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MAMMAL-LIKE ADAPTATIONS IN THE DEVELOPMENT OF A PLACENTAL SHARK.

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Evolution of selachian placental viviparity peaks in the spadenose shark, *Scoliodon laticaudus*. Its eggs are small (1mm), nearly yolk-free, and have a mean dry weight of 0.065 mg. Term embryos (130-150mm) have a dry weight of 600-900 mg. Gestational weight increase is 1,000,000%. Others (Choodamani, 42; Setna & Sarangdhar, 49; Teshima et al. 78; Devados, 79) have shown: 1. cleavage and gastrulation are modified; 2. implantation is early (at 3mm or less); 3. gestation is short (5-6 months); 4. the unique maternal placenta, the "trophonematous cup" may be hemochorial; 5. transplacental nutrient transfer may be hemotrophic; 6. the umbilical stalk lacks a yolk duct and is covered with appendiculae, long finger-like processes, that may absorb maternal nutrients. Marked reduction in egg size, early implantation, a shift to a hemochorial placenta, and extreme matrotrophy parallel similar evolutionary innovations in the developmental program of placental mammals.

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RELEASE OF MOTILE SPERMATOPHORES FROM THE FRESHWATER MUSSEL *ANODONTA GRANDIS*.

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Mature sperm are released from *A. grandis* as multiple 40-50 um spherical spermatophore complexes (SS) containing up to 2800 sperm when fully populated. The 1.5 x 4.0 um cylindrical sperm head is anchored in the SS periphery with the 35 um long flagella projecting perpendicular to the surface. Rotational and progressive motility is achieved by an asynchronous but sequential flagellar beat. The amorphous 80 nm lamina of the SS encircles a hollow fluid filled globe. Individual laminar folds encompass each sperm head and attach to a flagellar collar posterior to the 5 mitochondria at the sperm nucleus base. A proximal centriole located in a fossa in the nucleus base is connected to a distal centriole by a dense amorphous matrix. The distal centriole is locked to the flagellar collar via 9 striated, bifurcated pericentriolar processes. The sperm anterior contains an acrosomal-like region containing membrane bound vesicles. The spermatophore complexes may survive 24 hours and serve as sperm transports to the female mussel gill chamber where fertilization occurs.

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EFFECTS OF *in vitro* CAPACITATION ON A PROTEINASE INHIBITOR-ZONA PELLUCIDA BINDING SITE ON MURINE SPERM. H. Boettger*, R. Richardson*, D. Free*, T. Buckingham* and G.R. Poirier. Univ. of Birmingham at Birmingham

Recent observations suggest the presence of a site on the plasma membrane over the apical portion of the acrosome of murine spermatozoa which recognizes both the zona pellucida and a proteinase inhibitor of seminal vesicle origin. This presentation explores the binding characteristics of the site during *in vitro* incubation. Eighty percent of cauda epididymal sperm showed positive fluorescence, using a monoclonal antibody to the site, after 2 hours of incubation in a capacitating medium. A similar percentage of sperm bound seminal inhibitor after the two-hour incubation. Sperm, once capacitated, are able to bind to the zona. However, the percentage of sperm able to bind zonae after capacitation could not be determined. Furthermore, sperm which show evidence of the acceptor, bind the inhibitor and bind to zonae have intact acrosomes as demonstrated by the Fc binding method. These observations indicate that the site remains both structurally and functionally intact during the time necessary to induce capacitation.

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THE INDUCEMENT OF ANNULATE LAMELLAE FORMATION VIA CADMIUM CHLORIDE TREATMENT IN THE *NECTURUS MACULOSUS* OOCYTE.

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Annulate lamellae are found in a variety of cell types. In *Necturus* oocytes these porous cytomembranes are derived from the nuclear envelope, accumulate out in the cytoplasm and form whorls which are visible with the light microscope. Annulate lamellae are presumed to function in the mobilization of mRNA. By utilizing various mRNA inhibitors, we were able to further test this hypothesis. Cadmium chloride was selected due to its ability to suppress the synthesis of poly (A). When the cells were incubated with cadmium chloride (200 ug/ml) the degree of annulate lamellae formation dramatically increased thus indicating a probable relationship between poly (A)⁺ RNA and annulate lamellae. Upon *in situ* hybridization with [³H] poly (U), label was seen primarily associated with the periphery of these whorls which suggests the presence of mRNA. This study was supported in part by a research grant from Ball State Univ. and NIH grant #1R15GM36014-01.

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