A Study on the Role of MEK/ERK Signaling Pathway in the Differentiation of Bovine Testis Sertoli Cells.

MEK/ERK信号通路在牛睾丸支持细胞分化中的作用研究

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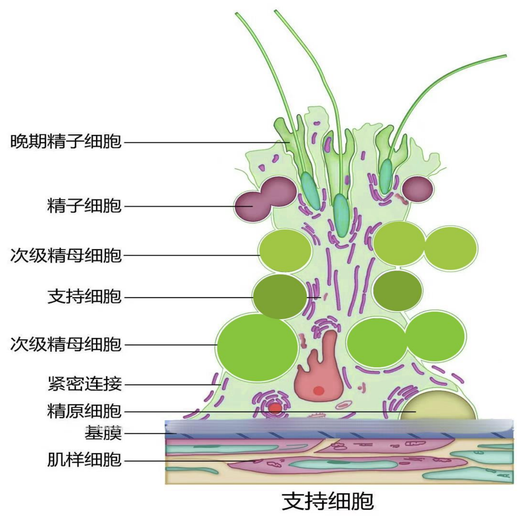
Research Background

Sertoli cells are the only somatic cells in the testes that directly contact various levels of germ cells, playing a crucial role inspermatogenesis. During this process, sertoli cells undergo a process of production, proliferation, loss of proliferation ability, and gradual differentiation and maturation,which is regulated by various factors, among which retinoic acid (RA) plays an important role in this process. Previous studies have found that the MEK/ERK signaling pathway inhibits the proliferationof bovine testis sertoli cells.



However, the role of the MEK/ERK signaling pathway in sertoli cell differentiation and its involvement in the regulation of RA on sertoli cell differentiation and maturation still require further research.

Research Purpose

This project focuses on bovine immature testis sertoli cells and intends to use PCR and WB, we aim to elucidate the role and mechanism of the MEK/ERK signaling pathway in thedifferentiation of bovine testis sertoli cells, in order to further improve the regulatory network of supporting cells and theregulatory mechanism of spermatogenesis.

Research Results

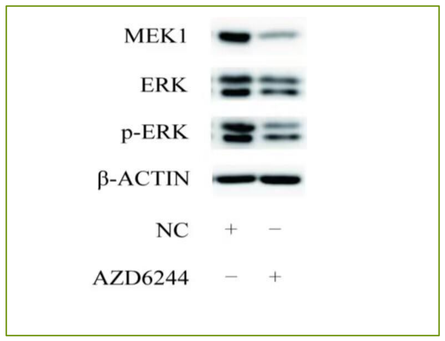


Fig.1 Western blot detection of MEK1 in AZD6244 and its solvent treated Sertoli cells expression of ERK and P-ERK.

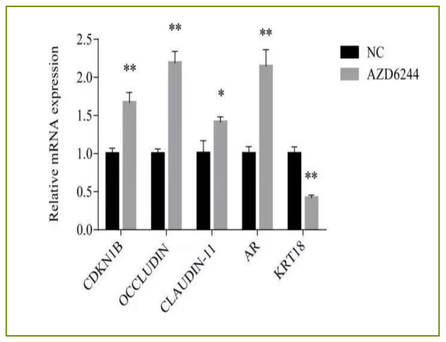


Fig.3 Western blot detection of *CDKN1B*, a cell differentiation related gene, after AZD6244 treatment the expression changes of *OCCLUDIN*,*CLAUDIN-11*, *AR*, and *KRT18* (*P<0.05,** P<0.01 showed statistical differences.)

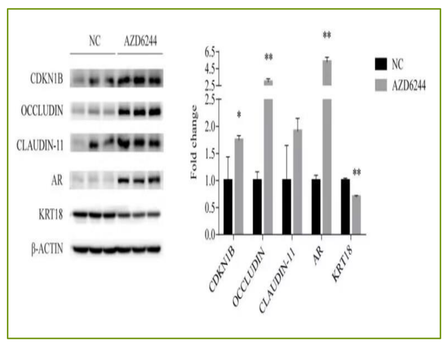


Fig.2 qPCR detection of *CDKN1B*, a cell differentiation related gene, after treatment with AZD6244 (10 μM) for 48 hours the expression changes of *OCCLUDIN*, *CLAUDIN-11*, *AR*, and *KRT18* (* P<0.05,**P<0.01 showed statistical differences.)

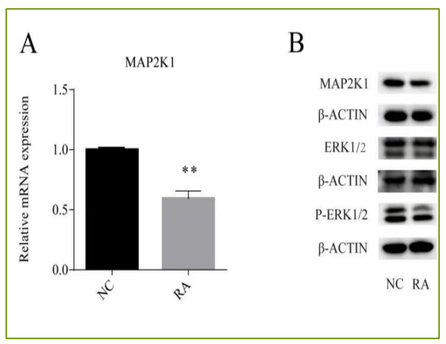
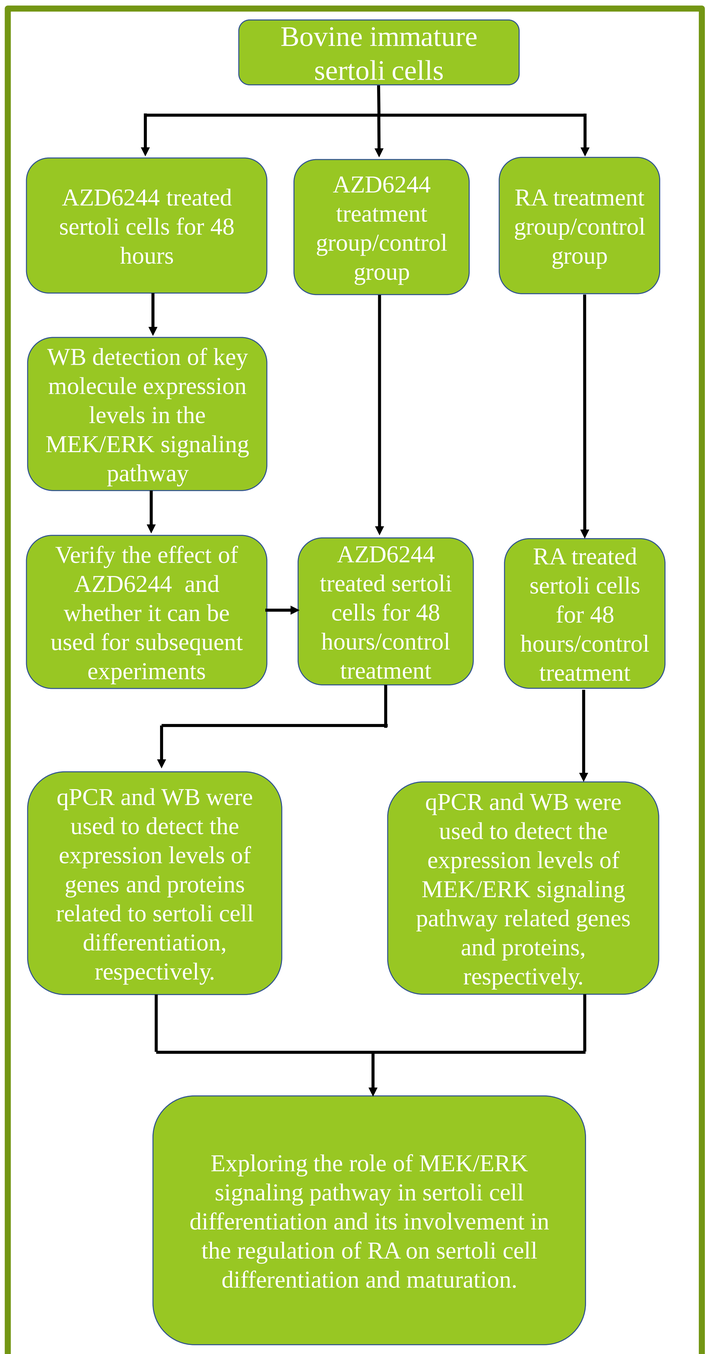


Fig.4 Changes in gene expression related to the MEK/ERK signaling pathway after RA treatment.
(A) Changes in mRNA expression of MAP2K1 after 48 hours of RA treatment.
(B) Changes in the expression levels of MAP2K1 and P-ERK1/2 proteins after 48 hours of RA treatment.

Conclusions

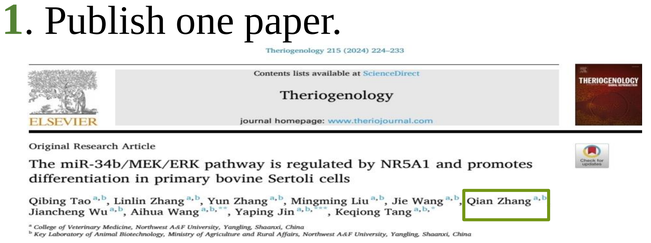
1. The use of AZD6244 can effectively inhibit the expression of key molecules in the MEK/ERK signaling pathway.
2. Inhibition of the MEK/ERK signaling pathway can regulate the expression of mRNA and proteins related to sertoli cell differentiation, thereby inducing differentiation of bovine immature testicular sertoli cells.
3. The MEK/ERK signaling pathway mediates the process of RA induced differentiation and maturation of bovine immature testicular sertoli cells.

Technical route



Achievements

1. Publish one paper.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Original Research Article

The miR-34b/MEK/ERK pathway is regulated by NR5A1 and promotes differentiation in primary bovine Sertoli cells

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2. This project has been approved as a provincial-level science and technology innovation project and has achieved excellent results.