AB182. Efficient generation of haploid spermatids with Fertilization and development capacity from human spermatogonial stem cells of cryptorchid patients

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Objective: Generation of functional spermatids from azoospermia patients is of unusual significance for treating male infertility. Here we report an efficient approach to obtain human functional spermatids from cryptorchid patients.

Design: Comparative and controlled study.

Materials and methods: Study was performed from January 2012 to May 2013 using testicular biopsies obtained from cryptorchid patients and obstructive azoospermia patients from 25 to 37 years old. Multiplex PCR was carried to exclude Y chromosome microdeletion and male germ cells were obtained from cryptorchid testes. Retinoic acid (RA) and stem cell factor (SCF) were used to induce differentiation of male germ cells enriched in spermatogonial stem cells from cryptorchid testes.

Results: Spermatogonia remained whereas meiotic germ cells were rare in cryptorchid patients. Expression of numerous markers for meiotic and post-meiotic male germ cells was enhanced in human spermatogonial stem cells (SSCs) of cryptorchidism patients by RA and SCF treatment. Meiotic spreads and DNA content assays revealed that RA and SCF induced an obvious increase of SCP3-, MLH1- and CREST-positive cells and haploid cells. Single-cell RNA sequencing analysis reflected distinct global gene profiles in the embryos derived from round spermatids and nucleus of somatic cells. Significantly, haploid spermatids generated from human SSCs of cryptorchid patients possessed fertilization and development capacity.

Conclusions: This study thus provides an invaluable source of autologous male gametes for treating male infertility of azoosperma patients.

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Keywords: Human spermatogonial stem cells (SSCs); differentiation; haploid spermatids; fertilization and development potentials; single-cell RNA sequencing; cryptorchid patients

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AB183. Clinical and cytogenetic characterization of a boy with a de novo pure partial trisomy 16q24.1-24.3 and complex chromosome rearrangement

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