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**Study question:** Does the presence of cumulus cells affect the *in vitro* maturation (IVM) rate of human oocytes at the germinal vesicle (GV) stage obtained *in vivo*?

**Summary answer:** The oocyte maturation and fertilization rates are higher in the presence of cumulus cells (CC) comparing with their absence in the culture system.

**What is known already:** According to the ESHRE guidelines IVM is currently not considered experimental, but nevertheless it is not very often used in reproductive medicine clinics. Accumulated data of more than 30 years of existence of IVM method can present to us how effective is the level of oocytes maturation *in vitro* obtained by aspiration follicles *in vivo*. Some studies reported that oocytes were matured after denudation, and in others they are cultured in cumulus oocyte complexes or in the presence of CC. Therefore, a comparison of oocyte maturation at the GV stage with and without CC was performed in this study.

**Study design, size, duration:** We searched Medline and Embase up to January 10, 2023. Full texts of classical articles, clinical studies, clinical trials, clinical trial protocols, comparative studies, controlled clinical trials, multi-centre studies, randomized controlled trials were included

**Participants/materials, setting, methods:** Participants were women undergoing infertility treatment with IVM. All oocytes from the included studies were obtained by follicular aspiration *in vivo*.

**Main results and the role of chance:** A preliminary screening of the word combination "human oocyte *in vitro* maturation" yielded 355 results, from which 42 were original publications with full-text. Selected papers included a full description of the stimulation protocol, maturation medium, and the group of immature oocytes consisted of gametes only at the GV stage. A total of 24,649 GV oocytes were examined for IVM rate. The average of oocyte maturity was  $61.5 \pm 10.7\%$ . However, the distribution of oocyte maturation data depending on the presence or absents of CC in the culture media. The maturation rate was higher in oocytes with cumulus cells than in denuded oocytes without cumulus (64.7% vs 53.5%, respectively,  $p < 0.05$ ). The fertilization rate had the same tendency (69.2% vs. 59.5%,  $p < 0.05$ ). However, there was no significant difference between the groups in embryo development up to the cleavage stage (74.9% vs 76.5%,  $p > 0.05$ ). Unfortunately, there are very only a few studies that provide data on the more advanced stages of embryo development as a blastocyst, which does not allow a large sample to be made for any IVM method.

**Limitations, reasons for caution:** This study does not take into account the influence of stimulation protocols and the composition of the maturation medium, which may in turn also affect the results of oocyte IVM.

**Wider implications of the findings:** The obtained data can be used for comparison with new maturation protocols that will be aimed at increasing the maturation rates, in addition, these data are important for comparing the efficacy of maturation obtained from ovaries outside the body for the purpose of preserving fertility.

**Trial registration number:** not applicable

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**P-118 Are cumulus cells required during *in vitro* maturation of human oocytes at the germinal vesicle stage? a systematic review**

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