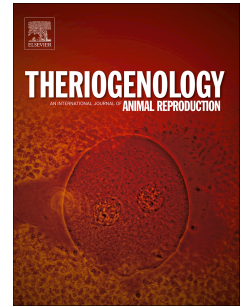


# Accepted Manuscript

A recovery time after warming restores mitochondrial function and improves developmental competence of vitrified ovine oocytes

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3 competence of vitrified ovine oocytes.

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## 9 **Abstract**

10 The aim of the present study was to assess the ability of vitrified/warmed oocyte to recover from  
11 vitrification-induced damages after warming. In vitro matured, vitrified/warmed ovine oocytes were  
12 assessed for developmental competence, mitochondrial activity and distribution, ATP, ROS and  
13 catalase levels during 6 hours of in vitro culture using fresh oocytes as control. ATP content in  
14 vitrified oocytes was lower than control during 4 hours of post warming culture ( $p<0.01$ ). Vitrified  
15 oocytes were able to fill this gap only after 6 hours of post-warming incubation. Moreover,  
16 mitochondrial activity was significantly lower ( $p<0.01$ ) in vitrified oocytes compared to controls,  
17 and this difference was maintained up to 2 hours of incubation. Then the activity increased and at 4  
18 hours it was higher compared to controls ( $p<0.01$ ). These oocytes showed an increasing rate of  
19 clustered distribution of mitochondria which was lower than controls during the first 4 hours of post  
20 warming culture ( $p<0.01$ ). ROS level was significantly higher at 0 hours in vitrified compared to  
21 control oocytes and this difference was maintained also at 2 hours and 6 hours of incubation  
22 ( $p<0.01$ ). Catalase level was higher in vitrified oocytes than controls ( $p<0.01$ ) during the entire  
23 culture period. Cleavage and blastocyst rates were lower in vitrified oocytes compared to control  
24 ones during the two first time point of incubation period ( $p<0.01$ ), indeed they increased  
25 significantly from 0 to 4 hours of incubation post warming ( $p<0.01$ ). The study demonstrated that

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