INPLASY PROTOCOL

To cite: Labrune et al. An update on in vitro folliculogenesis: a new technique for post-cancer fertility. Inplasy protocol 202280111. doi: 10.37766/inplasy2022.8.0111

Received: 31 August 2022

Published: 31 August 2022

Corresponding author:
Elsa Labrune

elsa.labrune@chu-lyon.fr

Author Affiliation:
Université Claude Bernard, Faculté de Médecine Laennec.

Support: **No support.**

Review Stage at time of this submission: **Completed but not published.**

Conflicts of interest:
None declared.

An update on in vitro folliculogenesis: a new technique for post-cancer fertility

Labrune, E[1]; Salle, B[2]; Lornage, J[3].

Review question / Objective: **The present review intends to summarize the progress of in vitro folliculogenesis in humans. It focuses on the culture media and then, according to the culture stage, on the different culture systems developed with comments on the results obtained.**
Condition being studied: **This review focuses on the progress of in vitro folliculogenesis in humans.**
Eligibility criteria: **Inclusion criteria : all original English-language articles on in vitro folliculogenesis from ovarian tissue in humans; exclusion criteria: non-English papers, works on animals, in vitro maturation and in vivo maturation works carried out within the context of in vitro fertilization protocols, studies on in vitro folliculogenesis that checked slow freezing and/or vitrification of ovarian tissue, studies on frozen or vitrified tissues (these do not have the same objective), studies on short culture times, and studies that lacked major results.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 31 August 2022 and was last updated on 31 August 2022 (registration number INPLASY202280111).

INTRODUCTION

Review question / Objective: **The present review intends to summarize the progress of in vitro folliculogenesis in humans. It focuses on the culture media and then, according to the culture stage, on the different culture systems developed with comments on the results obtained.**

Rationale: **Obtaining in vitro mature oocytes from ovarian tissue is a challenge to understand oogenesis and folliculogenesis phenomena as well as to preserve female fertility. For the latter purpose, cryopreservation of ovarian tissue remains the only technique likely to be proposed to prepubertal girls and women**

whose potentially gonadotoxic treatment (chemotherapy, radiotherapy) is urgent or to those who are not compatible with ovarian hyperstimulation. The use of cryopreserved ovarian tissue requires transplantation when the woman wishes to become pregnant [1]. Since the live birth reported in 2004 by Donnez et al., the results have been satisfactory; the success rate regarding recovery of endocrine activity amounts to more than 90% and that regarding live births to more than 30%. However, autografts were not recommended when there was a risk of reintroduction of malignant cells, as in acute leukemia or borderline ovarian tumors. An interesting alternative to ovarian tissue transplantation can be in vitro folliculogenesis. In case of parental project, the ovarian tissue can be thawed, then cultured for in vitro folliculogenesis that enables production of mature oocytes destined for in vitro fertilization.

Condition being studied: This review focuses on the progress of in vitro folliculogenesis in humans.

METHODS

Search strategy: PubMed and Embase databases were searched for articles of interest published up to March 2022.

Participant or population: Ovarian tissue from female patients who have been used to perform in vitro folliculogenesis.

Intervention: Not applicable.

Comparator: Not applicable.

Study designs to be included: This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) guidelines.

Eligibility criteria: Inclusion criteria : all original English-language articles on in vitro folliculogenesis from ovarian tissue in humans; exclusion criteria: non-English papers, works on animals, in vitro maturation and in vivo maturation works carried out within the context of in vitro fertilization protocols, studies on in vitro folliculogenesis that checked slow freezing and/or vitrification of ovarian tissue, studies on frozen or vitrified tissues (these do not have the same objective), studies on short culture times, and studies that lacked major results.

Information sources: PubMed and Embase databases.

Main outcome(s): The first phase of in vitro folliculogenesis is carried out in the original ovarian tissue. The addition of one (or more) initiation activator(s) is not essential but allows better yields and the use of a 3D culture system at this stage provides no added value. The second stage requires a mechanical and/or enzymatic isolation of the secondary follicles. The use of an activator and/or a 3D culture system is then necessary. Conclusion: The current results are promising but there is still a long way to go. Obtaining live births in large animals is an essential step to validate this in vitro folliculogenesis technique.

Quality assessment / Risk of bias analysis: Descriptive review only, no statistical analysis performed.

Strategy of data synthesis: No statistical analysis, only descriptive.

Subgroup analysis: No subgroup.

Sensitivity analysis: Not applicable.

Language restriction: Only English language.

Country(ies) involved: France.

Keywords: oncology nursing; folliculogenesis; culture medium; oogenesis; assisted reproductive technology; fertility preservation.

Contributions of each author:

Author 1 - Elsa Labrune - Participation in design, execution and manuscript drafting and critical discussion.
Email: elsa.labrune@chu-lyon.fr

Author 2 - Bruno Salle - Participation in design and critical discussion.
Email: bruno.salle@chu-lyon.fr
Author 3 - Jacqueline Lornage - Participation in design and critical discussion.
Email: jacqueline.lornage@gmail.com