

Maryam Shahhoseini, BSc, MSc, Ph.D

Full Professor of Department of Genetics,
Royan Institute for Reproductive Biomedicine,
PO.BOX:19395-4644, Tehran, Iran.

Mobile: (98) 912 2110883
Phone: (98) 21 23562737
Fax: (98) 21 23562681
E-mail: m.shahhoseini@royan-rc.ac.ir
Shahhoseini244@gmail.com



Education:

- **2007:** Ph.D. Degree in Biochemistry (1st rank, with a general average of 18.91 out of 20), in the Institute of Biochemistry and Biophysics, University of Tehran, Tehran.
- **2001:** M. Sc. Degree in Biochemistry (1st rank, with a general average of 18.81 out of 20), in the Institute of Biochemistry and Biophysics, University of Tehran, Tehran.
- **1998:** B. Sc. Degree in Microbiology (1st rank, with a general average of 18.45 out of 20) in the Faculty of Sciences, University of Tehran, Tehran.

Current Field of Research:

Epigenetic Regulations, with focus on Differentiation of Stem Cell Fate, and Cellular Developments through Male/Female Reproduction

Professional Experiences:

- **2008-current:** Supervisor/advisor of 12 PhD students and 70 MSc students in fields of Biochemistry, Genetics, Cell and Molecular Biology
- **2008-2018:** Lab Director of Department of Genetics, Reproductive Biomedicine Research Center, Royan Institute
- **2010-current:** Group leader of Epigenetics in Reproductive Biomedicine Research Center, Royan Institute

- **2018-2021:** Head of Department of Genetics, University of Science and Culture, Tehran-Iran
- **2019-current:** Head of Department of Biochemistry, University of Science and Culture, Tehran-Iran
- **2019-current:** Related Academic Staff of Department of Cell and Molecular Biology, School of Biology, College of Science, University of Tehran, Tehran-Iran

Teaching Experiences:

- Teaching "Advance Molecular Biology" and "Molecular Genetics" and "Molecular Biotechnology" courses in Department of Biotechnology, Collage of Sciences, University of Tehran (Since 2007).
- "Gene Regulation" and "Biochemistry of Chromatin" courses in Departments of Genetics and Cell and Molecular Biology, University of Science and Culture (Since 2010).

Merit:

Scientific Board and Reviewer of:

1. _Royan International Research Award, Since 2010
2. International Journal of Fertility & Sterility (IJFS)
3. Cell Journal
4. International Journal of Reproductive Medicine (IJRM)

International Training/Collaborations:

- **2009:** Post-Doctoral training in "Epigenetics" with focus on ChIP-Sequencing method, in the Nijmegen Center for the Molecular Life Sciences (NCMLS), Radboud University, The Netherlands
- **2017-current:** Methylome Mapping of Endometriosis Disease, under an international collaboration with Royan Institute and French National Centre for Scientific Research (CNRS), and 10000.00 Euro Foundation by Institut A. Bonniot, INSERM-France

Research Awards and Achievements:

- Award Winner of Young Scientists of Developing Countries, in 12th International Congress of Human Genetics (ICHG 2011), Canada
- Selective Researcher in 12th Festival of Application of Selective Researchers and Technologists, 2011, Iran
- Selective Researcher in Academic Center for Education and Culture research (ACECR), 2012, Iran
- Award Winner in 16th Royan International Research Award, September 2015
- Award winner of the Selective Researcher in The International Society of Embryology and Reproductive Biology (ISERB), 2017

Publications:

1. Shakhoseini, M., Ziaee, A-A. and Ghaemi, N. (2003) Expression and secretion of an alpha-amylase gene from a native strain of *Bacillus licheniformis* in *Escherichia coli* by T7 promoter and putative signal peptide of the gene. *Journal of Applied Microbiology* 95, 1250-1254.
2. Shakhoseini, M., Ziaee, A-A., Pourbabai, A-A., Ghaemi, N. and Declerck, N. (2005) A natural variant of *Bacillus licheniformis* alpha-amylase isolated from flour mill wastewaters sheds light on the origin of high thermostability. *Journal of Applied Microbiology*, 98, 24-32.
3. Shakhoseini, M. and Ziaee, A-A. (2001) Gene Submission in GenBank with Accession Number "AF438149".
4. Shakhoseini, M., Rabbani, A. and Abdossamadi, S. (2007) Identification of non-histone protein LMG₁₆₀ as a ribonucleoprotein of the nuclear matrix with a role in transcription in vitro. *Biochimie* 89, 1343-1350.
5. Totonchi, M., Shakhoseini, M., Momeni Moghadam, M., Baharvand, H. (2007) [Epigenetic of stem cells]. *Cell J.* 9, 51-66.
6. Shakhoseini, M. and Rabbani, A. (2008) Transcriptional inhibition by a non-histone protein from low mobility group in homologous and heterologous in vitro systems. *Mol. Biol. Rep.* 35, 189-193.
7. Shakhoseini, M., Rabbani, A. and Abdossamadi, S. (2009) Evidence for the structural stability of ribonucleoprotein LMG₁₆₀ under ribonuclease-A treatment. *Mol. Cel. Biochem.* 321, 65-72.
8. Shakhoseini, M., Rabbani, A. (2009) [An overview to the structure and function of nuclear matrix]. *Cell J.* 10, 232-241.

9. Shahhoseini, M., Taeae, A., Zare, N., Hosseini Salekdeh, Gh. and Baharvand H. (2010) Epigenetic analysis of human embryonic carcinoma cell line NT2 during neural differentiation induced by retinoic acid. *Biochem. Cell Biol.* 88, 527-538.
10. Shahhoseini, M., Favaedi, R., Baharvand, H., Sharma, V. and Stunnenberg, H.G. (2010) Evidence for a dynamic role of the linker histone variant H1x during retinoic acid-induced differentiation of NT2 cells. *FEBS Lett.* 548, 4661-4664.
11. Jadaliha, M., Shahhoseini, M. (2010) [Epigenetic and cellular memory]. *Cell J.* 12, 311-318.
12. Baghban Eslami, M. R., Karimi, N., Shahhoseini, M. (2011) Enhancement of glycosaminoglycan-rich matrix production in human marrow-derived mesenchymal stem cell chondrogenic culture by lithium chloride and SB16763 treatment. *Cell J.* 13, 117-126.
13. Favaedi, R., Shahhoseini, M., Akhoond, M.R. (2012) Comparative epigenetic analysis of Oct4 regulatory region in RA-induced differentiated NT2 cells under adherent and non-adherent culture conditions. *Mol. Cell. Biochem.* 363(1-2), 129-34.
14. Saeed S, Logie C, Francoijs KJ, Frigè G, Romanenghi M, Nielsen FG, Raats L, Shahhoseini M, Huynen M, Altucci L, Minucci S, Martens JH, Stunnenberg HG. Chromatin accessibility, p300, and histone acetylation define PML-RAR α and AML1-ETO binding sites in acute myeloid leukemia. *Blood.* 2012 Oct 11;120(15):3058-68.
15. Jangravi Z, Alikhani M, Arefnezhad B, Sharifi Tabar M, Taleahmad S, Karamzadeh R, Jadaliha M, Mousavi SA, Ahmadi Rastegar D, Parsamatin P, Vakilian H, Mirshahvaladi S, Sabbaghian M, Mohseni Meybodi A, Mirzaei M, Shahhoseini M, Ebrahimi M, Piryaee A, Moosavi-Movahedi AA, Haynes PA, Goodchild AK, Nasr-Esfahani MH, Jabbari E, Baharvand H, Sedighi Gilani MA, Gourabi H, Salekdeh GH. A fresh look at the male-specific region of the human Y chromosome. *J Proteome Res.* 2013 Jan 4;12(1):6-22.
16. Shahhoseini M, Taghizadeh Z, Hatami M, Baharvand H. Retinoic acid dependent histone 3 demethylation of the clustered Hox genes during neural differentiation of human embryonic stem cells. *Biochem. Cell Biol.* Nov 2013; 91(2): 116-122.
17. Ashrafi Kakhki S, Shahhoseini M, Salekdeh GH. Comparative SRY incorporation on the regulatory region of pluripotency/differentiation genes in human embryonic carcinoma cells after retinoic acid induction. *Mol Cell Biochem.* Jan 2013; 376(1-2):145-50.
18. Baghaban Eslaminejad M, Karimi N, Shahhoseini M. Chondrogenic differentiation of human bone marrow-derived mesenchymal stem cells treated by GSK-3 inhibitors. *Histochem Cell Biol.* 2013; 140(6):623-33.
19. Fatehi R, Ebrahimi B, Shahhosseini M, Farrokhi A, Fathi R. Effect of ovarian tissue vitrification method on mice preantral follicular development and gene expression. *Theriogenology.* Sep 2013; 81(2):302-8.

20. Rajabpour-Niknam M, Totonchi M, Shahhosseini M, Farrokhi A, Alipour H, Eftekhari-Yazdi P. Quantitative expression of developmental genes, Pou5f1 (Oct4) and Mest (Peg1), in vitrified mouse embryos. *Iran J Reprod Med.* 2013; 11(9):733-40.
21. Abdossamadi S, Rabbani-Chadegani A, Shahhoseini M. Insights into the structural stability of nuclear matrix ribonucleoprotein, LMG160: thermodynamic and spectroscopic analysis. *J Biomol Struct Dyn.* 2014; 32(6):890-8.
22. Shafipour M, Sabbaghian M, Shahhoseini M, Sadighi Gilani MA. Comparative expression analysis of Septin 14 in testes of infertile men with normal spermatogenesis and spermatogenic failure. *Iran J Reprod Med.* 2014; 12:205-8.
23. Jahangiri M, Shahhoseini M, Movaghar B. H19 and MEST gene expression and histone modification in blastocysts cultured from vitrified and fresh two-cell mouse embryos. *Reprod Biomed Online.* 2014 Nov;29(5):559-66.
24. Hosseinfar H, Shafipour M, Modarresi T, Azad M, Sadighi Gilani MA, Shahhosseini M, Sabbaghian M. Relationship between absence of annulus and asthenozoospermia in Iranian men. *J Assist Reprod Genet.* 2014 Dec;31(12):1681-5.
25. Mahdian S, Aflatoonian R, Yazdi RS, Yaghmaei P, Ramazanali F, Afsharian P, Shahhoseini M. Macrophage migration inhibitory factor as a potential biomarker of endometriosis. *Fertil Steril.* 2015 Jan;103(1):153-9.
26. Falahzadeh K, Banaei-Esfahani A, Shahhoseini M. The potential roles of actin in the nucleus. *Cell J.* 2015 Spring;17(1):7-14.
27. Ziadlou R, Shahhoseini M, Safari F, Sayahpour FA, Nemati S, Eslaminejad MB. Comparative analysis of neural differentiation potential in human mesenchymal stem cells derived from chorion and adult bone marrow. *Cell Tissue Res.* 2015 May 30.
28. Haji Ebrahim Zargar H, Mohseni Meybodi A, Sabbaghian M, Shahhoseini M, Asadpor U, Sadighi Gilani MA, Chehrazi M, Farhangniya M, Shahzadeh Fazeli SA. Association of Two Polymorphisms in H2B.W Gene with Azoospermia and Severe Oligozoospermia in An Iranian Population. *Int J Fertil Steril.* 2015 Jul-Sep;9(2):205-14.
29. Moeinvaziri F and Shahhoseini M. Epigenetic role of CCAAT Box-binding Transcription Factor NF-Y on ID Gene Family in Human Embryonic Carcinoma Cells. *IUBMB Life* 2016, 67 (11): 880-7.
30. Sadr SZ, Ebrahimi B, Shahhoseini M, Fatehi R, Favaedi R. Mouse preantral follicle development in two-dimensional and three-dimensional culture systems after ovarian tissue vitrification. *Eur J Obstet Gynecol Reprod Biol.* 2015 Nov;194:206-11.
31. Falahzadeh K, Shahhoseini M, Afsharian P. Differential Incorporation of β -actin as A Component of RNA Polymerase II into Regulatory Regions of Stemness/Differentiation Genes in Retinoic Acid-Induced Differentiated Human Embryonic Carcinoma Cells. *Cell J.* 2016 Jul-Sep;18(2):214-20.
32. Heydarian N, Favaedi R, Sadighi Gilani MA, Shahhoseini M. Expression level of chromodomain Y (CDY): potential marker for prediction of sperm recovery in non-obstructive azoospermia. *Int J Reprod Biomed (Yazd).* 2016 Jun;14(6):383-8.

33. Favaedi R, Shahhoseini M, Pakzad M, Mollamohammadi S, Baharvand H. Comparative epigenetic evaluation of human embryonic stem and induced pluripotent cells. *Int J Dev Biol.* 2016;60(4-6):103-10.
34. Banijamali M, Rabbani-Chadegani A, Shahhoseini M. Lithium attenuates lead induced toxicity on mouse non-adherent bone marrow cells. *J Trace Elem Med Biol.* 2016 Jul; 36:7-15.
35. Hosseini E, Mehraein F, Shahhoseini M, Karimian L, Nikmard F, Ashrafi M, Afsharian P, Aflatoonian R. Epigenetic alterations of CYP19A1 gene in Cumulus cells and its relevance to infertility in endometriosis. *J Assist Reprod Genet.* 2016 Aug;33(8):1105-13.
36. Fani N, Ziadlou R, Shahhoseini M, Baghaban Eslaminejad M. Comparative epigenetic influence of autologous versus fetal bovine serum on mesenchymal stem cells through in vitro osteogenic and adipogenic differentiation. *Exp Cell Res.* 2016 Jun 10;344(2):176-82.
37. Eelaminejad Z, Favaedi R, Sodeifi N, Sadighi Gilani MA, Shahhoseini M. Deficient expression of JMJD1A histone demethylase in patients with round spermatid maturation arrest. *Reprod Biomed Online.* 2017 Jan;34(1):82-89.
38. Keyvani-Ghamsari S, Rabbani-Chadegani A, Sargolzaei J, Shahhoseini M. Effect of irinotecan on HMGB1, MMP9 expression, cell cycle, and cell growth in breast cancer (MCF-7) cells. *Tumour Biol.* 2017 Apr; 39(4):1010428317698354. doi: 10.1177/1010428317698354.
39. Jahangiri M, Shahhoseini M, Movaghar B. The Effect of Vitrification on Expression and Histone Marks of Igf2 and Oct4 in Blastocysts Cultured from Two-Cell Mouse Embryos. *Cell J.* 2018 Jan; 19(4):607-613. doi: 10.22074/cellj.2018.3959. Epub 2017 Nov 4.
40. Mokhtari V, Afsharian P, Shahhoseini M, Kalantar SM, Moini A. A Review on Various Uses of N-Acetyl Cysteine. *Cell J.* 2017 Apr-Jun; 19(1):11-17. Epub 2016 Dec 21. Review.
41. Eelaminejad Z, Favaedi R, Modarresi T, Sabbaghian M, Sadighi Gilani MA, Shahhoseini M. Association between JMJD1A Expression and Sperm Retrieval in Non-Obstructive Azoospermic Patients. *Cell J.* 2018 Jan; 19(4):660-665.
42. Eslami H, Eslami A, Favaedi R, Asadpour U, Zari Moradi S, Eftekhari-Yazdi P, Madani T, Shahhoseini M, Mohseni Meybodi A. Epigenetic Aberration of FMR1 Gene in Infertile Women with Diminished Ovarian Reserve. *Cell J.* 2018 Apr; 20(1):78-83.
43. Bakhtiarizadeh MR, Hosseinpour B, Shahhoseini M, Korte A, Gifani P. Weighted Gene Co-expression Network Analysis of Endometriosis and Identification of Functional Modules Associated With Its Main Hallmarks. *Front Genet.* 2018 Oct 12; 9:453. doi: 10.3389/fgene.2018.00453.
44. Sahraei SS, Shahhoseini M, Movaghar B. Vitrification Has an Effect like Culture on Gene Expression and Histone Modification In Mouse Embryos. *Cryo Letters.* 2018 Mar/Apr;39(2):102-112.
45. Golestan Jahromi M, Aflatoonian R, Afsharian P, Aghajanzpour S, Shahhoseini M, Aflatoonian A. Altered expression of 3' paralogous HOX A-D clusters in endometriosis disease: A case-control study. *Int J Reprod Biomed (Yazd).* 2018 Sep;16(9):549-556.
46. Samadieh Y, Favaedi R, Ramezanali F, Afsharian P, Aflatoonian R, Shahhoseini M. Epigenetic Dynamics of HOXA10 Gene in Infertile Women With Endometriosis. *Reprod Sci.* 2019 Jan;26(1):88-96.

47. Shokraii F, Moharrami M, Motamed N, Shahhoseini M, Totonchi M, Ezzatizadeh V, Firouzi J, Khosravani P, Ebrahimi M. Histone Modification Marks Strongly Regulate CDH1 Promoter in Prostospheres as A Model of Prostate Cancer Stem Like Cells. *Cell J*. 2019 Jul;21(2):124-134.
48. Molaie S, Shahverdi A, Sharafi M, Shahhoseini M, Rashki Ghaleno L, Esmaeili V, Abed-Heydari E, Numan Bucak M, Alizadeh A. Dietary trans and saturated fatty acids effects on semen quality, hormonal levels and expression of genes related to steroid metabolism in mouse adipose tissue. *Andrologia*. 2019 Jun;51(5): e13259.
49. Amirteimouri S, Ashini M, Ramazanali F, Aflatoonian R, Afsharian P, Shahhoseini M. Epigenetic role of the nuclear factor NF-Y on ID gene family in endometrial tissues of women with endometriosis: a case control study. *Reprod Biol Endocrinol*. 2019 Mar 15;17(1):32.
50. Mousazadeh S, Ghaheri A, Shahhoseini M, Aflatoonian R, Afsharian P. The Effect of Imbalanced Progesterone Receptor-A/-B Ratio on Gelatinase Expressions in Endometriosis. *Int J Fertil Steril*. 2019 Jul;13(2):127-134.
51. Barjaste N, Shahhoseini M, Afsharian P, Sharifi-Zarchi A, Masoudi-Nejad A. Genome-wide DNA methylation profiling in ectopic and eutopic of endometrial tissues. *J Assist Reprod Genet*. 2019 Aug;36(8):1743-1752.
52. Hosseini E, Shahhoseini M, Afsharian P, Karimian L, Ashrafi M, Mehraein F, Afatoonian R. Role of epigenetic modifications in the aberrant CYP19A1 gene expression in polycystic ovary syndrome. *Arch Med Sci*. 2019 Jul;15(4):887-895.
53. Shariati F, Favaedi R, Ramazanali F, Ghoraeian P, Afsharian P, Aflatoonian B, Aflatoonian R, Shahhoseini M. Increased expression of stemness genes REX-1, OCT-4, NANOG, and SOX-2 in women with ovarian endometriosis versus normal endometrium: A case-control study. *Int J Reprod Biomed (Yazd)*. 2019 Jan 28;16(12).
54. Mousazadeh S, Ghaheri A, Shahhoseini M, Aflatoonian R, Afsharian P. Differential expression of progesterone receptor isoforms related to PGR +331g/a polymorphism in endometriosis: A case-control study. *Int J Reprod Biomed (Yazd)*. 2019 May 5;17(3).
55. Etesami E, Nikukar H, Ramezanali F, Ghotbizadeh Vahdani F, Shahhoseini M, Favaedi R, Ghaheri A, Seydabadi S, Zamanian M. Gene expression analysis of MMPs in women with preeclampsia using cell-free fetal RNA in maternal plasma. *Pregnancy Hypertens*. 2019 Jul; 17:261-268.
56. Chekini Z, Poursadoughian Yaran A, Ansari-Pour N, Shahhoseini M, Ramazanali F, Aflatoonian R, Afsharian P. A novel gene-wide haplotype at the macrophage migration inhibitory factor (MIF) locus is associated with endometrioma. *Eur J Obstet Gynecol Reprod Biol*. 2020 Apr;247:6-9.
57. Emami N, Alizadeh A, Moini A, Yaghmaei P, Shahhosseini M. Differences in fatty acid profiles and desaturation indices of abdominal subcutaneous adipose tissue between pregnant women with and without PCOS. *Adipocyte*. 2020; 9(1); 16-23.
58. Mollae Z, Favaedi R, Jazireian P, Afsharian P, Mohseni Meybodi A, Shahhoseini M. Genetic contribution of HIST1H1T regulatory region alternations to human nonobstructive azoospermia. *Andrologia*. 2020; e13647
59. Mahdian S, Zarrabi M, Moini A, Movahedi M, Shahhoseini M. In silico identification of new inhibitors for β 2-glycoprotein I as a major antigen in antiphospholipid antibody syndrome. *J. Mol. Model*. 2020; 26(6); 156.
60. Mahdian S, Shahhoseini M, Moini A. COVID-19 Mediated by Basigin Can Affect Male and Female Fertility. *Int. J. Fertil. Steril*. 2020 Oct;14(3):262-263.

61. Esfandiari F, Favaedi R, Heidari-Khoei H, Chitsazian F, Yari S, Piryaee A, Ghafari F, Baharvand H, Shahhoseini M. Insight into epigenetics of human endometriosis organoids: DNA methylation analysis of HOX genes and their cofactors. *Fertil. Steril.* 2020 Oct 14;S0015-0282(20)32152-X. doi: 10.1016/j.fertnstert.2020.08.1398. Online ahead of print.
62. Mahdian S, Pirjani R, Favaedi R, Movahedi M, Moini A, Shahhoseini M. Platelet-activating factor and antiphospholipid antibodies in recurrent implantation failure. *J Reprod Immunol.* 2021 Feb;143:103251. doi: 10.1016/j.jri.2020.103251. Epub 2020 Nov 27.
63. Hajitarkhani S, Moini A, Hafezi M, Shahhoseini M, Alizadeh A. Differences in gene expression of enzymes involved in branched-chain amino acid metabolism of abdominal subcutaneous adipose tissue between pregnant women with and without PCOS. *Taiwan J Obstet Gynecol.* 2021 Mar;60(2):290-294. doi: 10.1016/j.tjog.2020.12.008.
64. Oveisi A, Vahdati A, Shahhoseini M, Favaedi R, Maroufizadeh S, Movaghar B. Ovulation Induction Changes Epigenetic Marks of Imprinting Genes in Mice Fetus Organs. *Cell J.* 2021 Apr;23(1):99-108. doi: 10.22074/cellj.2021.6953. Epub 2021 Mar 1.
65. Almasi MZ, Hosseini E, Jafari R, Aflatoonian K, Aghajanpour S, Ramazanali F, Moini A, Shahhoseini M, Afsharian P, Aflatoonian R. Evaluation of Toll-like receptor 3 (TLR3) signaling pathway genes and its genetic polymorphisms in ectopic and eutopic endometrium of women with endometriosis. *J Gynecol Obstet Hum Reprod.* 2021 Apr 20;50(9):102153. doi: 10.1016/j.jogoh.2021.102153. Online ahead of print.
66. Esfandiari F, Heidari Khoei H, Saber M, Favaedi R, Piryaee A, Moini A, Shahhoseini M, Ramezanali F, Ghaffari F, Baharvand H. Disturbed progesterone signalling in an advanced preclinical model of endometriosis. *Reprod Biomed Online.* 2021 Jul;43(1):139-147. doi: 10.1016/j.rbmo.2020.12.011. Epub 2021 Mar 13.
67. Emami N, Moini A, Yaghmaei P, Akbarinejad V, Shahhoseini M, Alizadeh A. Differences in expression of genes related to steroidogenesis in abdominal subcutaneous adipose tissue of pregnant women with and without PCOS; a case control study. *BMC Pregnancy Childbirth.* 2021 Jul 7;21(1):490. doi: 10.1186/s12884-021-03957-5.
68. Yari S, Khoei HH, Saber M, Esfandiari F, Moini A, Shahhoseini M. Metformin attenuates expression of angiogenic and inflammatory genes in human endometriotic stromal cells. *Exp Cell Res.* 2021 Jul 15;404(2):112659. doi: 10.1016/j.yexcr.2021.112659. Epub 2021 May 19.
69. Khomehiee N, Jazireian P, Ebrahimi B, Alizadeh A, Shahhoseini M. Paternal trans-fatty acid and vitamin E diet affects rat offspring's semen quality and PPARs expression. *Andrologia.* 2021 Aug;53(7):e14082. doi: 10.1111/and.14082. Epub 2021 Apr 27.
70. Esfandiari F, Chitsazian F, Jahromi MG, Favaedi R, Bazrgar M, Aflatoonian R, Afsharian P, Aflatoonian A, Shahhoseini M. HOX cluster and their cofactors showed an altered expression pattern in eutopic and ectopic endometriosis tissues. *Reprod Biol Endocrinol.* 2021 Sep 1;19(1):132. doi: 10.1186/s12958-021-00816-y.
71. Olia Bagheri F, Alizadeh A, Sadighi Gilani MA, Shahhoseini M. Role of peroxisome proliferator-activated receptor gamma (PPAR γ) in the regulation of fatty acid metabolism related gene expressions in testis of men with impaired spermatogenesis. *Reprod Biol.* 2021 Sep 4;21(4):100543. doi: 10.1016/j.repbio.2021.100543. Online ahead of print.