Generation of Organized Porcine Testicular Organoids in Solubilized Hydrogels from Decellularized Extracellular Matrix

Commonly used acronym: *Testicular organoids*

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Organisation

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SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research, Translational - Applied Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Pig
Type of cells/tissues/organs	Testes

DESCRIPTION

Method keywords

artificial testis
decellularization
extracellular matrix
immature testicular tissue
spermatogonial stem cells
testis
organoids
3D Cell culture

Scientific area keywords

fertility preservation
cancer
boys
fertility restoration

Method description

This method describes the generation of porcine testicular organoids using piglet testicular cells seeded in a testicular extracellular matrix (tECM) hydrogel. To generate the solublized tECM hydrogel, porcine immature testicular tissues (ITTs) were dissected in small fragments and decellularized in a 0.01% sodium dodecyl sulfate solution followed by agitation in a 1% Triton X-100 solution before being lyophilized and digested in a solution of HCl/pepsin. To generate the organoids, testicular cell suspensions were isolated from the porcine ITT and seeded into the hydrogel to form each organoid (500 000 cells per hydrogel). The generated organoids were then cultured *in vitro* and showed both an architecture and endocrine function that are similar to that found in the native organ *in vivo*.

Lab equipment

- Biosafety cabinet,
- Laminar flow hood,
- Culture incubator,
- Nanodrop,
- Rheometer,
- Mass spectrometer,
- Cryogenic freezer,
- Bain Marie.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

This an open acess method that describes in detail how to create an artificial porcine testis using testicular cell suspensions seeded in an 'inhouse' produced hydrogel formed from decellularized extracellular matrix.

Challenges

An optimal balance between cell removal and extracellular matrix preservation is the biggest challenge of the technique.

Modifications

The impact of tECM of different stiffnesses on the outcome of testicular organoids culture still needs to be evaluated.

Future & Other applications

This method can be potentially applied to testis tissue from other species to produce testis organoids.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

Associated documents

ijms-20-05476.pdf
ijms-19-00227.pdf