

Could comparison of oocyte gene expression enhance pre-clinical validation of vitrification protocols?

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PRE-CLINICAL VALIDATION:

- mRNA expression may indicate developmental competence
- measurement of mRNA expression not yet included as standard

OBJECTIVE: To compare methods of vitrification through assessment of their impact on oocyte mRNA levels of genes known to be essential for preimplantation development following fertilisation.

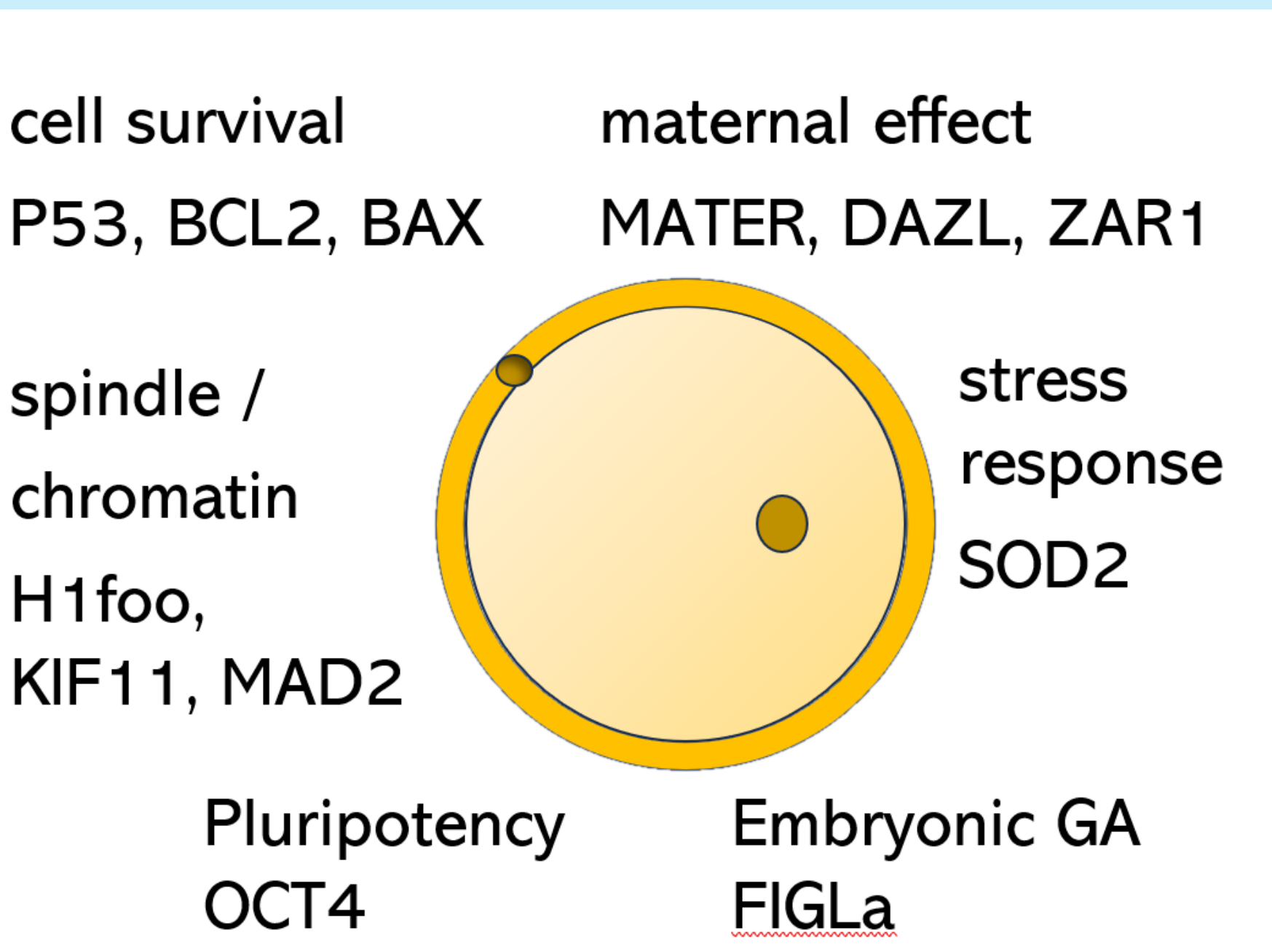
STUDY DESIGN: Three experiments used sibling oocyte experimental design.

1. vitrified and non-vitrified MII failed-to-fertilize oocytes
2. open (Cryoleaf) and closed (Rapid-i) vitrification systems
3. different media using the closed system.

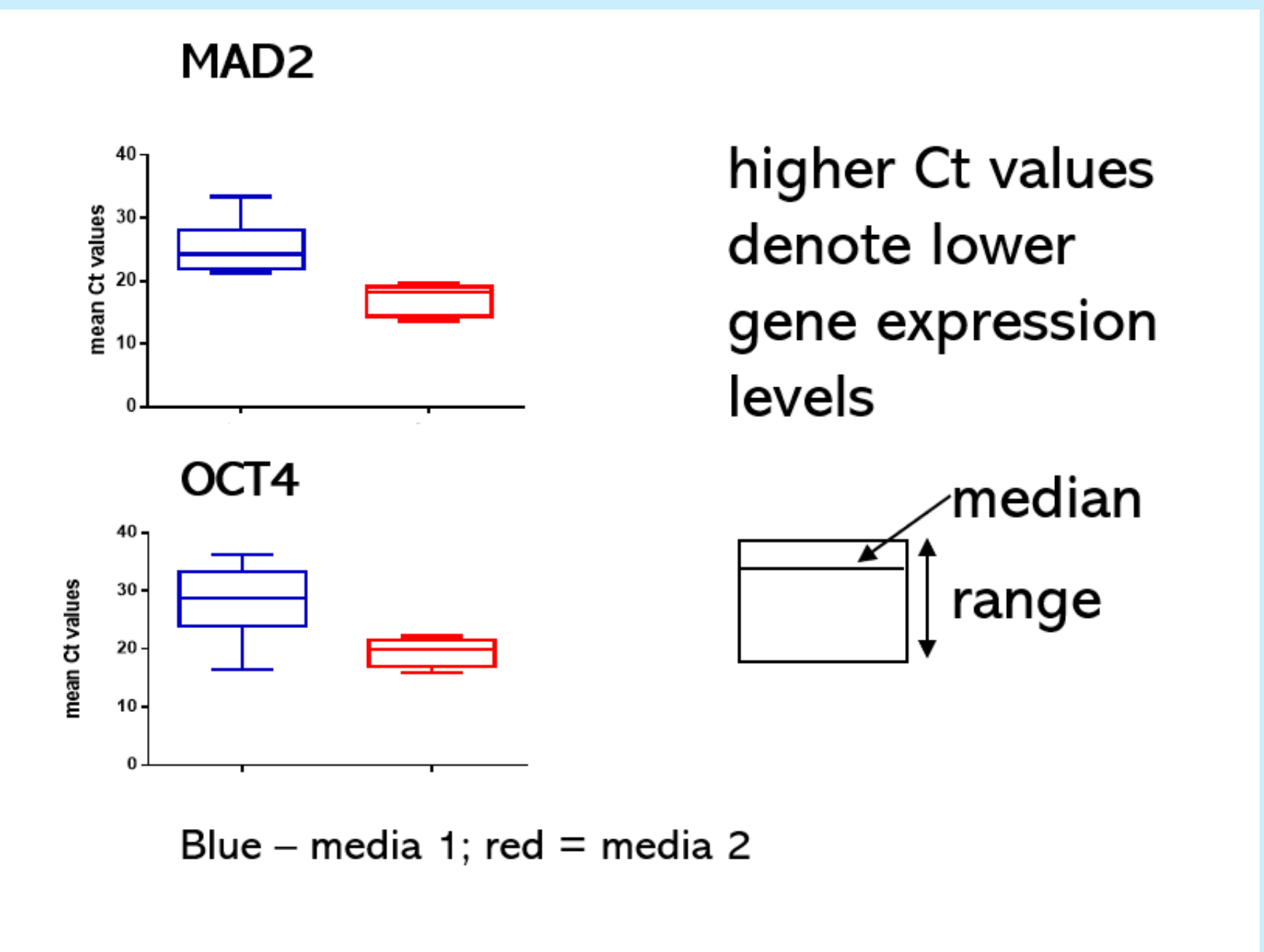
METHODS:

- PolyA PCR and QPCR
- Thermo cycler cut-off point as constant point of comparison
- Limited statistical analysis avoided distortion of results
- Graphical presentation of results to avoid distortion

Target genes



Example mRNA expression



RESULTS: Different protocols and media, same closed device

- media 2 higher mean expression of OCT4, FIGLα, ZAR1, MAD2, SOD2
- greater number of oocytes expressed mRNA of all target genes
- variability in gene expression noticeably less in media 2 oocytes

INTERPRETATION OF RESULTS:

- Evidence of developmental capacity - or its loss?
- Knowledge rapidly evolving e.g. mRNA, molecular level
- Technologies rapidly evolving e.g. transcriptomics, dehydration

POTENTIAL USES OF METHOD:

- pre-clinical validation of media and devices under development
- comparative assessments of existing optimised protocols

FURTHER INFORMATION ABOUT METHOD AND RESULTS:

<https://research.manchester.ac.uk/en/studentTheses/impact-of-oocyte-vitrification>

Summary mRNA expression with different media

Oocyte	BAX	BCL2	P53	DAZL	MATER	ZAR	H1FOO	KIF11	MAD2	FIGLα	OCT4	SOD2
1 M1												
1 M2												
2 M1												
2 M2												
3 M1												
3 M2												
4 M1												
4 M2												
5 M1												
5 M2												
6 M1												
6 M2												
7 M1												
7 M2												
8 M1												
8 M2												
9 M1												
9 M2												
10 M1												
10 M2												
Total M1	1/10	5/10	4/10	5/10	7/10	9/10	6/10	6/10	9/10	9/10	10/10	6/10
Total M2	10/10	10/10	9/10	10/10	10/10	9/10	10/10	9/10	9/10	10/10	10/10	10/10

M1= media 1, blue cells = detected genes; M2= media 2, red cells = detected genes; White cells = undetected genes