

## Aquaglyceroporins Expression and Glycerol Permeability are modulated by Estradiol in Mouse Sertoli cells

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**Introduction:** Metabolic diseases are related with severe fertility problems, partly due to increased aromatization of androgens to estrogens. Elevated levels of 17 $\beta$ -Estradiol (E2) are known to cause alterations on normal development of germ cells, compromising spermatogenesis. Spermatogenesis is dependent on Sertoli cells (SCs) function, since these cells ensure an adequate environment inside the seminiferous tubule.

**Objective:** To determine the impact of elevated levels of E2 on aquaglyceroporins (AQPs) expression and glycerol permeability in mouse SCs (mSCs, TM4 cell line).

**Material and Methods:** The expression of AQP3, AQP7, AQP9, and AQP11 were identified by RT-PCR and immunofluorescence techniques. Then, the expression was evaluated by qRT-PCR. Glycerol permeability was evaluated by stopped flow light-scattering.

**Results:** We were able to identify for the first time the expression of AQP3, AQP9 and AQP11 in mouse testis and mSCs. AQP9 was about six times more expressed than AQP3

and sixty-four times more expressed than AQP11 in these cells. High E2 levels caused a decrease of AQP9 mRNA levels and had no influence on AQP3 expression. On the other hand, high E2 levels led to an increase in AQP11 mRNA levels. AQPs are the main transporters of glycerol in physiological conditions, where AQP9 and AQP3 are responsible for transmembrane transport and AQP11 for endoplasmic reticulum and lipid droplets transport. In addition to downregulating the expression of AQP9, E2 also decreased cellular glycerol permeability.

**Conclusions:** E2 is a regulator of mSCs physiology by modulating AQP9 expression and the permeability to glycerol, which has been referred as crucial player for the homeodynamics of these testicular cells and for spermatogenesis. In addition, as glycerol is essential for spermatogenesis by control of blood-testis barrier, it is evident that alterations caused by E2 in glycerol permeability can be related to infertility problems.

**Keywords:** Aquaglyceroporins, glycerol permeability, estradiol, mouse sertoli cells