Alternative In Vitro Testing for Human Reproductive Health

Rita Cortvrindt

EggCentris
Proactive Female Reproduction Testing
Fertility ?

[Diagram showing female and male symbols with various biological processes indicated]
Fertility?
REPRODUCTION: MALE AND FEMALE ROLE?

**Male**
- production of sperm cells
  (1/2 of the genetic information)

**Female**
- production of the oocyte
  (1/2 of genetic information)
- site of fertilisation
- establishment and development of pregnancy
- delivery and nourishment of the child
In Vivo Fertility Testing

- Time consuming
- Cumbersome
- Costly
- Animal suffering

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FEMALE REPRODUCTIVE SYSTEM
Functions of the ovary

Steroidogenesis

Folliculogenesis

Oogenesis
THE OVARIAN FOLLICLE

Functional unit within the ovary

Time - follicle development (primary - secondary - tertiary)

growth and maturation

proliferation and differentiation

Oocyte

Endo-
crine

Para-
crine

Intra-
crine

Theca

Granulosa

Somatic compartment

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Follicle Isolation

- oocyte
- ZP
- granulosa cells
- Basal membrane
- theca cells
In vitro folliculogenesis
OVARY - Folliculogenesis

In Vivo

“chaotic”

In Vitro

synchronised
OVARY - OOGENESIS

In Vivo

OOCYTE (only few)
not available for direct evaluation

In Vitro

OOCYTES (in large numbers)
AVAILABLE for direct evaluation

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Ovary - Steroidogenesis

In Vivo

In the mouse system, collection of serum or follicle fluid on a timed basis for steroid measurements is almost impossible to achieve.

In Vitro

Spent medium* is throughout the culture readily available.
(from individual follicles)

Steroid concentration can easily determined by commercial available kits.

* Also measurement of secreted proteins possible
MOUSE FOLLICLE BIOASSAY: ADVANTAGES

Multi-parametric assay

Allows simultaneous evaluation of:

- Cytotoxicity, cell proliferation, cell differentiation
  (Theca cells, Granulosa cells and Oocyte)

- Process of Folliculogenesis (follicle development & ovulation)

- Process of Steroidogenesis (prediction of brain/uterus function)

- Process of Oogenesis (quality, cytogenetic constitution)

physiologically relevant model
IN VITRO Ovarian Function

- a powerful tool for

Toxicity testing of ovarian functions
Direct evaluation of the female gamete
Elucidation of mechanism of action

- will help to Reduce, Refine and Replace (3R ’S) in vivo studies