

High Doses of MPA as the Cause of Disappearance of Adherence of the Zona Pellucida to an Oocyte

B. Jodłowska – Jedrych, W. Matysiak

Department of Histology and Embryology, Medical University of Lublin,
11 Street Radziwiłłowska, 20-080 Lublin, Poland

b.jedrych@gmail.com

Keywords: zona pellucida, oocyte, medroxyprogesterone

The zona pellucida (ZP) is an external glycoprotein membrane of oocytes of mammals and embryos in early stages of development [1, 2]. For the first time it appears in growing ovarian follicles as extracellular substance between the oocyte and granule cells [3]. ZP constitutes the closest, natural surroundings of the oocyte, and has a crucial effect on the development and maturing of the oocyte. The complex morphology: the zona pellucida – oocyte allows to determine the maturity of an oocyte with a great probability. A considerable number of published experimental procedures confirm important role played by the zona pellucida during preimplantation embryonic development of the man and other mammals [4, 5]. The zona pellucida as a dynamic structure, is responsible for providing nutritional elements in an early form of the fetal ovum in mammals [6].

The aim of the study was the ultrastructural evaluation of the zona pellucid contact with the oocyte in the conditions of inhibited ovulation. Females of the white rat of Wistar strain were administered a suspension of medroxyprogesterone acetate (MPA) in single intramuscular injections. There were used increasing doses of MPA beginning with the therapeutic dose, i.e. 3,7 mg, then 7,4 mg and 11,1 mg. The rats were decapitated 5 days after the administration of the preparation. The sample material were the sections of the ovaries, which were evaluated in a transmission electron microscope Zeiss EM 900.

In the females which received MPA in the therapeutic dose the zona pellucid existed in a form of granular-fibrous reticulum of an average electron density. Within the reticulum there were observed cytoplasmic processes from the surrounding structures. The oocyte cell membrane generated single, delicate processes directed towards the zona pellucida (Fig.1). The oocyte microvilli were short and thin. A similar image was observed in the group of females receiving the second of the applied doses. The zona pellucida had the structure of a delicate, loose granular-fibrous reticulum, and the oocyte cell membrane generated single microvilli in the direction of the zona pellucida. In the discussed groups of females there was observed a thight contact of the oocyte with the zona pellucida. However, in the group of females receiving MPA in the highest of the administered doses there were observed thicker and more numerous oocyte microvilli which did not enter ZP matrix. They were dense, irregularly separated and constituted a kind of a barrier between the zona pellucida and the oocyte (Fig.2). Such an image appeared in most of the observed ovarian follicles in this studied group. Further text goes here.

The conducted analysis of the sample material may suggest that medroxyprogesterone acetate has an inhibiting effect on the synthesis of connecting proteins, and at the same time, on the loss of the oocyte contact with the zona pellucida.

1. B.S. Dunbar et all., *Biol. Reprod.* **65** (2001), p951.
2. F. Sinowatz et all., *Cell Tissues Organs* **1** (2001) p24
3. T. Rankin et all., *Mol. Cell. Endocrinol.* **163** (2000) p21
4. F. Parillo et all., *J. Mol. Hist.* **36** (2005) p131
5. P.M. Wassarman et all., *Cytogenet. Genome. Res.* **105** (2004) p228
6. P.M. Wassarman et all., *Nat. Cell. Biol.* **3** (2001) p59

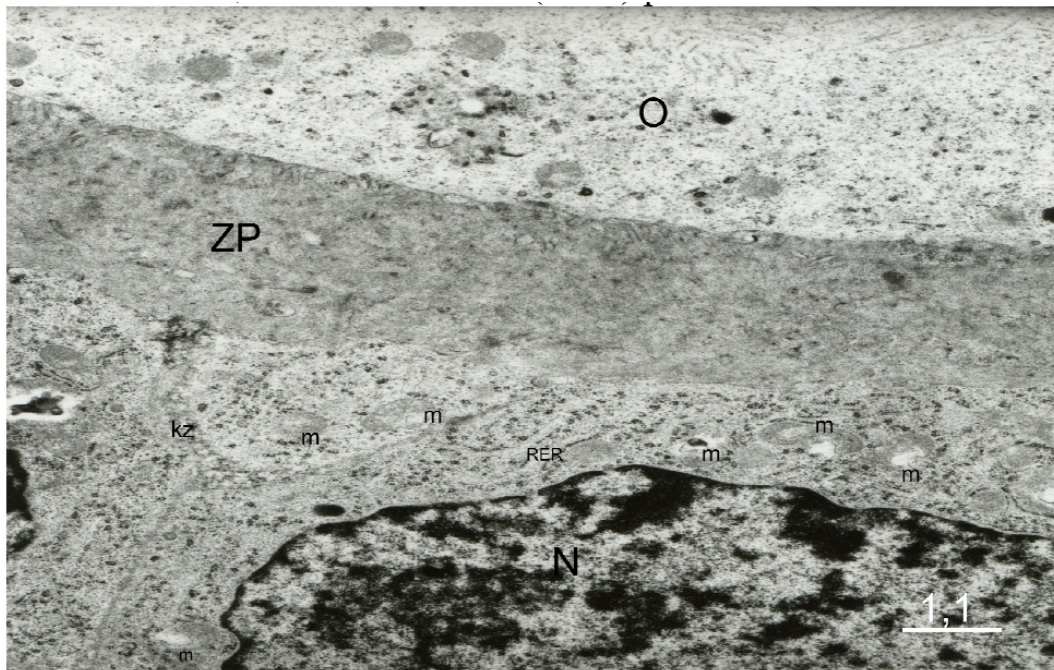


Figure 1. Zona pellucida (ZP), and oocyte (O), and corona radiata. MPA – therapeutic dose, i.e. 3,7 mg. Scale bar = μm .

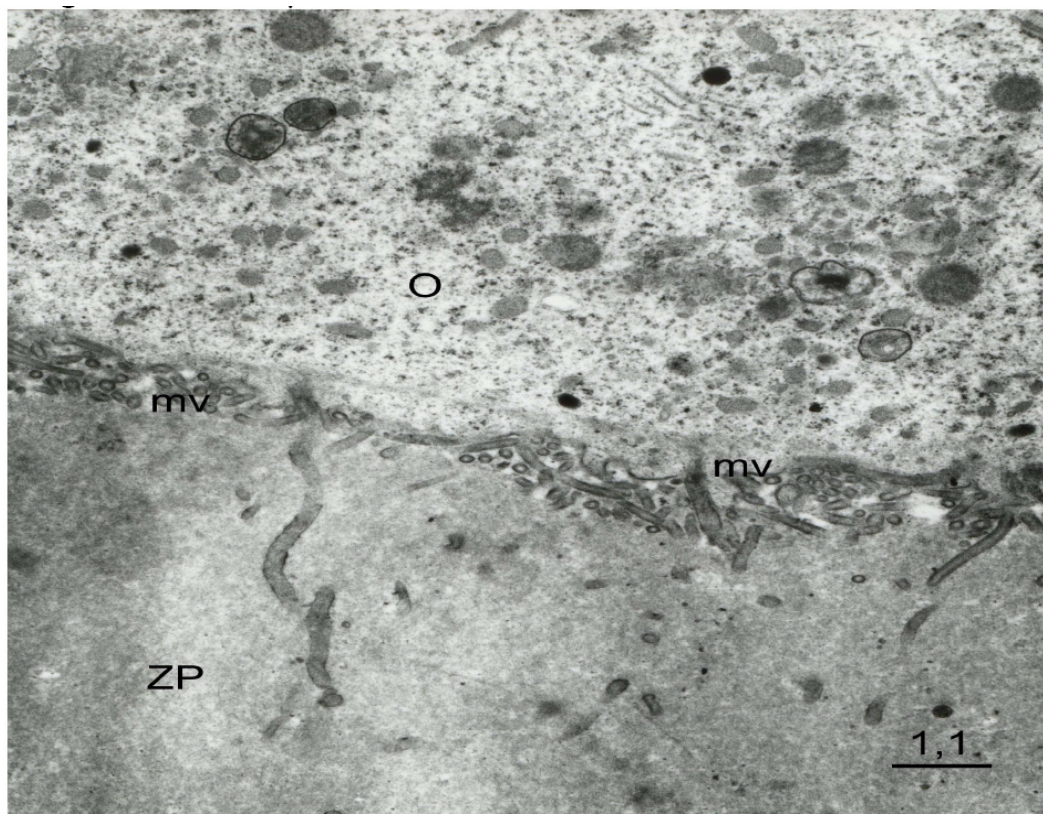


Figure 2. Zona pellucida (ZP), and oocyte microvilli (mv). MPA - 11,1 mg. Scale bar = μm