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## Supplemental material

### Supplemental Table 1 The primers used for real-time PCR and RT-PCR

Genes	Primer sequences (5'-3')	Product sizes (bp)
<i>MKK7</i>	F: GAAGGAGAAGCACGGTGTCA R: GAGATGCCCAGGCTCCATAC	234
<i>SV40</i>	F: GAACAGCCCAGCCACTATAA R: ACTCCAGCCATCCATTCTTC	248
<i>THY1</i>	F: ATCGTCTCCTGCTAACAGTC R: CTCGTACTIONGGATGGGTGAACT	135
<i>GFR<math>\alpha</math>1</i>	F: CGGGTGGTCCCATTATATC R: TGGCTGGCAGTTGGTAAA	411
<i>UCHL1</i>	F: AGCTGAAGGGACAAGAAGTTAG R: TTGTCATCTACCCGACATTGG	265
<i>SOX9</i>	F: AGGTGCTCAAAGGCTACGACTG R: TGCCCGTTCTTCACCGACT	322
<i>DDX4</i>	F: GCAGAAGGAGGAGAAAGTAGTG R: CTCGTCCTGCAAGTATGATAGG	289
<i>ACTB</i>	F: CGCACCCTGGCATTGTCAT R: TTCTCCTTGATGTCACGCAC	206

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**Supplemental Table 2 Antibodies applied in Western blots and immunofluorescence**

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Antibodies	Source	Dilution
<i>Western blots</i>		
MKK7	LSBio cat#169289	1:800
ACTB	Abcam cat#ab8226	1:1000
JNK	CST cat#9252	1:1000
p-JNK	CST cat#9255	1:1000
PCNA	Abcam cat#ab29	1:500
<i>Immunofluorescence</i>		
MKK7	LSBio cat#169289	1:100
UCHL1	Abcam cat#ab8189	1:50
THY1	Abcam cat#ab133350	1:100
GFR $\alpha$ 1	R&Dcat#AF560	1:25
PCNA	Abcam cat#ab29	1:50
KIT	R&D cat#AF332	1:25
DDX4	Abcam cat#ab27591	1:100
<i>Secondary Antibody</i>		
Donkey anti-Rabbit	Thermo Fisher Scientific	1:1000
IgG,Alexa Fluor 488	cat#A21206	
Donkey anti-Mouse	Thermo Fisher Scientific	1:1000
IgG,Alexa Fluor 594	cat#A21203	
Donkey anti-Goat IgG,Alexa	Thermo Fisher Scientific	1:1000
Fluor 594	cat#A11058	

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F: forward primer; R: reverse primer

**Supplemental Table 3 The siRNA sequences targeting human MKK7 mRNA**

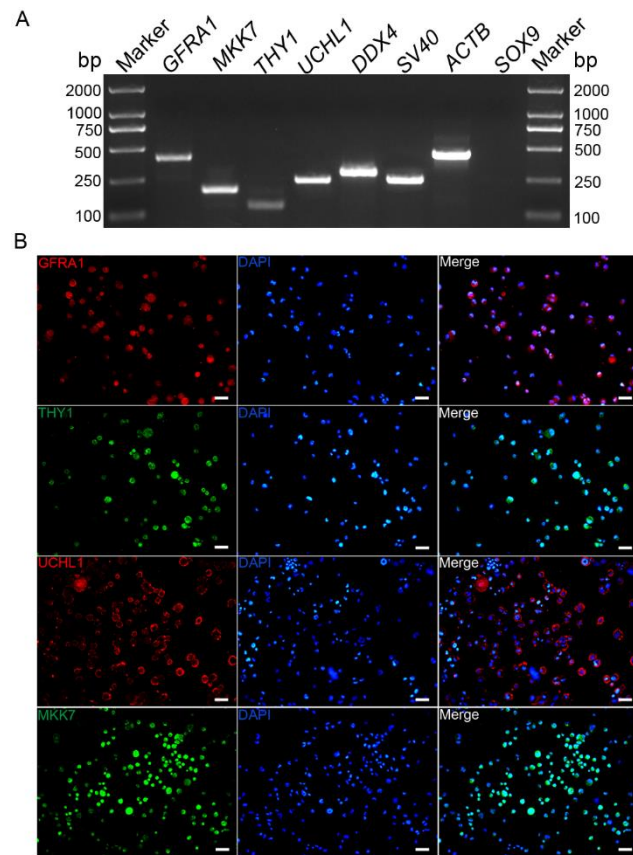
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siRNA	Targeting sequence
MKK7-siRNA1	ACAGGACAGTTTCCCTACA
MKK7-siRNA2	GACCAAAGTATAATAAGCT
MKK7-siRNA3	GCTTCATCAAGCGCTACGA

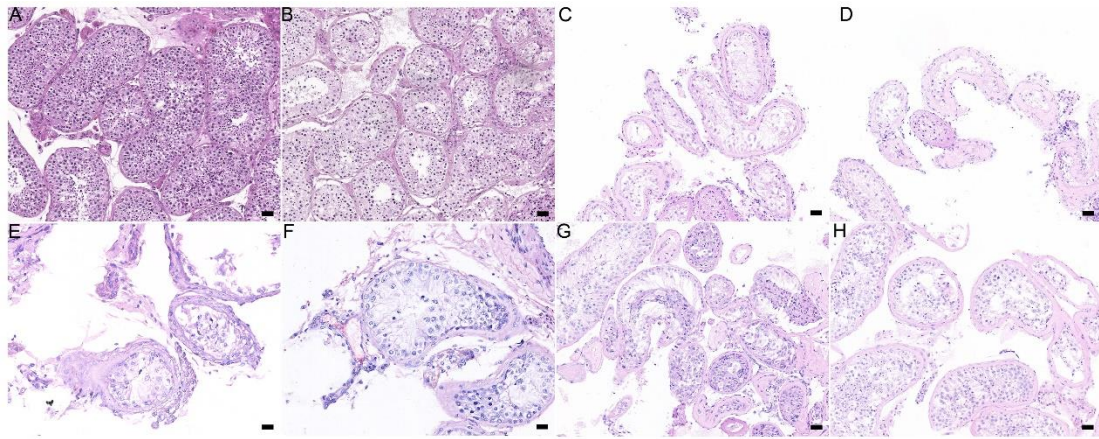
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Supplemental Figures



**Supplemental Figure 1 Identification of the Human SSC line.** (A) RT-PCR revealed gene expression of *GFRA1*, *MKK7*, *THY1*, *UCHL1*, *DDX4*, *SV40*, *ACTB* and *SOX9* in the human SSC line. Sertoli cell marker gene *SOX9* were not detected, and *ACTB* served as the loading control of total RNA. (B) Immunocytochemistry demonstrated the presence of GFRA1, THY1, UCHL1 and MKK7 in human SSC line. Scale bars: B, 50  $\mu$ m.



**Supplemental Figure 2 H&E staining for testes of OA and NOA patients.** (A and B) Testis samples from OA patients with normal spermatogenesis, numerous spermatozoa were observed in seminiferous tubules. (C and D) Testis samples from NOA patients with spermatogonial maturation arrest (Spg MA), and only few spermatogonia and Sertoli cells were seen in the seminiferous tubules. (E and F) Testis samples from NOA patients with spermatocyte maturation arrest (Spc MA), and there were a number of spermatocytes and no spermatid. (G and H) Testis samples from NOA patients with hypo-spermatogenesis, and a very small amount of sperm was observed in some tubules. Scale bars: A-L, 100  $\mu$ m.