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RESEARCHES REGARDING THE INFLUENCE OF THE NUMBER OF CUMULAR CELLS LAYER OVER THE OOCYTE MATURATION EFFICIENCY

CERCETĂRI PRIVIND INFLUENŢA NUMĂRULUI DE STRATURI DE CELULE CUMULARE ASUPRA EFICIENŢEI MATURĂRII OVOCITELOR

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During the experiments we have carried out with imature oocyte collected from the ovarian follicles, we found a variety of oocyte-cumulus complexes. We got the following experiment in order to understand the role of cumular cells on the achievement of the cytoplasma and oocyte nucleus maturation. We select the oocyte-cumulus complexes collected both from cows and sows according to the number of cumular cell layers and we watched their development to the blastocyst stade. Thus, we achieved three groups of COC (oocyte-cumulus complexes).
One group was made of oocyte without cumular cells, the second group had a layer of cumular cells and the third group had many layers of cumular cells. we performed an incubation of all these types of COC in TCM-199 enriched with 20% of bovine fetal serum. Because only 1,2 oocyte of the ones who lack the cumular cells layer had maturation signs during cultivation in the thermostat versus 55 and 115, respectively, of the ones that had many cellular layers, presents a solid evidence that cumular cells are indispensable for the maturation and even to the fecundation process. The cumular cells perform a decisive role on the cytoplasma and oocyte nucleus maturation process.
Keywords*: oocyte-cumulus complexes (COC), bovine, swine, IVM*

Introduction

Mammalians oocyte maturation begins only in puberty when the first wave of adenohypophizary gonadotropin hormones FSH and LH take place. Only at this stage of an individual development, the gametogenesis started on the ovary during the foetal stage but locked in the diploten stage of the meiotic prophases continues.

It seems that the blocking that takes place during the embryogenesis of the germinal cell meiosis it is accomplished by the penetration of the oocite of adenosine monophosphate cyclic (AMP-c) produced by the granulose cells. The continuation of meiosis at puberty takes place by reducing the quantity of AMP-c within oocite in the same time with the first wave of gonadotropin hormones (FSH and LH). The continuation of meiosis started at the foetal stage takes place through the prophases and of the following stages of the cellular division continuance that

end up by producing a secondary oocite and releasing of the first polar globe. This process starts by breaking the germinal vesicle and continues with deep transformation of the oocite nucleus and cytoplasm.

Materials and Methods

The ovary we used for COC collection was sampled in the slaughterhouse from bovine and swine.

We punctured each ovarian follicle with a syringe needle (18G diameter) attached to a 10 ml syringe to acquire oocite-cumulus complexes.

The oocite-cumulus complexes recovered from the smaller (< 2mm) and larger (> 6mm) follicles were divided into three categories. Oocite without cumular cells, oocite with a single layer of cumular cell and cumular cell with many layers.

The estimation of maturation was performed subjectively after cumular cell expansion.

Results and Discussion

Data acquired from the oocite-cumulus complexes collected from the cow and sow ovaries are exhibit in the table 1. It can be seen that the total number and the oocite percentage who show the fair signs of maturation as those oocite that became embryos and had their first cleavage.

Table 1

The influence of the cellular richness to the oocite maturation

Nr. crt.	Oocite group	Nr. COC	Bovine				Nr. COC	Swine			
			Oocite with maturation signs		Oocite who became embryos and had their first cleavage			Oocite with maturation signs		Oocite who became embryos and had their first cleavage	
			Nr.	%	Nr.	%		Nr.	%	Nr.	%
1.	Oocite without cumulus cells	21	1	4.76	-	-	73	2	2.73	-	-
2.	Oocite with a single layer of cumular cells	40	20	50	5	12.5	34	16	47.06	1	2.94
3.	Oocite with many layers of cumular cells	62	55	88.71	49	79.03	127	115	90.55	12	9.45

Data above prove the fact that the cumular cells perform a decisive role in the oocite cytoplasm and nucleus maturation process. The fact that only 1, 2 of oocite that lack the cumular cell layer presented signs of maturation during cultivation in thermostat versus almost 55 and 115 respectively, as it did the ones that have many cellular layers is a solid prove that the cumular cells are indispensable to the maturation and even to the fecundation process. This observation is strongly supported by the fact that oocite-cumulus complexes who had many cellular layers maturates on a high scale.

The fact that the same phenomenon is observed both to the oocite-cumulus complexes collected from cows and sows ovaries entitle us to say that cumular cells perform the same role in the female germinal cell economy indifferent of the specie.

In figure 1, we presented cow and sow oocites wich showed maturation signs.

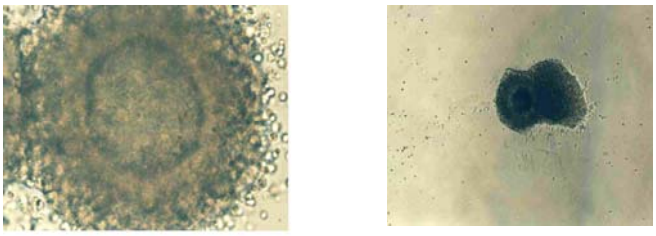

Figure 1. Maturated cow and sow oocites

Conclusions

As a result of our experiments carried out for *in vitro* maturation of cow and swine oocite, there are the following conclusions:

1 The cumular cells perform a decisive role in the oocite cytoplasm and nucleus maturation process;

2 The most oocite-cumulus complexes who reported maturation were to the oocite with many cumular cell layers both to the cows (88.71%) and sows (90.55), versus oocite with one cumular cell layers 50% and 47.06%, respectively.

References

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