

only be transduced through gap junctions but also through the mere presence of connexons or even connexins. The expression of cx differs according to their location and function. In human and rodent reproduction, deficiencies in cx expression lead to inadequate embryo implantation and trophoblast invasion and also characterize stages of malignancy in endometrial carcinogenesis. Therefore, cell-cell communication via gap junctional cx may be essential for the restricted trophoblast invasion performed by migrating trophoblast giant cells (TGC) in the synepitheliochorial placenta of the cow. TGC fuse with single caruncular epithelial cells forming mostly trinucleated feto-maternal hybrid cells which deliver hormonal products to the maternal compartment.

To study the potential role of connexins during placentomal development we localized cx26, cx32 and cx43 in frozen sections from day 90-210 of pregnancy and primary cell cultures by immunofluorescence and confocal laser scanning microscopy. The presence of the corresponding cx proteins was confirmed by Western blot analysis.

Although cx26 was present in tissue sections (trophoblast cells) it could not be detected in placentomal cell cultures. Surprisingly cx32 was localized in nuclei of cultured caruncular epithelial cells, whereas in placentomal sections it was found in caruncular stroma and caruncular epithelium specifically at the tips of maternal septa. In contrast to in vivo material, only cultured fibroblastoid cells were positive for cx43. In tissue sections also mononuclear trophoblast cells showed an apical-lateral cell membrane associated cx43 expression. In TGC, cx43 signals differed depending on the localization within the placentome. In the centre of the placentome cx43 was associated to the cell membranes whereas at the base of the fetal villi TGC additionally showed cytoplasmatic cx43 specific fluorescence. In contrast, TGC which were about to fuse with uterine epithelial cells and hybrid cells were negative.

We may conclude that apical cx43 localization supports the hypothesis that cx43 connexons may be involved in the regulation of cell proliferation without forming gap junctions. The correlation of TGC invasion with the loss of cx43 suggests that cx43 plays an important role for the differentiation and migration of TGC. The unexpected finding of cx32 in nuclei of cultured caruncular epithelial cells cannot be explained up to date. The loss of cx26 and cx43 during cell culture of epitheloid cells may be due to suboptimal culture conditions. Funded by the German Research Foundation (DFG).

#### APPLICATION OF COMPUTER ASSISTED THREE-DIMENSIONAL VISUALIZATION TECHNIQUES IN HISTOLOGY, MEDICAL COMPUTER TOMOGRAPHY AND NUCLEAR MAGNETIC RESONANCE IMAGING

Pieter Cornillie, Wim Van den Broeck, Paul Simoens  
*Department of Morphology, Faculty of Veterinary Medicine, Ghent University, Salisburylaan 133, 9820 Merelbeke, Belgium.*  
*E-mail: Pieter.Pornillie@UGent.be*

Over the last years, three-dimensional imaging has become more and more prevalent in biomedical and material science studies. For almost every highly specialized application, different specific 3D-software solutions have been designed. Although the 3D visualization package amira ResolveRTM has primarily been developed for confocal microscopy, it has also proven to be a valuable instrument in different other applications. In recent studies performed at our department, this stand-alone software pack turned out to be a rewarding tool

in morphometrical examinations of the equine semicircular canals starting from medical CT images, ex-vivo haemodynamic studies in porcine and human livers observed by MRI and micro-CT, and histological investigations on the developing digestive system in sea bass larvae and juveniles. The major benefits of this versatile application include the fact that image segmentation is not necessarily based on pixel value thresholds, its ability to deal with unaligned or lost slices and its capacity to render different types of real 3D stereo images or movies, starting from a wide range of input data types. Although the user can easily intervene in almost every automated process such as image alignment or labelling, many of these manual corrections and adaptations are rather time-consuming. Another inconvenience is that the broad potential and complexity of the program causes a substantial load of the internal and graphical memory of the system. Notwithstanding these disadvantages, investment in this software is certainly paying off as it can offer unparalleled representations of complex structures as a basis for the development of new insights in various morphological domains.

#### Poster presentations: summaries Povzetki posterjev

##### ELEMENTS OF THE ANATOMY OF TWO STURGEONS (ACIPENSER STELLATUS PALLAS, 1771 AND ACIPENSER BAERII BRANDT, 1869): OSTEOLOGY AND RADIOLOGY

A. Borvon<sup>1,2</sup>, Y. Gruet<sup>2</sup>, M.-C. Marinval<sup>1</sup>, C. Guintard<sup>3</sup>  
<sup>1</sup>Université Paris 1 - Panthéon-Sorbonne et UMR 7041 Equipe Archéologie Environnementale, 21 allée de l'Université, 92000 Nanterre, <sup>2</sup>58 rue Stendhal, 44300 Nantes, <sup>3</sup>Ecole Nationale vétérinaire de Nantes, Unité d'Anatomie comparée, route de Gachet, BP 40706, 44307 Nantes cedex 03, France

Most of the studies that have been carried out on the Acipenseridae concern evolution, phylogeny, diversity, conservation and reproduction, notably concerning their economic importance for caviar production (Billard, 2002). However, information about the peculiar osteology of this family is relatively rare. The only osteologic data that can be found in the literature (Grassé, 1958 ; Findeis, 1997) are difficult to use in the diagnosis of the bone remains discovered on archaeological sites and are only known for a few species (Radu, 2003). Consequently, a study associating dissections and radiology observations has been attempted in order to gather anatomical information.

Two individuals of two different species have been studied here: a Siberian sturgeon *Acipenser baerii* and a stellate sturgeon *Acipenser stellatus*. The first species is potamodromous (migration only in fresh water) while the second is diadromous (migration between salt water and fresh water).

This work is a preliminary contribution to the knowledge of the osteology of these two species of sturgeons and we hope that it will be developed in a near future.

#### References

- Billard R. Sturgeons et caviar. Tec & Doc, Paris, 2002., 298 pp.  
 Findeis EK. Osteology and phylogenetic interrelationships of sturgeons (Acipenseridae), 1997 Environmental Biology of Fishes 48:73-126.  
 Grassé PP. Traité de Zoologie. Anatomie, systématique, biologie. Masson, Paris, 1958, 2700 pp.

Radu V. Exploitation des ressources aquatiques dans les cultures néolithiques et chalcolithiques de la Roumanie Méridionale. Thèse de Doctorat, Université de Provence Aix - Marseille, Aix en Provence, 2003, 436 pp.

#### Acknowledgements

The authors are grateful to A. Hilt (aquarium du Bugue, Dordogne, France), S. Madec (radiographies) and B. Chanet for their precious help in the realization of this poster.

#### MORPHOLOGY OF THE STIFLE MENISCI IN DOGS: PRELIMINARY STUDY

V. De Busscher<sup>1</sup>, J. Letesson<sup>2</sup>, V. Busoni<sup>1</sup>, O. Jacqmot<sup>2</sup>, D. Cassart<sup>2</sup>, N. Antoine<sup>2</sup>, A. Gabriel<sup>2</sup>

<sup>1</sup>Department of Clinical Sciences, <sup>2</sup>Department of morphology and pathology, Bd de Colonster, B43, 4000 Liège

E-mail: annick.gabriel@ulg.ac.be

Letesson and De Busscher are first authors.

#### Introduction

In dogs, ultrasonography can be realised to assess soft tissue and bony surfaces. Little is known about ultrasonographic appearance of canine meniscal lesions and their histological appearance and signification. Meniscal lesions are common in dogs and are generally associated with rupture of the cranial cruciate ligament. The medial meniscus is more often and more severely injured than the lateral one.

#### Objectives

The aims of this study were to set the technique for the histological examination of the dog menisci, to describe the normal echographical and histological appearance and to present 2 pathological specimens of injured menisci.

#### Methods

Sound menisci were taken from the stifles of an 8 month old mixed breed dog and a 9 years old Bernese mountain dog. Two injured medial menisci were also evaluated: from a 9 years old rottweiler and a 7 years old shepherd dog.

The menisci were examined in situ and after post-mortem excision in a water bath with a linear 7.5 MHz ultrasonographic transducer. Three zones were examined: Zone 1: cranial horn, Zone 2: body of the meniscus, Zone 3: caudal horn, near the collateral ligament.

Vertical sections were made. These are plane perpendicular sections to a given horizontal plane. Two kinds of sections were tested. The isolated menisci of the 8 month old dog were put on the dissection table (horizontal plane) and cut from the cranial to the caudal horn (the sections were triangular in shape, with thin axial border and thick abaxial border), or cut into 4 quarters that were then cut tangential from the abaxial border to the axial border. Menisci of the 8 month old dog were embedded in paraffin whereas the other menisci were embedded in methyl metacrylate and cut with a vertical diamond saw. The sections were stained either with toluidine blue, PAS/ hematoxylin or safranin O.

#### Results and discussion

##### Ultrasonography

The normal menisci appeared triangular and homogeneously echogenic. The injured menisci were more heterogeneous and con-

tained hypoechogenic areas. In horses, hypoechogenic defects were associated with fibre disruption and collapse, oedema, or degenerative processes such as fibroplasias or necrosis.

##### Histology

Normal menisci were more fibrous in the middle, with a regular architecture composed of collagen trabeculae in two main directions: circumferential or cranio-caudal direction and radial or abaxio-axial direction. The periphery showed more chondrocytes and more matrix organised in several layers.

In this study, hypoechoic defects or heterogeneous areas were associated with fibrillation, major degenerative changes and modification of internal architecture.

#### MORPHOMETRIC STUDY OF INTERPHALANGEAL JOINTS IN ARDENNER HORSES WITH JUVENILE OSTEOARTHROPATHY

A. Gabriel<sup>1</sup>, C. Spelmans<sup>1</sup>, F. Farnir<sup>2</sup>, J.P. Lejeune<sup>3</sup>, L. Gilles<sup>1</sup>, O. Jacqmot<sup>1</sup>, D. Serteyn<sup>3</sup>

<sup>1</sup>Department of morphology and pathology, <sup>2</sup>Department of Animal Productions, <sup>3</sup>Department of Clinical Sciences, Bd de Colonster, B43, 4000 Liège

E-mail: annick.gabriel@ulg.ac.be

#### Introduction

Little information is available about the morphometrical aspect of osteochondral tissues in horses though osteo-articular pathologies may cause pain, handicaps and also important economic loss. Attempts are made to rehabilitate Ardenner horses but they may develop juvenile osteoarthropathy which lead to precocious cast. This disease, also called osteoarthritis, may be considered as a group of degenerative disorders characterized by a common end stage: progressive deterioration of the articular cartilage accompanied by changes in the bone and soft tissues of the joint.

#### Objectives

The aim of this study was to improve knowledge about bone and cartilaginous tissues in Ardenner horses with osteoarthropathy, regarding proximal and distal interphalangeal joints.

#### Material and methods

Two Ardenner geldings aged 4 years were included in this study. One was euthanized because of dangerous behavior and the other for ataxic problems after an accident. Both of them presented radiographic signs of osteoarthropathy with enthesiophytes at the dorsal border of the middle phalanx. Fore and rear digits were dissected. Four sampling sites were used for each digit: distal articular surface of the proximal phalanx (P1D), proximal (P2P) and distal (P2D) articular surfaces of the middle phalanx and articular surface of the distal phalanx and navicular bone (P3P). A standardized squaring was carried out using a graduated rubber band giving place to 9 intake points by articular surface. Osteocartilaginous samples, of a fixed diameter of 5 mm over a length of 8-10 mm, were taken owing to a surgical motor with a bell mill. The samples were embedded in methyl metacrylate without previous decalcification. Sections were stained with toluidine blue or methylene blue and were imaged with a microscope provided with a video camera connected to a computer. Five measurements were made with the imaging analysis system (Leica): maximal thickness of full cartilage (TC), maximal thickness of calcified cartilage