D-6. Modulation of sperm function during sperm transport in the female(Abstracts of the International Symposium on Recent Advances in Animal Science(IS-RAAS),Joint meeting of 2^<nd> IS-AS and 3^<rd> IS-IFS)

D-5. Ultrastructural morphology of the oocyte from its stem origin to fertilization

Stefania A. Nottola
Department of Human Anatomy, Laboratory for Electron Microscopy "Pietro Motta", University La Sapienza, Rome, Italy

The morphodynamics of the female gamete during oogenesis, folliculogenesis, ovulation and fertilization will be traced through an integrated analysis by light, transmission and scanning electron microscopy. Particular emphasis will be given to some reproductive events occurring in the ovary, including: germ-somatic cell relationships and onset of folliculogenesis during formation and early development of the female gonad; follicular growth and oocyte-follicle cell associations through adult folliculogenesis, finally leading to ovulation; regressive processes which may halt the growth of the ovarian follicle at any stage. Further, the peculiar ultrastructural markers of viability and fertilizability of the mature oocyte when it leaves the ovarian milieu will be summarized. The main features of the early developing embryo during its first crucial cleavages up to the blastocyst stage will be also described. In this vein, the ultrastructure of the human egg vestments, i.e. the zona pellucida and the cumulus oophorus will be outlined, underlining their role in the sperm-egg interactions as well as in the human embryo development. The results reported arise from some experiments on mammals and have been also obtained on a large selection of human specimens (ovarian fragments/biopsies or samples belonging to in vitro fertilization).

D-6. Modulation of sperm function during sperm transport in the female

Heriberto Rodríguez-Martínez
Division of Comparative Reproduction, Obstetrics and Udder Health, Department of Clinical Sciences, Faculty of Veterinary Medicine & Animal Science, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden

In the female, a functional tubal sperm reservoir (TSR) is established before ovulation to ensure availability of suitable numbers of viable spermatozoa for fertilization. Although identification of subpopulations reaching this TSR has been attempted it is still unclear whether the recruitment is programmed or fortituous. Those spermatozoa remaining intra-utero are ultimately destroyed by phagocytosis of invading leukocytes. While the type of ejaculate differs among species, seminal plasma proteins and/or the spermatozoa appear to act as leukocyte chemoattractants. SR-spermatozoa not only escape phagocytosis/rejection by the female immune system but sustain viability and potential fertilizing capacity. Spermatozoa are continuously redistributed towards the upper isthmus in relation to ovulation. In vitro, only uncapacitated spermatozoa bind to epithelial explants, suggesting the SR-milieu modulates sperm capacitation. In vivo, most viable spermatozoa during pre-ovulatory spontaneous oestrus are uncapacitated, capacitation significantly increasing after ovulation. Capacitation is effected by different components of the oviductal fluid, bicarbonate being the common denominator for the initial membrane destabilization. Such effects can be blocked or even reversed by co-incubation with isthmic fluid or specific GAGs such as hyaluronan. Although the pattern of response to in vitro induction of sperm capacitation is similar for all spermatozoa, the capacity of response and its speed is individual. Such diverse response would not only confirm capacitation does not occur massively in the SR but clearly insure full sperm viability before ovulation and the presence of spermatozoa at different stages of capacitation in the upper oviduct, thus maximizing the chances of normal fertilization.