

## عنوان مقاله:

Effects of sodium alginate capsules as 3D scaffolds on hormones and genes expression in preantral follicles of mice compared to 2D medium: An experimental study

## محل انتشار:

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## خلاصه مقاله:

Background: The improvement of in vitro maturation methods, which can activate the preantral follicle growth, plays a crucial role in the production of mature oocytes in reproductive technology. Objective: To evaluate the different concentrations of 3D scaffolds of sodium alginate on hormones and gene expression in mice preantral follicles. Materials and Methods: Immature female BALB/c mice (12-14 days) were sacrificed. The follicles were removed mechanically and transferred into  $\alpha$  minimal essential medium with 5% fetal bovine serum. The preantral follicles were incubated with different concentrations of sodium alginate (0.25%, 0.5%, and 1%) and 2D medium for 12 days. The follicles were examined for antral formation following the 10th day and the diameter on days 6th and 12th. The levels of hormones (AMH, androstenedione,  $17\beta$ -estradiol, and progesterone) and the expression of genes (CYP11a1, CYP17a1, CYP19a1, AMH, and GnRH) at the end of the 12th day. Results: Maximum follicle diameter and highest percentage of antrum formation were related to 0.5% concentration ( $p = 0.00$ ). The levels of hormones in different doses of sodium alginate were increased significantly compared to the control group ( $p = 0.00$ ). The highest and lowest levels of these hormones were related to 0.5% concentration and 2D medium, respectively. The highest level of genes expression was observed in 0.5% sodium alginate, which showed a significant increase compared to the control group ( $p = 0.00$ ). Conclusion: Proper concentration of alginate hydrogel increases follicle growth, causes follicle maturation, produces steroid hormones, and increases appropriate expression of steroidogenesis-related genes.

## کلمات کلیدی:

Follicle, Three-dimensional culture, Sodium alginate, فولیکول, کشت سه بعدی, سدیم آلژینات.

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