Influence of temperature and preparation techniques on sperm quality

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• Laboratory factors influencing sperm quality
  
  – Preparation techniques
    Chen and Bongso, 1999. Hum Reprod.
  
  – Temperature during sperm preparation
    Franken et al., 2011. Andrologia.
  
  – Time interval from sperm preparation to IUI
  
  – Temperature during long term *in vitro* incubation
    Matsuura et al., 2010. Asian J Androl.
• IVF laboratory:
  – Incubation in CO₂ incubator at 37°C

• Testis temperature = 2-3°C below body temperature
  – High testis temperature is associated with infertility
    (i.e. cryptorchidism)

A comparison of the swim-up procedure at body and testis temperatures

Junko Otsuki · Mizuki Chuko · Yoshie Momma · Keiko Takahashi · Yasushi Nagai

Temperature controlled centrifugation improves sperm retrieval
D. R. Franken¹, R. van Wyk¹, C. Stoumann¹ & K. Avari²

Effect of Different Incubation Conditions on Phosphatidylycerine Externalization and Motion Parameters of Purified Fractions of Highly Motile Human Spermatozoa

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• Aim

  – Examine the effect of long term (24h) *in vitro* sperm incubation at room temperature (RT; 23°C) versus testis temperature (35°C) on various semen quality parameters

  – Compare the influence of sperm preparation on sperm quality after incubation
Materials & Methods

• Schematic overview of the experimental design

Chen and Bongso, 1999. Hum Reprod.
Materials & Methods

- Schematic overview of the experimental design
Materials & Methods

• Sperm parameters
  – Total sperm number
  – Motility
  – Morphology
  – Viability (eosin or 7-AAD)
  – Acrosome reaction (CD-46)
  – Apoptosis (Annexin-V)

Routine

Sperm function
• Inclusion criteria
  – Normal sperm sample according to WHO (2010)
    • Total sperm number of 39 million
    • Progressive motility of $\geq 32\%$
Results

- % A+B motility
- Total % CD46+ spermatozoa
- % eosin+ spermatozoa
- % normal morphology
- Total % Annexin-V+ spermatozoa
- % 7-AAD+ spermatozoa

Native sample ■ DGC prepared sample □ SU prepared sample * p<0.05 ** p<0.01 *** p<0.001
Results

• ‘Good quality’ spermatozoa

Number of motile, morphologically normal, non-acrosome reacted and non-apoptotic spermatozoa

[Bar chart showing the number of spermatozoa in different samples with statistical significance indicators]

Native sample
DGC prepared sample
SU prepared sample

* p<0.05
** p<0.01
*** p<0.001
Conclusion

• Long term incubation at RT:

  – Better preservation of:
    • progressive motility
    • normal morphology

  – Lower percentage:
    • acrosome reacted
    • apoptotic
    • dead spermatozoa

→ translates into improved pregnancy rates?
Take Home Message

*In vitro*, storage of prepared sperm samples at RT is beneficial for preserving sperm quality.
Thank you for your attention!

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