

APPLICATION OF TWO PHASES ALGINATE MATRIX FOR MOUSE PREANTRAL FOLLICLE IN VITRO DEVELOPMENT

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Abstract Body

Introduction: In vitro culture of ovarian follicles is an important procedure that needs more attention. Resembling of different parts of ovarian tissue stroma (denser cortex and looser medulla) could improve in vitro follicle culture condition.

Methods & Material: First, ovarian cells were extracted from 3-week-old mice ovaries. Then, preantral follicles were isolated from 13-day-old mice ovaries and divided into two groups: Control 1 and Encapsulation groups. In Encapsulation groups, preantral follicles were cultured in three subgroups as following:

1. 1% alginate
 2. Two phases alginate matrix: 0.5% alginate as medulla and 1% alginate as cortex
 3. Two phases alginate matrix as the same as subgroup 2 with presence of ovarian cells in both phase.
- In vitro follicle culture were performed for 12 days. At the end, antral follicles were isolated from 6-week-old mice as Control 2 group.

Finally, follicles survival, growth, antrum formation and also quantitative expression of maturation genes (*bmp15*, *fgf8*) were evaluated.

Result: Survival, antrum formation and growth rates were significantly higher in both two phases alginate matrix groups (with or without ovarian cells). Decreasing expression pattern of both genes were observed during culture period ($p < 0.05$). At 12th day of culture, *bmp15* expression were significantly lower in all Encapsulation groups compared to Control 2 but *fgf8* expression were similar in all groups.

Conclusion: According to higher survivability and better development in both two phases alginate matrix groups and also proximity of gene expression to in vivo condition, two phases alginate matrix without considering of ovarian cells presence or absence could be applied as a good alternative to homogenous scaffold for follicle in vitro culture.

Abstract image



In vitro cultured follicle in 12th day of culture.

- (A) Encapsulation in Alginate 1%
(B) Encapsulation in 2 Phases Alginate
(C) Encapsulation in 2 phases Alginate with ovarian cells