



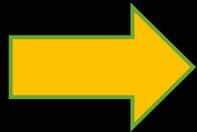
Biotechnology of Reproduction

UNIVERSITY of
TERAMO

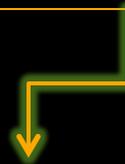
BIOLOGY OF GAMETES

OOCYTE
CYTOPLASMIC
MATURATION

THE OOCYTE MATURATION



◆ *What happens in the oocyte during the process of maturation?*



MEIOSIS/NUCLEAR MATURATION



CYTOPLASMIC MATURATION

The process of oocyte maturation is composed of different aspects



Oocyte developmental competence

Cytoplasmic maturation

- **Cortical granules (CGs)**

In IVM oocytes the CGs number and distribution can deviate from the physiological one

OOCYTE PENETRABILITY AND CORTICAL GRANULE DISTRIBUTION

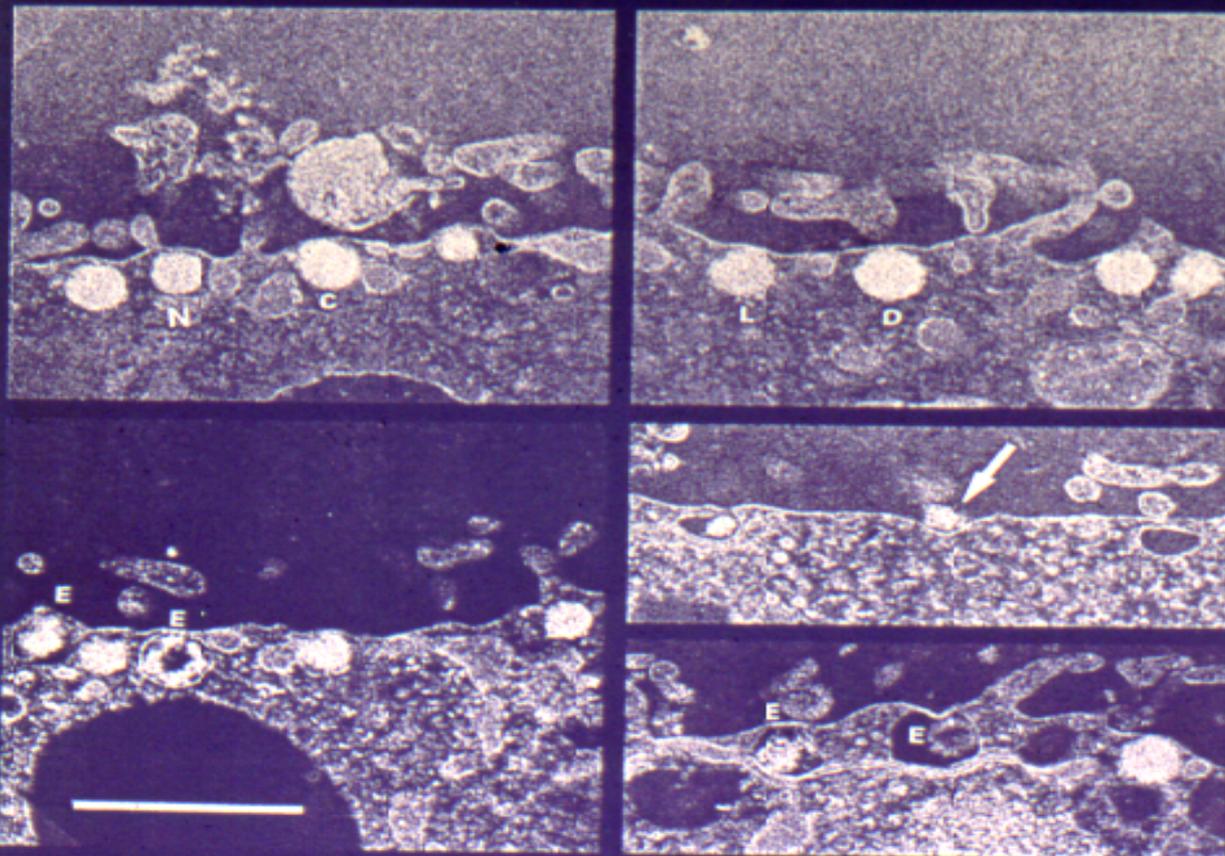


Fig. 1. In vitro-matured pig oocytes. "Near" (N), "in contact" (C), "light" (L), and "dark" (D) cortical granules. Note different morphological features of "empty" (E) cortical granules and a cortical granule after exocytosis (arrow). $\times 28,000$. Bar = 1 μm .

Cultural conditions influence the quality of IVM oocytes

GALEATI et al., 1991

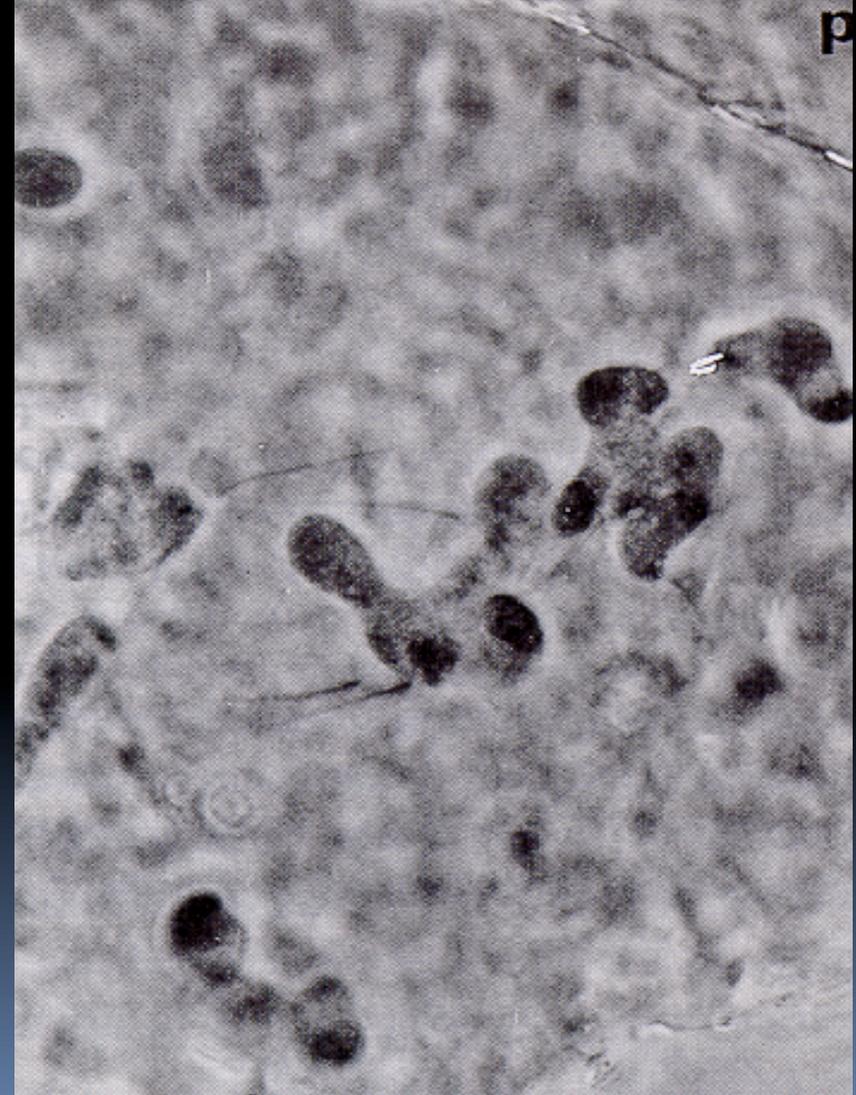
In denuded oocytes (matured without CCs), a spontaneous exocytosis of CGs can be frequently observed

Abnormal distribution of CGs

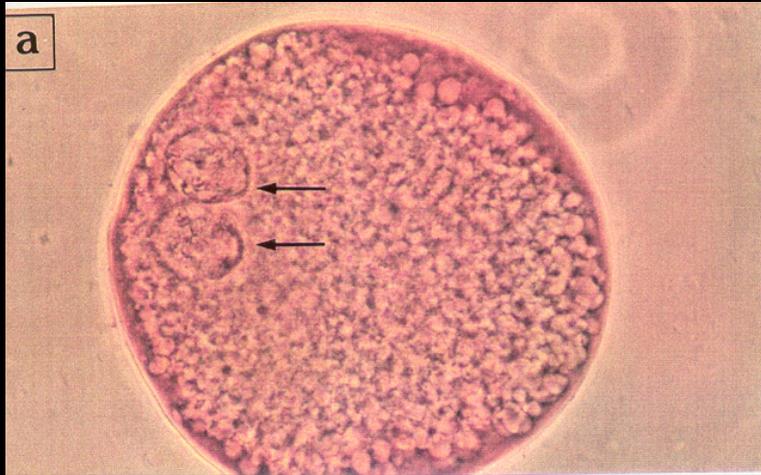


IVF → POLYSPERMY

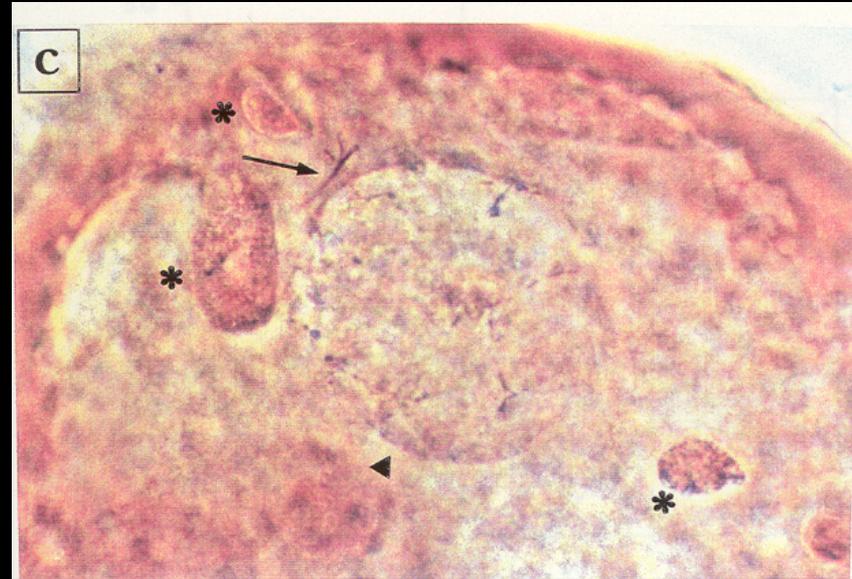
- A **high incidence of polyspermy** is a major problem during pig IVF



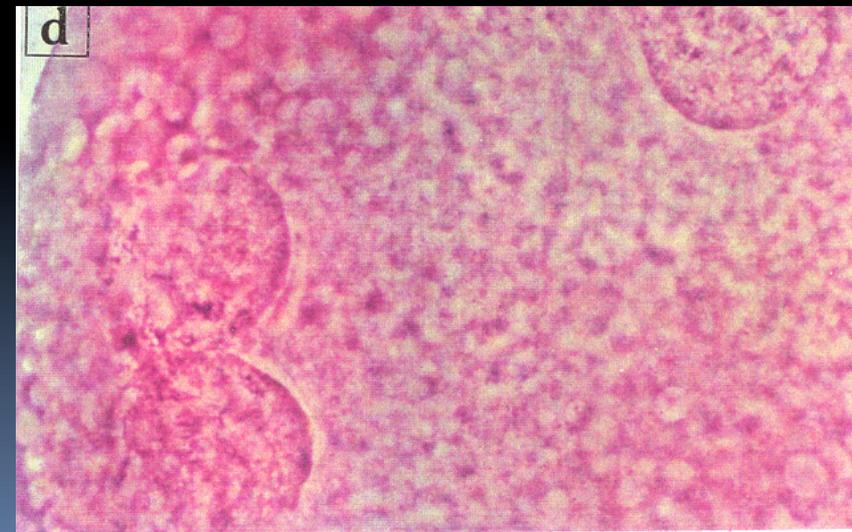
IVF pig oocytes



Correct fertilization



Polyspermic fertilization



Cytoplasmic maturation

- Intracellular GSH level

Intracellular GSH level

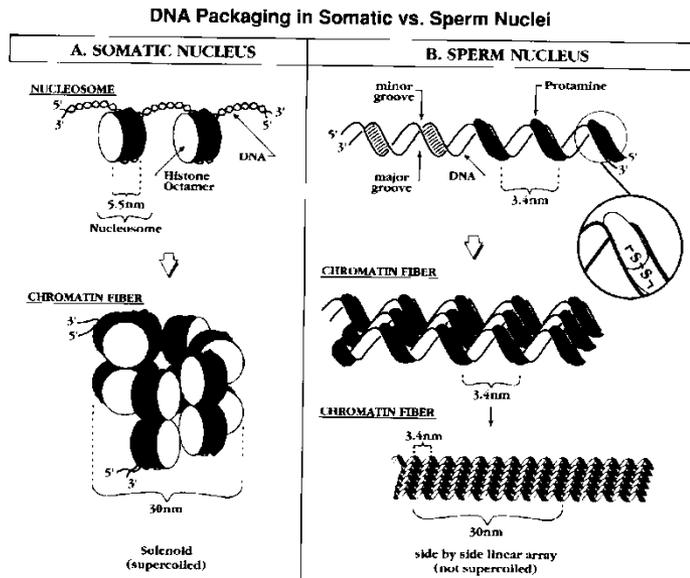
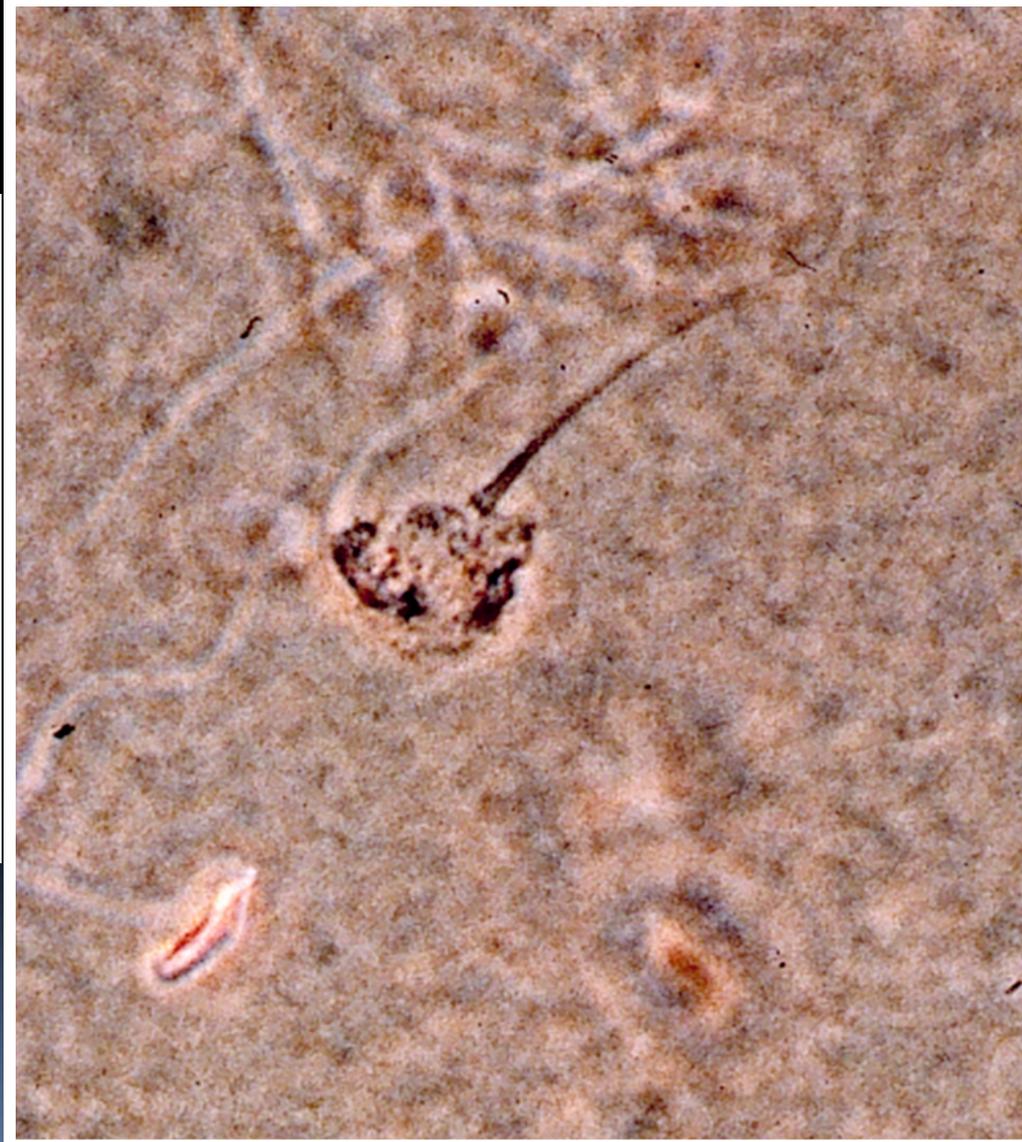


FIG. 81. Diagrams of DNA packaging in somatic (A) and sperm nuclei (B). For explanation, see the text. (From ref. 1636.)



At fertilization, adequate **GSH** stores in the ooplasm are necessary to properly decondense the male nucleus