

THE EFFECT OF EXTERNAL PRESSURE ON PRIMORDIAL FOLLICLE ACTIVATION IN THE MOUSE OVARY

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Abstract Body

Introduction

The longevity of ovarian tissue graft depends on the prolonged maintenance of primordial follicles in the dormant state. However, massive activation of primordial follicles following auto-transplantation leads to depletion of the graft and low success rates. It has been shown that activated primordial follicles in mouse ovaries can revert to a dormant state when exposed to external pressure. It remains to be studied whether dormancy is maintained after the removal of excess pressure.

Aim

To investigate whether high-pressure culture has a lasting suppressive effect on primordial follicle activation during the timespan required for re-vascularisation of transplanted ovarian tissue.

Study design

We cultured postpartum day 7 mouse ovaries in a high-pressure system. Fifteen ovary pairs were equally divided among 3 timing groups. One ovary from each pair was cultured under 1.3 bar, while the other was cultured under 1.0 bar (atmospheric pressure) for 16, 32, or 48 hours, followed by subsequent culture of all ovaries for 7 days under 1.0 bar. Finally, the ovaries were fixed, immunostained for p63 and DDX4, and imaged *in toto* to quantify follicle stage distribution.

Main results

On average, 600 and 595 viable follicles were present per ovary in the 1.0 bar and 1.3 bar pressure groups, respectively. Follicle stage distribution was not significantly different between groups. Extended 48 hours of exposure to 1.3 bar pressure was associated with a higher proportion of resting primordial follicles compared to 1.0 bar (40.8% versus 34.5%, $P < 0.05$, t-test).

Conclusion

High external pressure over 48 hours has a lasting suppressive effect on primordial follicle activation so that follicles are retained in, or reverted to, dormant stage without affecting follicle viability.