

抗 GENA (生殖細胞特異抗原) 抗体、ラットモノクローナル (TRA98)

商品コード	73-003
容量	100 µg
保存	-20°C
濃度	1.0 mg/ml
バッファー	PBS- with 50% glycerol
純度	ハイブリドーマ培養上清から種々のクロマトグラフィーを用いて精製した
抗原	マウス精巣抽出液
アイソタイプ	ラット IgG2a κ
反応性	マウス
特記事項	Rat hybridoma clone TRA98 was established by Dr. Tanaka H and Prof. Nishimune Y at Osaka University.
アプリケーション	<ol style="list-style-type: none"> 1. ウエスタンブロッティング (1/1,000- 1/5,000) 2. 免疫沈降(1/200) 3. 免疫蛍光染色 (1/400) 4. 免疫組織染色 (1/200-1/500) 5. Flow Cytometry
背景	TRA98 は生殖細胞特異的に発現する抗原を認識するモノクローナル抗体である (1)。TRA98 を用いたウェスタンブロッティングでは、精巣にのみ反応し、60-100 kD の分子量のタンパク質が検出される (図 1)。Embryonic day 12.5 以降の雌雄の生殖巣でシグナルがみられ、雌では生後まもなく反応が消えるが雄では発現が強くなる。抗原は生殖細胞核に強く局在し、免疫染色も可能である (1, 2)。
関連商品	73-001 抗 SLA (haploid sperm cell-specific antigen) 抗体, ラットモノクローナル, (TRA54)
※本製品は研究用です。診断および軍事目的に使用することはできません。	

画像: 73-003 抗 GENA (生殖細胞特異抗原) 抗体、ラットモノクローナル (TRA98)

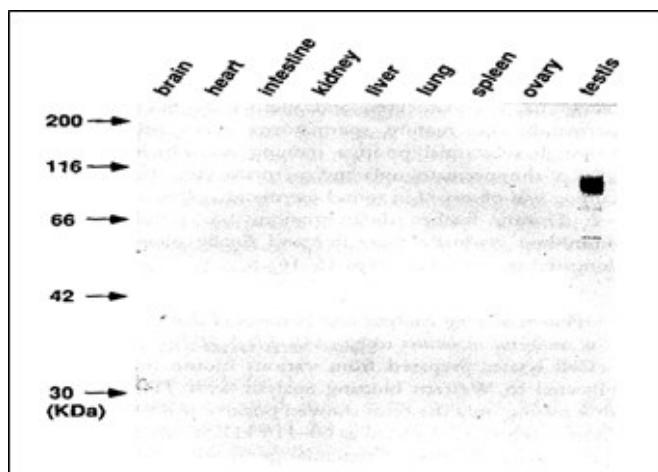


Fig.1. Western blot analysis with TRA98 of various mouse tissues.

The antibody was used at 1 µg/ml. The tissue homogenate samples were applied at 100 µg protein per lane. Note that TRA98 is detected only in testis lysate.

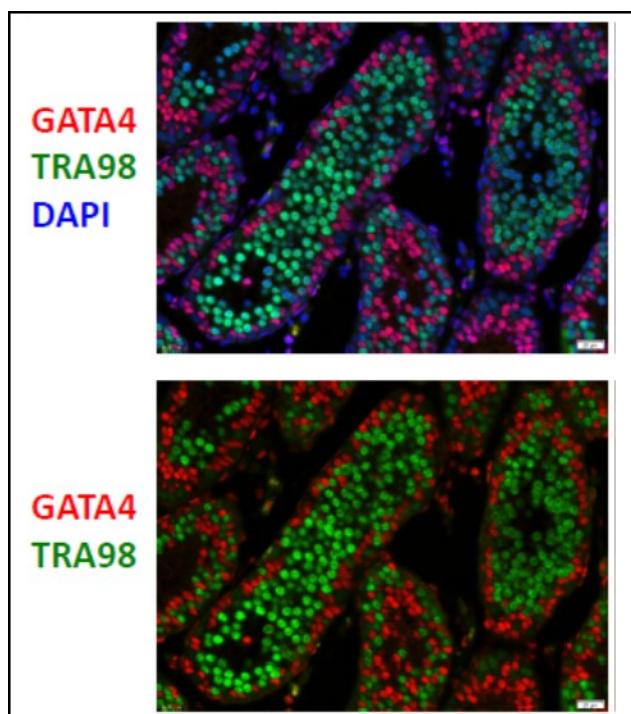


Fig.2. Immunohistochemical staining of a 10-day-old testis with germ cell-specific antibody, TRA98.

Sections of 10-day-old mouse testis were fixed with 4% paraformaldehyde and embedded in paraffin. After antigen retrieval by boiling for 10 min in 10 mM citrate buffer (pH 6), they were reacted with the anti-TRA98 antibody (Green) at 1/400 dilution and anti-GATA4 antibody (Red). As the 2nd antibody, Donkey anti-rat Alexa Fluor488 and Donkey anti-rabbit Alexa Fluor594 were used. DNA was stained with DAPI (Blue) in the above figure.

Anti-GATA antibody stains nuclei of Sertoli cells in seminiferous tubule while anti-TRA98 stains reproductive cells.

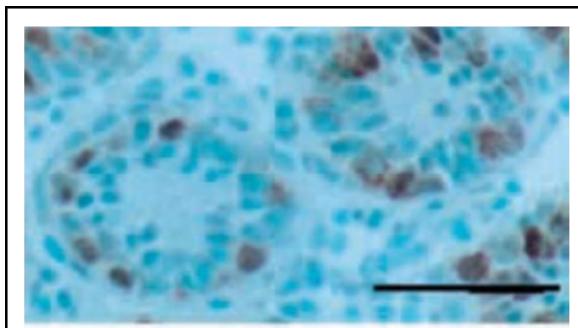


Fig.3. Immunohistochemical staining of a 7-day-old testis with germ cell-specific antibody, TRA98.

Frozen sections were reacted with the antibody and the antibody was detected by the avidin-biotin-peroxidase complex method with hydrogen peroxide and diaminobenzidine.

Scale bar; 50 μ m

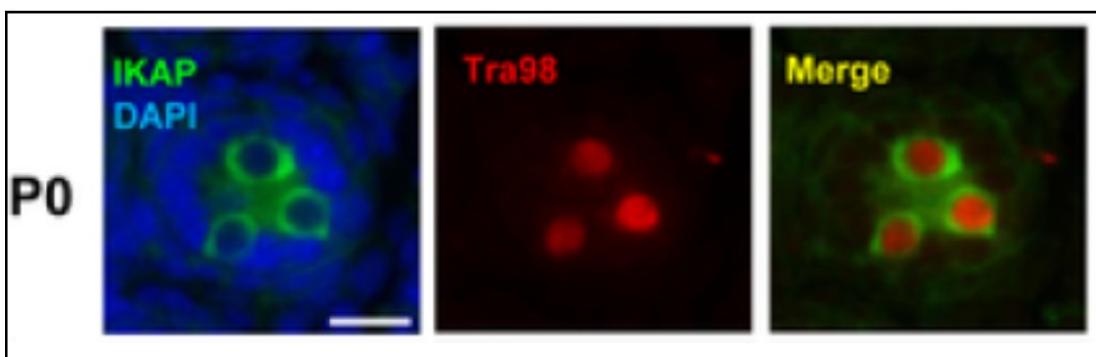


Fig.4 Colocalization of germ cell specific marker, Tra98, with IKAP at PO during spermatogenesis as shown by immunohistological staining. Image from . [PLoS Genet.](#) 2013 May;9(5):e1003516 authored by Lin FJ et al.

参考文献: 本抗体は以下の論文につかわれている

1. Fukunaga H et al. Application of an Ex Vivo Tissue Model to Investigate Radiobiological Effects on Spermatogenesis. [Radiat Res.](#) 2018 Jun;189(6):661-667. PMID: 29595376. **IHC (mouse)**
2. Gu W et al. Dnd1-mediated epigenetic control of teratoma formation in mouse. [Biol Open.](#) 2018 Jan 29;7(1). PMID: 29378702. **IHC-F (mouse)**
3. Pui HP, Saga Y. Gonocytes-to-spermatogonia transition initiates prior to birth in murine testes and it requires FGF signaling. [Mech Dev.](#) 2017 Apr;144(Pt B):125-139. PMID: 28341395. **IHC-F (mouse)**
4. Okada R et al. Expression Profile of NOTCH3 in Mouse Spermatogonia. [Cells Tissues Organs.](#) 2017;204(5-6):283-292. PMID: 29161703. **IHC-F (mouse)**
5. Matsuura T et al. Zfp296 negatively regulates H3K9 methylation in embryonic development as a component of heterochromatin. [Sci Rep.](#) 2017 Sep 29;7(1):12462. PMID: 28963472. **IHC-F (mouse)**
6. Kang HS et al. Transcription Factor GLIS3: A New and Critical Regulator of Postnatal Stages of Mouse Spermatogenesis. [Stem Cells.](#) 2016 Nov;34(11):2772-2783. PMID: 27350140. **IHC-F (mouse)**
7. Ozawa M et al. The Histone Demethylase FBXL10 Regulates the Proliferation of Spermatogonia and Ensures Long-Term Sustainable Spermatogenesis in Mice. [Biol Reprod.](#) 2016 Apr;94(4):92. PMID: 26984996. **IHC-P (mouse)**
8. Dean A et al. Analgesic exposure in pregnant rats affects fetal germ cell development with inter-generational

- reproductive consequences. [Sci Rep.](#) 2016 Jan 27;6:19789. PMID:26813099. **IHC-P (mouse)**
- 9.Malki S et al. A Whole-Mount Approach for Accurate Quantitative and Spatial Assessment of Fetal Oocyte Dynamics in Mice. [Biol Reprod.](#) 2015 Nov;93(5):113. PMID: 26423126. **IHC (mouse)**
- 10.Lovasco LA et al. TAF4b is required for mouse spermatogonial stem cell development. [Stem Cells](#). 2015 Apr;33(4):1267-76. PMID:25727968. **IF (mouse)**
- 11.Sun T et al. Lats1 Deletion Causes Increased Germ Cell Apoptosis and Follicular Cysts in MouseOvaries. [Biol Reprod.](#) 2015 Jul;93(1):22. PMID:26040669. **IHC (mouse)**
- 12.Matsubara Y. et al. TALEN-Mediated Gene Disruption on Y Chromosome Reveals Critical Role of EIF2S3Y in Mouse Spermatogenesis. [Stem Cells Dev.](#) 2015 May 15;24(10):1164-70. PMID: 25579647 **IHC-P (mouse)**
- 13.Okuda H. et al. A novel transcriptional factor Nkapl is a germ cell-specific suppressor of Notch signaling and is indispensable for spermatogenesis. [PLoS One.](#) 2015 Apr 14;10(4). **IHC-P (mouse)**
- 14.Ito K et al. Gene targeting study reveals unexpected expression of brain-expressed X-linked 2 in endocrine and tissue stem/progenitor cells in mice. [J Biol Chem.](#) 2014 Oct 24;289(43):29892-911. PMID: 25143383. **IHC-P (mouse)**
- 15.Zhang T et al. The mammalian Doublesex homolog DMRT6 coordinates the transition between mitotic and meiotic developmental programs during spermatogenesis. [Development](#). 2014 Oct;141(19):3662-71. PMID: 25249458. **IHC-P (mouse)**
- 16.Zhang J et al. Reconstruction of a seminiferous tubule-like structure in a 3 dimensional culture system of re-aggregated mouse neonatal testicular cells within a collagen matrix. [Gen Comp Endocrinol.](#) 2014 Sep 1;205:121-32. PMID: 24717811. **IHC-P (mouse)**
- 17.Grive KJ et al. TAF4b promotes mouse primordial follicle assembly and oocyte survival. [Dev Biol.](#) 2014 Aug 1;392(1):42-51. PMID:24836512. **IHC-F (mouse)**
- 18.Kuroki S et al. JMJD1C, a JmjC Domain-Containing Protein, Is Required for Long-Term Maintenance of Male Germ Cells in Mice. [Biol Reprod.](#) 2013 Oct 17;89(4):93. PMID:24006281. **IHC-P (mouse)**
- 19.Shirakawa T et al. An epigenetic switch is crucial for spermatogonia to exit the undifferentiated state toward a Kit-positive identity. [Development](#). 2013 Sep;140(17):3565-76 PMID: 23903187. **IHC (mouse)**
- 20.Bi J et al. Basigin null mutant male mice are sterile and exhibit impaired interactions between germ cells and Sertoli cells. [Dev Biol.](#) 2013 Aug 15; 380 (2): 145-56. PMID:23727514. **IHC-P (mouse)**
- 21.Lin FJ et al. Ikbkap/Elp1 deficiency causes male infertility by disrupting meiotic progression. [PLoS Genet.](#) 2013 May;9(5):e1003516. **IHC (mouse)**
- 22.Manosalva I et al. Hes1 in the somatic cells of the murine ovary is necessary for oocyte survival and maturation. [Dev Biol.](#) 2013 Mar 15;375(2):140-51. PMID: 23274689. **IHC-F (mouse)**
- 23.Wu Q et al. Nodal/activin signaling promotes male germ cell fate and suppresses female programming in somatic cells. [Development](#). 2013 Jan 15;140(2):291-300. PMID:23221368. **IHC-F (mouse)**
- 24.Yamaguchi S et al. Dynamics of 5-methylcytosine and 5-hydroxymethylcytosine during germ cell reprogramming. [Cell Research](#) 2013, Feb: 23, 329–339. PMID: [23399596](#) IHC-F (mouse)
- 25.Yamaguchi S. et al. Tet1 controls meiosis by regulating meiotic gene expression. [Nature](#). 2012 Dec 20;492(7429):443-7. PMID: [23151479](#). **IHC (mouse)**
- 26.Kim Y et al. An essential role for a mammalian SWI/SNF chromatin-remodeling complex during male meiosis.

- Development. 2012 Mar;139(6):1133-40. PMID: 22318225. **IHC-F (mouse)**
- 27.Krentz AD et al. DMRT1 promotes oogenesis by transcriptional activation of *Stra8* in the mammalian fetal ovary. Dev Biol. 2011 Aug 1;356(1):63-70. PMID: 21621532. **IHC-P , IF (mouse)**
- 28.Geyer CB et al. RhoX13 is translated in premeiotic germ cells in male and female mice and is regulated by NANOS2 in the male. Biol Reprod. 2012 Apr 27;86(4):127. PMID: 22190708. **IHC-P (mouse)**
- 29.Sada A et al. NANOS2 acts downstream of glial cell line-derived neurotrophic factor signaling to suppress differentiation of spermatogonial stem cells. Stem Cells. 2012 Feb;30(2):280-91. PMID: 22102605. **IHC (mouse)**
30. Mazaud-Guittot S et al. Phenotyping the claudin 11 deficiency in testis:from histology to immunohistochemistry. Methods Mol Biol. 2011;763:223-36. PMID: 21874455. **IHC-P (mouse)**
- 31.Maebara M et al. Localisation of RA175 (Cadm1), a cell adhesion molecule of the immunoglobulin superfamily, in the mouse testis, and analysis of male infertility in the RA175 - deficient mouse. Andrologia. 2011 Jun;43(3):180-8. PMID:21486398. **IHC-P (mouse)**
- 32.Ebata KT et al. Soluble growth factors stimulate spermatogonial stem cell divisions that maintain a stem cell pool and produce progenitors in vitro. Exp Cell Res. 2011 Jun 10;317(10):1319-29. PMID:21420950. **IHC-P (mouse)**
- 33.Holloway K et al. NEK1 Facilitates Cohesin Removal during Mammalian Spermatogenesis. Genes (Basel). 2011 Mar 7;2(1):260-79. PMID: 21931878 **IHC (mouse)**
- 34.Gao L et al. Two regions within the proximal steroidogenic factor 1 promoter drive somatic cell-specific activity in developing gonads of the female mouse. Biol Reprod. 2011 Mar;84(3):422-34. PMID: 20962249. **IHC-F (mouse)**
- 35.Inoue N et al. Expression of a Testis-Specific Nuclear Protein, TRA98, in Mouse Testis during Spermatogenesis. A Quantitative and Qualitative Immunoelectron Microscopy (IEM) Analysis. Open Journal of Cell Biology, 2011, 1, 11-20. **WB, Dot blot, IHC-F, Immuno-Electron Microscopy (mouse)**
- 36.Saga Y. Function of Nanos2 in the male germ cell lineage in mice. Cellular and Molecular Life Sciences November 2010, Volume 67, Issue 22, pp 3815–382. PMID: 20652721. **IHC (mouse)**
- 37.Matson CK et al. The Mammalian Doublesex Homolog DMRT1 Is a Transcriptional Gatekeeper that Controls the Mitosis versus Meiosis Decision in Male Germ Cells. Dev Cell. 2010 Oct 19;19(4):612-24. PMID:20951351. **IHC-P (mouse)**
38. Ciraolo E et al. Essential Role of the p110 Subunit of Phosphoinositide 3-OH Kinase in Male Fertility. Mol Biol Cell. 2010 Mar 1;21(5):704-11. PMID:20053680. **IHC-P (mouse)**
- 39.Huang CC, and Yao HH Inactivation of Dicer1 in Steroidogenic factor 1-positive cells reveals tissue-specific requirement for Dicer1 in adrenal, testis, and ovary. BMC Dev Biol. 2010 Jun 11;10:66. PMID:20540774. **IHC-P (mouse)**
- 40.Nicholas CR et al. Intact fetal ovarian cord formation promotes mouse oocyte survival and development. BMC Dev Biol. 2010 Jan 8;10:2 PMID: 20064216 **IHC-P (mouse)**
- 41.Sun J et al. Rad18 is required for long-term maintenance of spermatogenesis in mouse testes. Mech Dev. 2009 Mar-Apr;126(3-4):173-83. PMID:19068231. **IHC-P (mouse)**
- 42.Ohta H et al. Male germline and embryonic stem cell lines from NOD mice: efficient derivation of GS cells from a nonpermissive strain for ES cell derivation. Biol Reprod. 2009 Dec;81(6):1147-53. PMID: 19726737. **IF (mouse)**
- 43.Yamaguchi S et al. Conditional knockdown of Nanog induces apoptotic cell death in mouse migrating primordial

- germ cells. [Development](#). 2009 Dec;136(23):4011-20. PMID:19906868. **IHC-F (mouse)**
44. [Krentz AD](#) et al. The DM domain protein DMRT1 is a dose-sensitive regulator of fetal germ cell proliferation and pluripotency. [Proc Natl Acad Sci U S A](#). 2009 Dec 29;106(52):22323-8. PMID:20007774. **IHC (mouse)**
45. Shoji M et al. The TDRD9-MIWI2 complex is essential for piRNA-mediated retrotransposon silencing in the mouse male germline. [Dev Cell](#). 2009 Dec;17(6):775-87. PMID:20059948. **IHC-F (mouse)**
46. Nicholas CR et al. Transplantation directs oocyte maturation from embryonic stem cells and provides a therapeutic strategy for female infertility. [Hum Mol Genet](#). 2009 Nov 15;18(22):4376-89. **IHC-P (mouse)**
47. Hirai T et al. Effect of 1,25-Dihydroxyvitamin D on Testicular Morphology and Gene Expression in Experimental Cryptorchid Mouse: Testis Specific cDNA Microarray Analysis and Potential Implication in Male Infertility. [J Urol](#). 2009 Mar;181(3):1487-92. PMID:19157449. **IHC-P (mouse)**
48. Barrionuevo F et al. testis cord differentiation after the sex determination stage is independent of Sox9 but fails in the combined absence of Sox9 and Sox8. [Dev Biol](#). 2009 Mar 15;327(2):301-12. PMID: 19124014. **IHC-P (mouse)**
49. Toyoda S et al. *Soh/h2* affects differentiation of KIT positive oocytes and spermatogonia. [Dev Biol](#). 2009 Jan 1;325(1):238-48. PMID:19014927. **IHC-F (mouse)**
50. Huang X et al. Inhibitory Phosphorylation of Separase Is Essential for Genome Stability and Viability of Murine Embryonic Germ Cells. [PLoS Biol](#). 2008 Jan;6(1):e15. PMID:18232736. **IHC-P (mouse)**
51. Tokuhiro K et al. The 193-Base Pair *Gsg2*(Haspin) Promoter Region Regulates Germ Cell-Specific Expression Bidirectionally and Synchronously. [Biol Reprod](#). 2007 Mar;76(3):407-14. PMID:17123944. **WB (mouse)**.
52. Kim S et al. Cell type-autonomous and non-autonomous requirements for Dmrt1 in postnatal testis differentiation. [Dev Biol](#). 2007 Jul 15;307(2):314-27. PMID:17540358. **IHC-P (mouse)**
53. Suzuki A et al. Functional redundancy among Nanos proteins and a distinct role of Nanos2 during male germ cell development. [Development](#). 2007 Jan;134(1):77-83. PMID:17138666. **IHC-P (mouse)**
54. Kimura T et al. The stabilization of beta-catenin leads to impaired primordial germ cell development via aberrant cell cycle progression. [Dev Biol](#). 2006 Dec 15;300(2):545-53. **PMID:17055474. IHC-F (mouse)**
55. Chuma S et al. *Tdrd1/Mtr-1*, a tudor-related gene, is essential for male germ-cell differentiation and nuage/germinal granule formation in mice. [Proc Natl Acad Sci U S A](#). 2006 Oct 24;103(43):15894-9. PMID:17038506. **IHC-P (mouse)**
56. Yamaguchi YL et al. Expression of low density lipoprotein receptor-related protein 4 (*Lrp4*) gene in the mouse germ cells. [Gene Expr Patterns](#). 2006 Aug;6(6):607-12. PMID:16434236. **IHC-P (mouse)**
57. Hasegawa K et al. Testatin transgenic and knockout mice exhibit normal sex-differentiation. [Biochem Biophys Res Commun](#). 2006 Mar 10;341(2):369-75. PMID: 16427609. **IHC-P (mouse)**
58. Isotani A et al. Genomic imprinting of XX spermatogonia and XX oocytes recovered from XX<-->XY chimeric testes. [Proc Natl Acad Sci U S A](#). 2005 Mar 15; 102(11):4039-44. PMID:15746241 **IHC -P (mouse)**
59. Shoji M et al. RNA interference during spermatogenesis in mice. [Dev Biol](#). 2005 Jun 15;282(2):524-34. PMID:15950615. **IHC, FC (mouse)**
60. Yamaguchi Nanog expression in mouse germ cell development. [Gene Expr Patterns](#). 2005 Jun;5(5):639-46. PMID:15939376. **IHC-F (mouse)**
61. Sakai Y et al. Co-expression of de novo DNA methyltransferases Dnmt3a2 and Dnmt3L in gonocytes of mouse embryos. [Gene Expr Patterns](#). 2004 Dec;5(2):231-7. PMID:15567719. **IHC-F (mouse)**

- 62.Ohta H et al.Commitment of fetal male germcells to spermatogonial stemcells during mouse embryonic development. [Biol Reprod.](#) 2004 May;70(5):1286-91. PMID:14695910. **IHC-P (mouse)**
- 63.Ohta H et al. Proliferation and Differentiation of Spermatogonial Stem Cells in the *W/W'* Mutant Mouse Testis [Biol Reprod.](#) 2003 Dec;69(6):1815-21. PMID: 12890724. **IHC-P (mouse)**
- 64.Kasai S et al. Haploinsufficiency of Bcl-x leads to male-specific defects in fetal germ cells: differential regulation of germ cell apoptosis between the sexes. [Dev Biol.](#) 2003 Dec 1;264(1):202-16. PMID:14623242. **IHC-P (mouse)**
- 65.Yomogida K et al. Dramatic expansion of germinal stem cells by ectopically expressed human glial cell line-derived neurotrophic factor in mouse Sertoli cells. [Biol Reprod.](#) 2003 Oct;69(4):1303-7. PMID:12801989. **IHC-P (mouse)**
- 66.Kim JM. Hypomorphic mutation in an essential cell-cycle kinase causes growth retardation and impaired spermatogenesis. [EMBO J.](#) 2003 Oct 1;22(19):5260-72. PMID:14517263. **WB, IHC-P (mouse)**
- 67.Ohbo K et al. Identification and characterization of stem cells in prepubertal spermatogenesis in mice. [Dev Biol.](#) 2003 Jun 1;258(1):209-25. PMID:12781694. **IHC-F (mouse)**
- 68.Kimura T et al. Conditional loss of PTEN leads to testicular teratoma and enhances embryonic germ cell production [Development.](#) 2003 Apr;130(8):1691-700. PMID:12620992. **IHC (mouse)**
- 69.Sakata S et al. Involvement of death receptor Fas in germ cell degeneration in gonads of Kit-deficient *Wv/Wv* mutant mice. [Cell Death Differ.](#) 2003 Jun;10(6):676-86. PMID:12761576. **IHC-F (mouse)**
- 70.Sato M et al. Identification of PGC7, a new gene expressed specifically in preimplantation embryos and germ cells. [Mech Dev.](#) 2002 Apr;113(1):91-4. PMID:11900980. **IHC (mouse)**
- 71.Tadokora Y et al. Homeostatic regulation of germinal stem cell proliferation by the GDNF/FSH pathway. [Mech Dev.](#) 2002 Apr;113(1):29-39. PMID:11900972. **IHC-P (mouse)**
- 72.Meng X et al.Promotion of seminomatous tumors by targeted overexpression of glial cell line-derived neurotrophic factor in mouse testis. [Cancer Res.](#) 2001 Apr 15; 61(8):3267-71. PMID:11309277. **IHC-P (mouse)**
- 73.Ohta H et al. Defect in germ cells, not in supporting cells, is the cause of male infertility in the *jsd* mutant mouse: proliferation of spermatogonial stem cells without differentiation. [Int J Androl.](#) 2001 Feb;24(1):15-23. PMID:11168646. **IHC-F (mouse)**
- 74.Ohta H et al. Regulation of proliferation and differentiation in spermatogonial stem cells: the role of c-kit and its ligand SCF. [Development](#) 127: 2125-2131 (2000) PMID: [10769236](#) IHC (mouse)
- 75.Danno S. Decreased Expression of Mouse Rbm3, a Cold-Shock Protein, in Sertoli Cells of Cryptorchid Testis. [Am J Pathol.](#) 2000 May;156(5):1685-92. PMID:10793079. **IHC-P (mouse)**
- 76.Tanaka SS et al. [The mouse homolog of Drosophila Vasa is required for the development of male germ cells.](#) The mouse homolog of Drosophila Vasa is required for the development of male germ cells. [Genes Dev.](#) 2000 Apr 1;14(7):841-53. PMID:10766740. **WB, IHC-P (mouse)**
- 77.[Toyoda-Ohno H](#) et al..Members of the ErbB receptor tyrosine kinases are involved in germ cell development in fetal mouse gonads. [Dev Biol.](#) 1999 Nov 15;215(2):399-406. PMID:10545246. **IHC-P (mouse)**
- 78.Tanaka H et al . A germ cell-specific nuclear antigen recognized by a monoclonal antibody raised against mouse testicular germ cells. [Int J Androl](#) 20: 361-366 (1997) PMID: [9568529](#) **WB (mouse)**