DOWNLOAD PDF COMPARATIVE MORPHOLOGY OF THE MAMMALIAN OVARY

Chapter 1 : Comparative Morphology of the Mammalian Ovary

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J Exp Clin Assist Reprod. Published online Mar 1. This article has been cited by other articles in PMC. Abstract Background Laboratory animals are commonly used for evaluating the physiological properties of the mammalian ovarian follicle and the enclosed oocyte. The use of different species to determine the morphological relationship between the follicle and oocyte has led to a recognizable pattern of follicular stages, but differences in follicle size, oocyte diameter and granulosa cell proliferation are not consistent across the different species. In an effort to better understand how these differences are expressed across multiple species, this investigation evaluates oocyte and follicle diameters and granulosa cell proliferation in the mouse, hamster, pig, and human. Methods Histological sections of ovaries from the mouse, hamster, pig, and human were used to calculate the diameter of the oocyte and follicle and the number of granulosa cells present at pre-determined stages of follicular development. A statistical analysis of these data was performed to determine the relationship of follicular growth and development within and between the species tested. Results These data have revealed that the relationships of the features listed are tightly regulated within each species, but they vary between the species studied. Conclusion This information may be useful for comparative studies conducted in different animal models and the human. Background In an effort to understand follicular growth and oocyte development in the human, many animal models of folliculogenesis are in use [1 - 6]. Each of these models has specific similarities to the human and where one model may be inadequate, another may provide the appropriate characteristics for experimentation. A major obstacle in the interpretation of data from different species in relation to the human lies in understanding the similarities and variances between the investigational systems and the human. At first glance, the follicular stages of maturation seem to be morphologically well defined across species. In fact, a follicle from any mammalian model can be generally categorized as primordial, primary, or secondary based on the presence and number of cuboidal granulosa cell layers [5 , 7]. Secondary follicles can then be further subdivided into various stages based on the size and presence of antral fluid. These stages are initially defined as preantral prior to the accumulation of antral fluid or antral after the accumulation of antral fluid. Antral stages are further clarified into stages of incipient antral from the first signs of fluid accumulation to later stages of early antral and Graafian stages based on the size of the follicle and amount of follicular fluid [5 , 8]. However, important variables such as oocyte diameter and the number of supporting granulosa cells are not evaluated in this universally applied classification system [2 , 9]. Until now, there has not been a study comparing multiple species or indicating the morphological differences that are present in a follicle and its enclosed oocyte at given stages in a single study. This study was therefore designed to simultaneously evaluate the variances in the oocyte and follicle diameter and granulosa cell proliferation within the mouse, hamster, pig, and human at all stages of maturation. Methods Ovarian tissue collection The appropriate ethics committee approval was obtained for the use of animal and human ovarian tissue in this study. Ovarian tissue was obtained at necropsy immediately after euthanasia and washed twice in 0. Pig ovaries were collected from pre-pubertal gilts at a local abattoir. These ovaries were transported in 0. Human ovaries were collected from women, 23 to 45 years of age, undergoing oophorectomy for non-neoplastic indications. Human ovarian tissue was removed by the operating surgeon and delivered to the pathology department where a section of ovarian cortex was obtained for study. Histological processing and follicle identification The formalin-preserved tissues from all species were sent to a university core laboratory for routine processing in an automated tissue processor and embedded in paraffin. Five to ten micron serial sections obtained from a rotary microtome were mounted onto plain glass slides and routinely stained with haematoxylin and eosin for light microscopy evaluation. Each

tissue section was evaluated for the presence of oocytic follicles using a Nikon E microscope equipped with four, ten, twenty, forty, and sixty times magnification Plan objectives Nikon, Japan. The identification of follicles within the serial sections was based on strict criteria. Follicles were first assessed to determine if an antral cavity had formed within the follicle. This was carried out by reviewing each appearance of the follicle, across serial sections, for antrum formation or an area within the structure containing a space void of granulosa cells. If an antral cavity was recognized, the serial section of the follicle showing the largest cross-sectional area was then used for further evaluation Fig. When the initial assessment of the follicle did not indicate an antral cavity, the section where the oocyte nucleus was visible in the follicle was used for further evaluation Fig. Based on the criteria of Gougeon [7] and Knigee and Laetham [8], all follicles were concurrently assessed for morphological signs of atresia and excluded from the study when identified. Furthermore, markedly distorted follicles, likely damaged during tissue preparation, were also excluded from the study. The captured images of all follicles meeting the selection criteria were saved as tiff formatted images and transferred to Image J NIH, Bethesda, MD , an open source application for data analysis, also running on a Macintosh G4, for further evaluation.

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Chapter 2 : Comparative Placentation

There are eight chapters which deal, inter alia, with the gross anatomy, the general microscopic structure and the development of the mammalian ovary, the morphology and cyclic changes of a representative ovary (from Tamiasciurus hudsonicus), the comparative morphology of specific ovarian tissues and structures, and features and problems.

Some Recent Findings Testosterone metabolism Reelin and aromatase cooperate in ovarian follicle development [1] "Reelin plays an important role in cerebral cortex development and synaptogenesis. In the hippocampus, the neurosteroid estrogen affects reelin expression. Our data provide evidence of a local increase of aromatase expression by reelin. Regarding reproduction, this crosstalk may contribute to follicular stability and counteract luteinization in ovaries. A total of 3, proteins were identified in samples spanning developmental days Bioinformatics clustering and Ingenuity Pathway Analysis identified DNA mismatch repair and base excision repair as major pathways upregulated during this time. Additionally, MAEL and TEX11, two key meiosis-related proteins, were identified as highly expressed during the developmental window associated with fetal oogenesis. However, in the last decade a direct role for androgens, acting via the androgen receptor AR , in female reproductive function has been confirmed. Deciphering the specific roles of androgens in ovarian function has been hindered as complete androgen resistant females cannot be generated by natural breeding. In addition, androgens can be converted into estrogens which has caused confusion when interpreting findings from pharmacological studies, as observed effects could have been mediated via the AR or estrogen receptor. The creation and analysis of genetic mouse models with global and cell-specific disruption of the Ar gene, the sole mediator of pure androgenic action, has now allowed the elucidation of a role for AR-mediated androgen actions in the regulation of normal and pathological ovarian function. Therefore the list of references do not reflect any editorial selection of material based on content or relevance. References appear in this list based upon the date of the actual page viewing. References listed on the rest of the content page and the associated discussion page listed under the publication year sub-headings do include some editorial selection based upon both relevance and availability. Int J Mol Sci: To date, 15 live births after retransplantation have been reported worldwide. We report the first pregnancy and the first live birth after retransplantation in Germany. This was the first live birth after retransplantation of cryopreserved ovarian tissue in Germany and also the first case with histological confirmation that the oocyte from which the patient conceived could only have come from the retransplanted tissue. Nevertheless due to the advancement of genetics, mouse ES cells and the development of genetic models, studies of ovarian differentiation was boosted. This review emphasizes some of new progresses in the research field of the mammalian ovary differentiation that have occurred in recent years with focuses of the period around prophase I of meiosis and of recent roles of small non-RNAs in the ovarian gene expression. Although anatomical changes in the ovary are less marked, a distinct sub-set of ovary specific genes are also expressed during this time.

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Chapter 3 : Comparative Morphology of the Mammalian Ovary - Europe PMC Article - Europe PMC

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Rickets in a zoo-kept woolly monkey. Adult ovary of woolly monkey with large amount of luteinized tissue and small amount of "interstitial gland". Higher magnification of ovary showing the fusion of granulosa with interstitial gland. Ryder at oryder ucsd. Many more placental observations are needed, as are measurements of cord length. Acknowledgement The animal photographs in this chapter come from the Zoological Society of San Diego. Some material has been made available by Dr. Heldstab, then at Zoo Basel. Outbreak of toxoplasmosis in Lagothrix lagotricha. Fibrillary glomerulonephritis and pulmonary haemorrhage in a Woolly monkey Lagothrix lagotricha. The use of high resolution banding in comparative cytogenetics: Spontaneous hypertension and its sequelae in woolly monkeys Lagothrix lagotricha. Mammals - Their Latin Names Explained. Blandford Press, Poole, Dorset, A Check-list with Bibliography. Pathology of Zoo Animals. Smithsonian Institution Press, Washington, D. And Atlas of Mammalian Chromosomes. Cytogenetics of Brazilian monkeys. Isolation of a hepadnavirus from the woolly monkey, a New World primate. Comparative Morphology of the Mammalian Ovary. University of Wisconsin Press, Madison, Wisconsin, The Johns Hopkins Press, Baltimore, The current status of the New World monkey phylogeny. Oxford University Press, Reciprocal chromosome painting between a New World primate, the woolly monkey, and humans. The primate umbilical cord with special reference to the transverse communicating artery.

Chapter 4 : Staff View: Atlas of the mammalian ovary

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Chapter 7 : Comparative Placentation > Index

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