIDRA versus a traditional learning methodology ($T(162) = 2.597$; $p = 0.010$). Students expressed satisfaction with the content ($M=4.296$) and feedback ($M=3.535$) provided by i-SIDRA and the methodology ($M=4.296$) used in the anatomy learning.

The data suggest that the feedback written by academics and provided by i-SIDRA allowed the students to learn new concepts and clarify misunderstandings improvement knowledge, identification of poor feedback, and detection of poorly formulated questions.

POSTERS

GLIOBLASTOMA AND NEUROBLASTOMA STEM CELLS: THE ROLE OF DECORIN AND LUMICAN

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Cancer stem cells (CSC) are related with glioblastoma (GBM) and neuroblastoma (NB) tumour progression. Tumour microenvironment plays an important role in the epithelial-mesenchymal transition by which the cells lose cell adhesion. In this context, the components of the extracellular matrix (ECM), which perform multiple functions in the cell reorganization and the homeostasis, may carry out relevant tasks. Decorin (DCN) and Lumican (LUM), two of the most prominent elements of the ECM, are related with stem cell differentiation, migration and invasion of cancer cells, chemoresistance, and formation of 3D neurospheres, although their role in nervous system-derived stem cells is still unknown. The lines SK-N-SH and SF-268 of GBM and NB respectively were cultivated in an enrichment medium for CSC in order to analyze afterwards the DCN and LUM expression at ARNm level, through qPCR, and proteins through Western-Blot. The invasivity was analyzed by means of soft-agar and the resistance to temozolomide (TMZ) by means of MTT. Results: 1. Increase of DCN and LUM at both ARNm and protein level in CSC. 2. Increased cell growth of CSC in soft-agar. 3. Significant resistance to TMZ only at highest doses in neurospheres. Conclusions: The study of GBM and NB neurospheres showed a significant increase of the DCN and LUM expression which was correlated with an increase in the resistance to very high doses of TMZ. These data suggest that CME proteins may be the key to the resistance to treatment and the invasivity of the CSC. This information might allow the design of new therapies to improve the prognosis in patients with GBM and NB.

RESISTANCE MECHANISMS IN GLIOBLASTOMA CELLS

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One of the main causes of failure in cancer treatment is drug resistance developed by the tumor. In

glioblastoma multiforme (GBM), adults are treated with adjuvant temozolomide (TMZ), which fundamental resistance mechanism is mediated by O6-methylguanine-DNA methyltransferase (MGMT) protein, thought also involved other resistance mechanisms such as repair complex as the mismatch repair (MMR) complex, P-glycoprotein, and/or the presence of cancer stem cells may also be implicated. The aim of our study is to analyze all these mechanisms of resistance in GBM cell lines. Methodology: A172, LN229, SF268 and SK-N-SH cell lines were exposed two TMZ cycles, after IC50 of TMZ was analyzed. Expression levels of MGMT, five genes of the MMR complex, P-Glycoprotein and CD133 (biomarker of cancer stem cells) were studied by RT-PCR. Also, MGMT protein was analyzed by western. Based on our results we could classify these cell lines into two groups: A172 and LN229 with low basal MGMT expression, low TMZ IC50 and high MMR complex expression; SF268 and SK-N-SH with high basal MGMT expression, high TMZ IC50 and low MMR complex expression. We demonstrated that a mutation of MGMT protein in the first group leading a significant increase in its TMZ IC50, unlike the second group which their IC50 was unchanged. In contrast, P-glycoprotein and CD133 was found to be unrelated to TMZ resistance in these cell lines. These results may be important for understanding the phenomenon of resistance to TMZ, can help in the design of new therapeutic strategies to improve the efficacy of TMZ in GBM patients, especially those with GBM without expression of MGMT.

RESOURCES FOR THE ANATOMICAL FORMATION IN PHYSIOTHERAPY WITHIN THE TUTORIAL ACTION PLAN

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The Tutorial Action Plan (TAP) of the University of Jaén (UJA) is a personalized attention programme for the incoming students. However, the concerns brought up by the students of the Faculty of Health Sciences are different as they reach higher courses. Among these needs is the extension of the formation in anatomy on the part of the students of the Physiotherapy Degree, an essential part for their professional activity. Facing this situation, many specific tutorial activities belonging to the Teaching Innovation Project PID55_201416 are being realized, in coordination with the TAP of the Faculty of Health Sciences.

There have been developed diverse activities that have put the students in contact with: - The Faculty of Medicine of the University of Granada in order to be able to attend to the dissection and drill halls.

- Private or public rehabilitation centers where they can do their internships. - Specialisation workshops with internal medicine doctors realized in the Department of Anatomy.

By means of these resources, the collaboration of the teachers of the Faculty of Health Sciences with other centers and professionals has been strengthened. Furthermore, the Physiotherapy Degree students have been able to improve their knowledge in the field of Anatomy. Conclusions: The development of these activities within the Teaching Innovation Project PID55_201416 has proved itself to be a useful tool to solve the concerns brought up by the students of the Physiotherapy Degree as they reach higher courses, being prominent the formation in Anatomy.

NEUROANATOMÍA MEDIANTE ECOGRAFÍA TRASFONTELAR. CASO CON AGENESIA COMPLETA DE CUERPO CALLOSO

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The transfontanelar ultrasound is a technique frequently used in pediatrics because it allows quick, cheap and accessible way for medical display different brain anatomical structures. The incidence of agenesis of the corpus callosum is about 1/1000 live births and also 21% with another malformations. Patients with this disease may have psychomotor alterations, in speech and behavior so early diagnosis and proper management enable improved prognosis. The display of neuroanatomy transfontanelar ultrasound in pediatric patients under the age of 5 months. Therefore, we present a case where we want to display the agenesis of the corpus callosum and the alteration in the neuroanatomy produced compared to a patient without alterations.

Two patients, one healthy and one with complete agenesis of the corpus callosum, which perform ultrasound with Philips ultrasound Enviso HD and probe transfontanelar miniconvex (8 hz). We observed anatomical differences between patients. In the patients with corpus callosum agenesis we did not see this structure and also we saw alterations in medioparietals and occipital convolutions and grooves are arranged radially and are perpendicular to the roof of the third ventricle. In the signs called "sunshine", we see the difference with normal neuroanatomy. In our case there are no other associated brain malformations. Ultrasound transfontanelar allows a proper study of the neuroanatomy in neonates and infants being an accessible, fast, cheap, safe and without requiring sedation for conducting additional testing. With the knowledge of neuroanatomy is easy diagnosis of many diseases with this technique.

THE NKX6.1 ANTIBODY SHOWS THAT BETA CELLS DO NOT LOSE THEIR REGENERATIVE CAPACITY WITH THE DEVELOPMENT OF TYPE 2 DIABETES MELLITUS

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The time of evolution of type 2 diabetes mellitus (T2DM) is essential for the remission of this condition, after metabolic surgery. It is considered that beta cell mass has an irreversible loss in the natural developing of diabetes. However, many studies describes the beta cell regeneration ability. This aspect again poses reasonable doubt about the T2DM (without obesity) is an inflammatory disease. Our aim is to demonstrate the effect of Duodenal Exclusion (DE) on the regeneration of beta cells pancreas. Materials and methods: 36 Goto-Kakizaki rats (18 with ED and 18 Sham) were operated at different times. The ability to produce the remission of the diabetic condition was evidenced by an immunohistochemistry technics using the Nkx6.1 antibody. This antibody is involved in embryonic development of pancreatic tissue.

An increased beta cell population in rats with ED compared to their counterparts of sham surgery group was observed. The rats operated at early time, showed increased cell regeneration than rats with delayed operation. Histological sections show different types of deformity in the pancreatic islets. Diverse inflammatory infiltrates and the fibrosis consume space in pancreatic tissue. This characteristic is evident in Sham rats and persists despite the surgery in the DE group with late operation. The regenerative capacity of the beta cell is not lost with the evolution of the disease, but the damage of the pancreatic tissue due to inflammation, fibrosis and amyloid deposits, are cause of pancreatic dysfunction.

FROM BARIATRIC SURGERY TO METABOLIC SURGERY. DESIGN OF A MODEL OF EXPERIMENTAL SURGERY FOR NON-OBESE DIABETIC SUBJECTS

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Bariatric surgery has proven to be the best option for treating obese patients with type 2 diabetes mellitus (T2DM). However, the T2DM is an epidemic that continues to rise and affects even people without obesity. Knowledge of the effects of surgery in non-obese diabetic models, it becomes necessary. The objective is to evaluate the effect of a variation of experimental surgery with duodenal exclusion (DE) on a non-obese diabetic animal model. Methods: 18 Goto-Kakizaki rats underwent

to the DE technic (gastroplasty, with the same size of the stomach, the duodenum was excluding from food circuit, and performing a gastrojejunostomy with omega loop). Another 18 rats underwent sham surgery (Sham). The rats were operated at different times (early, intermediate and late) to assess when the greatest beneficial effect is achieved. In both groups the effect of surgery on weight and glucose metabolism were compared.

The weight did not change because of surgery in any case, something that benefits the non-obese diabetic subjects. It was demonstrated decreased values of hyperglycemia with statistical significance ($p < 0.001$) in the group with DE at all times, being higher in the intervention group early. Hyperinsulinemia characteristic of T2DM, was corrected in all groups but the GLP-1 only showed an increase in early-operated rats ($p < 0.002$). Conclusion: DE involves control glucose metabolism without affecting body mass. The best results are produced when the intervention was made early.

ULTRASTRUCTURAL STUDY OF THE EXTERNAL CAPSULE AFTER PERINATAL HYPOXIC-ISCHEMIA AND CANNABIDIOL TREATMENT

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Perinatal hypoxic-ischemic (HI) encephalopathy is the principal reason for permanent brain damage in new-borns, with a 1-6% incidence. Many of these new-borns die, but those who survive develop severe disabilities such cognition delays, coordination impairments and behavioural alterations. In the last years, cannabinoids (CBs) have emerged as promising neuroprotective agents, in several brain damages. One of these compounds is the phytocannabinoid cannabidiol (CBD) that prevents brain damage caused by HI in several animal models. In the present work, we have studied the effects of CBD at the external capsule, which is one of the most affected areas of the brain by HI For these experiments we used four rat groups (Wistar strain): Controls rats (C), rats treated only with saline solution (SH), rats exposed to hypoxia conditions and treated with SH (HI/SH) and rats exposed to hypoxia conditions and treated with CDB (HI/CBD). The experimental model used for HI treatment was the Rice-Vanucci with slight modifications. The processed brains were studied under electron microscopy, attending to the axonal density and anatomy of the myelination sheets in each group and statistical analyzed between groups. The data analyzed showed no statistical differences between C and SH groups. However, when data for the HI/SH group was analyzed, it was showed a significant reduction of the axonal density and myelination density when compared to SH group. On the contrary, the results

obtained from the HI/CBD group presented similar values (axonal and myelination density parameters) to those found in SH group. Thus, we conclude that CBD might contribute to palliate the effects of axonal loss and shape in perinatal hypoxia patients. One possibility is that, CBD would function as a synergic treatment together with hypothermia, in the same manner as demonstrated its therapeutic effects in other neuro-pathological treatments such Parkinson, Alzheimer and epilepsy diseases.

COMPARING STATURE DETERMINED FROM THE FUNCTIONS DERIVED FROM UPPER AND LOWER LIMBS

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Comparing stature determined from the functions derived from upper and lower limbs Stature may be estimated on the basis of bone measurements of the majority of the bones of the skeleton, but the most accurate functions rely on those that include bone length measurements. Trotter and Gleser have calculated several functions that allow a quite accurate estimation of stature based on length of the humerus, ulna, tibia, or femur. Logically stature estimated by these functions (for instance, from humeral length) must yield a similar value when applied to, say, a tibia from the same population, but they may show differences if they are used in populations different from that from which the function was obtained. Therefore, applying these functions to different populations, we can estimate how "dysmorphic" are these populations in relation to that from which the function derived. We have applied Trotter and Gleser's functions to the totality of the prehispanic skeletons from La Gomera that preserved at least humerus, tibiae or ulnae, and also to 18 complete skeletons belonging to modern individuals from Tenerife. Preliminary results show that there was a trend to shorter stature estimated by humeri than by tibiae among 7 out of 8 women, but only in 8 out of 14 men. In a similar way, stature estimated by ulnae was less than that estimated by tibiae among 14 out of 18 contemporary samples and 4 out of 8 prehispanic ones. These preliminary data suggest that upper limbs were relatively shorter among the Canarian population, especially prehispanic women, although definitive confirmation requires the analysis of a greater number of individuals

IMMUNOHISTOCHEMICAL STUDY OF THE EFFECT OF INFLAMMATORY PAIN IN A MODEL OF FIBROMYALGIA INDUCED BY RESERPINE IN THE RAT

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Changes in pain processing have been observed in patients with fibromyalgia. Recent research suggests that the existing monoaminergic deficit in these patients leads to the sensitization of the central nervous system, which amplifies the perception of pain by removing inhibitory descending pathways and increasing the facilitator ones, both regulated by monoamines. In 2009, the Nagakura et al. team described an animal model of fibromyalgia based on reserpine-induced monoaminergic depletion. They observed symptoms of muscle hyperalgesia, tactile allodynia and depressive symptoms in these rats. Objectives: To examine the neural activation by c-Fos expression produced by superficial somatic pain (formalin test) applied to Nagakura et al. animal model. Methodology: 24 male rats, strain Sprague-Dawley were used. The animals were administered 1 mg/kg of reserpine/vehicle for three consecutive days. The formalin test was performed 6 hours or 5 days after the last dose of reserpine. The expression of c-Fos was analyzed in laminae I-II and V of spinal cord and also in Dorsal Raphe nuclei (DR) and Locus Coeruleus (LC). Results: Regarding the formalin test, there is an increase of c-Fos expression of in DR and LC in reserpine rats in comparison with control animals at 6 hours after the last reserpine dose, although there are no differences in the spinal cord. At the 5 days condition, the c-Fos expression in DR and LC is less than in the 6 hours condition, but an elevated expression persists in spinal cord. Conclusion: LC and DR activation does not modify the expression of c-Fos in spinal cord following application of formalin test in reserpine rats, indicating an altered pain processing in supraspinal centers.

THE SENSORY CORPUSCLES IN COMMON CHIMPANZEE DIGITAL GLABROUS SKIN

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The chimpanzee is the living specie closest to humans both in morphology and genetics. Actually there are two species of chimpanzees: *Pan troglodytes* and *Pan paniscus*. Touch sense is an essential toll in animal survival, and mutual body contact is key to develop social links. The study was aimed to describe the morphology and the immunohistochemical profile of cutaneous Meissner and Pacinian corpuscles from *Pan troglodytes*. Skin samples were obtained from the palmar side of the distal phalanx of hand fingers of

necropsies of naturally dead chimpanzees donated by Spanish zoos. Sections from paraffin-embedded material were processed for structural and immunohistochemical techniques, using a battery of antibodies directed against specific axonal (N4142 anti-neurofilaments) or Schwann-like cells (S100 protein) of sensory corpuscles. The general aspect of the tissue were very different to the other primates previously studied (*Macaca fascicularis*) but with the usual fibrous consistency present in other monkeys. The number of Meissner corpuscles were few and the size big compared to *Macaca fascicularis* and similar to humans. We found positive immunolabelling for S100 protein and N4142 neurofilament. Related with Pacinian corpuscles, they are of big size and the shape is different to other previously studied. They show a gross capsule that was immunoreactive for a smooth muscle marker. This work belongs to a series of compared anatomy studies in primates. Our work report for the first time detailed images of sensory corpuscles *Pan troglodytes* digital glabrous skin, the living specie closest to humans.

ENDOSCOPIA VIRTUAL DEL SENO ESFENOIDAL. RECONSTRUCCIÓN 3D BASADA EN ANGIOTAC PARA LA PLANIFICACIÓN DE LA CIRUGÍA ENDOSCÓPICA HIPOFISIARIA

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La técnica endoscópica endonasal ha revolucionado la cirugía de base de cráneo. La variabilidad anatómica del seno esfenoidal hace imprescindible una correcta planificación quirúrgica basada en la tomografía computarizada (TC).

Nuestro objetivo es demostrar la utilidad de las reconstrucciones 3D del seno esfenoidal mediante TC craneal para la planificación de la cirugía endonasal hipofisaria.

Se ha realizado protocolariamente una AngioTC de cortes finos (1mm) a cada paciente sometido a cirugía endoscópica endonasal por patología hipofisaria desde Noviembre 2010 a Diciembre de 2014 (72 pacientes). Cada estudio ha sido procesado para la reconstrucción 3D del seno esfenoidal y su interior.

En todos los casos la reconstrucción 3D preoperatoria ha mostrado la anatomía real comprobada intraoperatoriamente con endoscopia. Se han establecido como principales referencias anatómicas del abordaje: el receso clival, los recesos optocrotídeos mediales y laterales, el suelo selar, el túberculo selar y las carótidas paraclivales, parase-

lares y paraclinoideas. Se ha reconocido con exactitud el patrón de septación (número y lateralización). La neumatización en el plano sagital se ha distribuido: selar (79% de los casos), preselar (19%) y conchal (2%); en el plano coronal la aireación ha mostrado los patrones: cuerpo (35%), alas menores (20%), pterigoides (23%) y tipo mixto (22%).

La reconstrucción 3D del seno esfenoidal basada en TC craneal permite reconocer preoperatoriamente la disposición de las referencias anatómicas que sirven de orientación durante la cirugía endoscópica endonasal, aumentando por tanto la seguridad de la técnica.

REGULATION OF CHONDROGENESIS AND TENOGENESIS BY BTG1 DURING DIGIT DEVELOPMENT

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In the developing limb, differentiation of skeletal progenitors towards distinct connective tissues of the digits is correlated with the establishment of regulate domains of *Btg1* gene expression. Zones of high expression of *Btg1* include the condensing mesoderm at the tip of the digits, the peritendinous mesenchyme, and the chondrocytes around the developing interphalangeal joints. Gain- and loss-of function experiments in micromass cultures of skeletal progenitors reveal a negative influence of *Btg1* in cartilage differentiation accompanied by up-regulation of *Ccn1*, *Scleraxis* and *PTHrP*. Previous studies have assigned to these factors a role in the aggregation of progenitors in the digits tips (*Ccn1*), in the differentiation of tendons blastemas (*Scleraxis*) and, repressing hypertrophic cartilage differentiation (*PTHrP*). Overexpression of *Btg1* upregulates the expression of Retinoic acid and Thyroid hormone receptors, but at difference of other systems, the influence of *Btg1* in connective tissue differentiation appears to be independent of retinoic acid and thyroid hormone signaling.

BIPARIETAL THINNING IN A MUMMY OF THE XVI CENTURY

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This entity represents a loss of trilaminar structure parietal bones and replaced by a thin sheet of compact bone; this usually bilateral and circumscribed depression is already known from the XVIII century, having been described in Egyptian mummies and a skull of the Bronze Age.

In 2008, at the laboratory of Anthropology of the Anatomical Museum of the University of Valladolid, we did paleopathological and anthropological study of human remains recovered in the archaeological work of the Church of San Esteban de Cuellar (Segovia), by Archaeologists SL company Aratikos. The remains were found inside the apse, several tombs of the fifteenth and sixteenth centuries. In one of the bodies, naturally mummified by the applied lime and environmental conditions, we discovered this variation. It belongs to a woman with spinal osteoporosis, scoliosis and generalized moderate osteoarthritis, between 60 and 75 years and 1.53 m high. The body belonged to Isabel de Zuazo (the owner of the tomb), wife of Martín López de Cordoba Hinestrosa, ruler of the town, and also had a large collection of documents printed bulls and a small prayer book among his linen shroud.

Results and conclusions: The biparietal thinning, of unknown etiology, considered as an epigenetic variation is asymptomatic and is usually diagnosed based on an incidental finding while performing an X-ray or CT, as was our case. More common in women, it has proven a genetic component. As there is a clear family influence, it could serve to establish family relationships in large populations, or confirm the relationship between specific individuals, as it could be our case.

RELATIONSHIP OF THE JUXTAORAL ORGAN AND THE NERVES OF THE MOUTH IN ADULT HUMANS

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The Danish histologist Chevitz described an epithelial structure in relation to the development of the parotid gland. According to this author, the remains of this structure disappeared during development. Zenker and collaborators noted the persistence of this structure in adults without involution, calling it the juxtaoral organ. Mérida and collaborators have studied its development in humans and rats. Despite being described in the *Nomina Anatomica*, it is not described in anatomy textbooks. Through dissection of the pterygomandibular space of 20 adult bodies, the relationship between the juxtaoral organ and the nerves of the mouth is evident. Its topological location has been drafted by Kramer and Zenker. We confirm its normal topological location in adults. Dissection of the mouth nerve tract prevents a possible error in its location. It is formed by epithelial nests surrounded by connective tissue that is connected to nerve fibers. This tight relationship has raised concern, as it has been erroneously interpreted as a perineural invasion of neoplastic epithelial cells or as a mucoepidermoid carcinoma instead of a normal anatomical finding. We present these findings to

broaden the knowledge regarding this normal structure and to prevent diagnostic errors.

STUDY OF THE EFFECT OF RESERPINE ON THE ACTIVITY OF MONOAMINERGIC NUCLEI BY MEANS OF THE IMMUNODETECTION OF C-FOS

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Reserpine irreversibly blocks the v-mat receptors of the release vesicles of monoamines, causing a shortfall in monoaminergic systems. These systems are crucial to the functioning of neural processes such as pain control, regulation of sleep, mood and motor activity. Growing research studying reserpine create animal models of diseases characterized by monoamine deficit, such as Parkinson, depression or fibromyalgia. By the immunodetection of immediate early gen c-fos, it is possible to study reserpine effect on monoaminergic nuclei. The aim of this paper is to study the patterns of activation of monoaminergic nuclei after administration of reserpine by immunodetection of c-Fos. Methodology: 18 male rats of the Sprague-Dawley strain were used. Two groups of animals were treated with a single dose of reserpine/vehicle of 1 mg/kg and another group was treated with 1 mg/kg for 3 consecutive days. The c-fos expression was studied in monoaminergic nuclei the Dorsal Raphe (DR), Locus Coeruleus (LC), and Substantia Nigra (SN). Results show that an acute dose of reserpine increased expression of C-Fos in DR and LC, and a decrease in SN, in contrast to control animals. Moreover, following the three days administration protocol, a significant increase on the expression of C-Fos in LC and SN was observed, as well as a high decrease in DR, compared to control animals. Conclusion: Reserpine activates the studied monoaminergic nuclei in a different manner depending on whether it is acute or repeated doses, and there is no consistency between nuclei. It is necessary to characterize neurochemically to determine the nature of the active neuronal populations in each nucleus and analyze its role in the system.

EVALUATION OF THE ANALGESIC EFFECT OF DULOXETINE IN A MODEL OF NEUROPATHIC PAIN IN THE RAT

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Neuropathic pain significantly affects the quality of life of general population and also has a great socioeconomic impact. Currently, however, treatment is in most cases unsatisfactory. Therefore, new therapeutic alternatives such as the use of antidepressants like duloxetine are sought. The aim of this study is to identify the anatomic substrate underlying the analgesic effect of duloxetine in a model of neuropathic pain in rat, the Chronic Constriction Injury. The analgesic effect of duloxetine was studied by employing behavioral tests (Electro Von Frey) and immunohistochemical detection (detection of immediate early gene C-fos). Results show, on the one hand, that duloxetine decreases hyperalgesia and tactile allodynia caused by chronic constriction of the sciatic nerve in the behavioral test. Similarly, duloxetine decreases the expression of C-fos in the superficial laminae of the spinal dorsal horn ipsilateral to the pain stimulus, but not the in the laminae V. In contrast, although it seems that this antidepressant inhibits C-fos expression in the Dorsal Raphe nucleus, results are inconclusive neither for this nucleus nor for the Locus Coeruleus nucleus. Duloxetine is effective in relieving the symptoms of allodynia and hyperalgesia resulting from neuropathic pain. This effect is shown in laminae I and II of the spinal cord, but it is necessary to deepen the supraspinal mechanisms responsible for this effect.

MICRO CT: PRESENT AND FUTURE IN THE DEVELOPMENT OF DENTAL RESEARCH

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Computed microtomography (micro CT) is one of the best available techniques to visualize, analyze and study with high resolution and structural detail the cranial and dental morphology consenting to establish the thickness of the enamel and the dentine layers, the morphology of the dental roots or to evaluate the dimensions of the skull. This communication reports the results of the morphologic analysis of the skull and teeth of adult midline deficient mice, they are compared with those obtained from mice with wild genotype. The micro-CT used was a SkyScan 1072, SkyScan Bvba (McGill University, Montreal, Canada) and the reconstructions were made with the SkyScan Reconstruction NRecon Server software. Using the images obtained in different anatomical planes three-dimensional reconstructions were made (software CT Vox/CT Bowl) to determine the variations in the morphology of the teeth, the thickness of the enamel and the dentine, the changes in the volume and morphology of the skull. On the other

hand, by means of software CtAn SkyScan, it has been possible to observe details of the radicular dental anatomy and of the elements forming the tooth, as well as to know the percentage of enamel, dentine and dental pulp (Tool Shrink Wrap); for example, the confluences of the radicular channels, not known in the mouse to date, can be visualized. The micro-CT is a simple and reproducible tool, noninvasive, for the three-dimensional analysis of animal models in odonto-stomatology.

MORPHOLOGY OF THE VERTEBRA PEDICLE IN THE CERVICAL AREA IN THE MEXICAN POPULATION

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In the transpedicular fixing with screwed plates in patients with unstable cervical spine, the knowledge of the size and orientation of the spine pedicles are essential to avoid fracture or invasion of the spinal canal during the disposal of the bolt during the surgery, also the complications intraoperative and postoperative. The bolts accepted by the FDA for the lumbar fusion technique by posterior approach are from 5 to 10 millimeters long. Therefore, this research aims to appraise the morphology of the pedicles in the C3-C7 cervical vertebrae of the Mexican population.

Observational, descriptive, transversal and comparative research were made. The morphological characteristics of the C3-C7 cervical vertebrae pedicles have been determined in 30 corpses (by direct anthropometry) and 30 patients (by CAT). Neurosurgery Clinic, University Hospital. Dr. José Eleuterio Gonzalez, Monterrey, Mexico.

In the conclusions obtained from the CAT, the height of the pedicle is similar in the entire vertebra (C3-C7). The anteroposterior and the axial diameters increase gradually from C3 to C7, with statistically differences between C7 and C3, C4 and C5, as well as between C6 and the values of C3 and C4. The morphometric characteristics of the pedicle, obtained through direct anthropometry in the corpse, are similar in the entire vertebra analyzed.

The average of the pedicle width in the cervical vertebra C3-C7 in all the population analyzed is less than 5 millimeters, and the standard thickness of the cervical transpedicular bolts is 4 millimeters, so that there is a high risk of an existing fracture of the pedicle and the possible damage of the medullary canal. The realization of national anthropometric researches in Mexico allows to knowing in depth the anatomy of each ethnicity, select the best techniques and developing the specialized and suitable surgery material to each population.

SURGICAL ANATOMY OF THE VERTEBRAL PEDICLES IN THE LUMBAR AREA IN THE MEXICAN POPULATION

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The anthropometric measures of the lumbar vertebra elements are interesting for the surgery in order to introduce transpedicular bolts on them. In particular, the knowledge of the pedicle measures is useful to avoid the fracture or invasion of the vertebral canal during the collocation of the bolt. The bolts accepted by the FDA for the lumbar fusion technique by posterior approach are from 5 to 10 millimeters long and the pedicular lumbar size as well as the rest of the vertebra anatomic details could be different in the ethnicities and breeds. The lordosis lumbar angles are surgery relevance too. So that the purpose of this research is to decide the lumbar vertebra pedicle measures in the Mexican population.

Here we carried out a descriptive, transversal and comparative research of lumbar vertebra pedicles of 30 corpses (by direct anthropometry) and 30 patients (by CAT). Neurosurgery Clinic, University Hospital. Dr. José Eleuterio Gonzalez, Monterrey, Mexico.

The morphometric characteristics of the vertebrae pedicle like the pedicle height, the anteroposterior diameter (pedicular length) and axial diameter (pedicular width) are similar in all the vertebrae, except the L5. The pedicle width (by anthropometry in a corpse) or the axial diameter (by CAT) increases from the first to the fifth lumbar vertebra, with statistical differences between L5 and L1; L2 and L3.

This research shows that the diameter of the pedicular implants available in the mexican market are appropriate for the general population. The biggest thickness or width of the pedicle of the fifth lumbar vertebra brings a better security and stability factor in the disposal of the bolts during a surgery.

METATARSUS ADDUCTUS IN THE TAILOR'S BUNION AND ITS PRESURGICAL EVALUATION

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Tailor's bunion is a bony eminence on the lateral side of the fifth metatarsal, which often requires surgical treatment. Although the type of metatarsus is one of the parameters to consider in the abductus hallux valgus surgery, this is not valued at the tailor's bunion surgery. This study aims to study the association of type metatarsal with a tai-

lor's bunion and its influence on the presurgical evaluation in this pathology. The Metatarsus adductus angle (MAA), the Intermetatarsal angle IV-V (IMA IV-V) and the fifth metatarsophalangeal angle (V MTPA) were measured at 35 feet with tailor's bunion which were subsequently surgically (group cases) and 35 feet that did not have this disease (control group). Results: 1.- We have found no significant differences in the type of metatarsal (metatarsus adductus and normal feet) between the tailor's bunion group and the control group. 2.- The fifth metatarsophalangeal angle has no significant difference in the normal feet and metatarsus adductus, both tailor's bunion group and controls. 3.- However, the IV-V IMA was significantly higher in the feet with metatarsal adduct in both cases tailor's bunion and controls. The type of metatarsal should be considered in the presurgical evaluation of tailor's bunion since feet with metatarsus adductus have an increased metatarsal IV-V IMA, about 2° compared to normal feet, without influencing the deviation in adduction of the fifth toe.

STUDY OF ANOGENITAL DISTANCE OR ANATOMICAL PERINEUM IN PATIENTS WITH PELVIC FLOOR DISORDERS

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Anogenital distance (AGD) corresponds exactly to the distance between anatomical perineum or superior anal margin in women. AGD has been correlated with hyperandrogenic conditions such as polycystic ovary syndrome and even count follicular. On the other hand, it has been established urogenital size as a possible risk factor for disorders of pelvic floor and even a risk factors for recurrent pelvic organ prolapse. Some authors have tried to see whether urogenital hiatus measured by three-dimensional ultrasound can be determined clinically.

Hypothesis: AGD seems determined prenatally and also influenced by the hormonal environment of the mother during intrauterine development (it has been seen that higher maternal androgenic environment, longer DAG). There is a strong family association of patients with a family history of pelvic organ prolapse (POP). The patients with POP do not usually have reproductive problems, but on the contrary, is associated with parity. We might think that these patients may have a shorter AGD than patients without these pathologies.

Objectives: Study of anogenital distance in cases (surgical patients with POP with or without urinary incontinence) and controls. We also made other anthropometric measurements of the pelvis (the clitoris-anal length, length of genital hiatus, perineal body distance and distance between both ischial tuberosity) to establish whether there is statistically significant difference between groups. After the observational study of cases and controls, the measurements were made with a caliper.

The DAG shows differences between the two populations with an average of 18 mm in POD group, while the controls have an average distance of 23 mm ($p=0.001$). There were also significant differences in the length clitoris-anal. The other measures are similar in both populations with no significant differences. We demonstrate an association between short DAG and POP, but we cannot determine if the difference in these distances is the cause or the consequence of this disease. Since this distance is determined prenatally we wonder whether this shortened distance could be a risk factor for the development of pelvic floor disorders.

OPTIMIZATION OF SCIENCE COLLECTIONS OF THE ANATOMY MUSEUM OF THE UNIVERSITY OF VALLADOLID

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One of the functions of museums, in addition to exposing, preserve and increase their funds is that their collections are studied and known to increase scientific knowledge. For this, museums have to keep their collections in optimal storage conditions and accessible to researchers who request an inquiry. From 16 years the Anatomical Museum at the University of Valladolid owned its funds and loans for consultation between the scientific community and since then have been increasing gradually.

There are currently three types of sensitive material of these activities: 1) anatomical parts, 2) instruments and apparatus, 3) osteological material. Osteology is the more demanded by researchers, particularly anthropologists, paleontologists and biologists, who need to know the morphology in numerous and well-documented populations of both humans and animals. Both the consultation and loans are free, running only by the researcher shipping costs of the material and the acceptance of rules on the use of the material. Since 2000, consultations have been conducted by 88 researchers in a total of 680 days and 189 loans have become material for an average of two years. Consultations involving the movement of researchers to the museum and often have to spend the night several days in the city, making it economically University reports (most of the rooms are in dormitories) and own city. The data collection for

research generates publications in journals and books, which spread and publicize the collections and the name of the University of Valladolid, which makes reference worldwide in osteology.

MORPHOLOGICAL STUDY ON THE SUBLINGUA IN THE MOUSE LEMUR (*MICROCEBUS MURINUS*) BY ESEM (ENVIRONMENTAL SCANNING ELECTRON MICROSCOPY)

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The sublingua is an elongated structure that is located under the tongue of primates prosimians such as lemurs, lorises and tarsiers. It has also seen a similar formation in primitive mammals such as marsupials and dermopters. Has a triangular shape and sharper vertex is directed forward. Their edges are smooth in the rear half and toothed above, the vertex presents several filiform endings.

In light microscopy studies have not located papillae or glands, and the main function is cleaning the "tooth comb" formed by incisors and lower canines highly modified, with the coat are cleaned. These include teeth, hair debris are removed by sliding the tip of the sublingua sliding back and forth between the teeth accumulate.

Sublinguas have used the two gray mouse lemur (*Lemuridae*) adults, from a zoological where they died of natural causes males. The privileges languages extracted and fixed in 10% formaldehyde and then dehydrated in alcohols for viewing on an ESEM with CO₂ atmosphere.

The total lengths of languages, from end to epiglottis were 18 and 20 mm and sublinguas, having a diamond shape, 9 and 11 mm high and 4 to 5 mm diagonal minimum diagonal respectively. The apex consisted of filiform terminals 5 and 6. The surface in both ventral and dorsal face is smooth, presenting no papillary formations. A large increases cellular junctions and large areas with similar micropores to those in the lingual papillae and have a distribution function of the lingual surface mucus are seen. The filiform apex terminations end in two or three points. In areas close to the apex outnumber cells desquamation process. The absence of papillary formations and taste pores reinforces the theory that this training fulfills only a mechanical tooth cleaning role in these animals.



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CONTENTS

Abstracts of the XXVII Congress of the Spanish Anatomical Society

<i>Honoric and Organizing Committees</i>	5
<i>Scientific Program</i>	7
<i>Oral Communications</i>	10
<i>Posters</i>	17
<i>Sponsors</i>	27

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9 772340 311009