

中华生殖与避孕杂志[®]

原刊名《生殖与避孕》

CHINESE JOURNAL OF REPRODUCTION AND CONTRACEPTION

月刊 1980年12月创刊 第44卷 第11期 2024年11月25日出版



主 管

中国科学技术协会

主 办

中华医学会
上海市生物医药技术研究院
复旦大学附属妇产科医院

编 辑

中华生殖与避孕杂志
编辑委员会
200237,上海市老沪闵路779号
电话:(021)64438169
传真:(021)64438975
Email:rande@sibpt.com
http://zhshzybyzz.yiigle.com

总编辑

乔 杰

编辑部主任

王 健

出 版

《中华医学杂志》社有限责任公司
100710,北京市东四西大街42号
电话(传真):(010)51322059
Email:office@cmaph.org

印 刷

上海界龙中报印务有限公司

发 行

范围:公开
国内:中国邮政集团公司
上海分公司
国外:中国国际图书贸易集团
责任有限公司
(北京399信箱,100048)
代号 BM 389

订 购

全国各地邮政局
邮发代号4-928

邮 购

中华生殖与避孕杂志编辑部
200237,上海市老沪闵路779号
电话:(021)64438169,64438975
Email:rande@sibpt.com

定 价

每期35.00元,全年420.00元

中国标准连续出版物号

ISSN 2096-2916

CN 10-1441/R

2024年版权归主办者所有

未经授权,不得转载、摘编本刊
文章,不得使用本刊的版式设计

除非特别声明,本刊刊出的所有
文章不代表中华医学会和本刊
编委会的观点

本刊如有印装质量问题,请向本刊
编辑部调换

目 次

规范与标准

- 紧急避孕临床应用专家共识(2024年)1107
中国妇幼保健研究会安全避孕专委会

标准与讨论

- 《不孕不育人群肥胖/超重诊疗指南(2025年版)》制定计划书1116
黄佳 江琳琳 陈慧 白诗雨 汤景 王峥 李蓉 杨冬梓

临床研究

- 波塞冬标准年轻预期低预后患者卵泡期长效方案不同
促性腺激素启动剂量的临床及围产结局比较1121
邹海蛟 王芳 史昊 焦芸云 马源 刘宇 郭艺红
经IVF/ICSI助孕首次单胎活产后患者二孩生育意愿
影响因素分析1131
于爽 管一春 苏卓伦 徐宁华 李文静 张永杰 姜华
体外受精/卵泡质内单精子注射单胚胎移植活产周期的
性别相关生长差异研究1138
张爱玉 王冬梅 蒋帅 张晟宁

实验研究

- 甲基转移酶样蛋白3调控FOXO1的表达及对子宫内膜基质
细胞蜕膜化的影响1146
葛挺 张曼丽 张于念 徐强 腊晓琳
基于HIF-1 α /VEGFA信号通路探讨育肾养卵方对小鼠卵巢
储备功能减退改善1156
黄家宓 夏翎晋 张兆伟 钟煜舜 毛燕燕 杜晶 张婷婷

临床报道

- 控制性卵巢刺激相关参数与染色体结构异常中新发染色体
异常的关系分析1164
张静 田烨 李芳 张妍 宋学茹 田文艳 陈海霞 白晓红
IVF/ICSI助孕后患者流产组织染色体异常相关
因素分析1170
石铭 张晨 康鑫 杨惠云 石杨 刘小雪 张静
不明原因反复妊娠失败患者的免疫学指标分析1175
董静 高海慧 王丽芹 潘琳 赵磊

现场调查

- 我国胚胎植入前遗传学诊断技术配置和服务利用分析1180
白符 马艺 高丽娜 张懿心 王冬颖 李志新

循证医学

- 维生素D改善男性不育患者精液质量的有效性评估：
系统评价和meta分析1184
黄臻伟 张静茹 李得春

综 述

- 铜稳态及铜死亡与多囊卵巢综合征发病关系的研究进展1191
李艳 李海 刘洋
- HSP70在早期胚胎发育中作用的研究进展1196
欧向阳 丁锦丽 杨哲 张琪璇 吴庚香
- 线粒体自噬影响卵巢储备功能减退女性卵母细胞发育的研究进展1200
孙娅瑄 马瑞红 马赛花 吴林玲 吴宇
- DNA甲基化调控在早发性卵巢功能不全发生、发展中的研究进展1205
刘鹏 孙宁霞
- 颗粒细胞程序性死亡在卵巢衰老中的研究进展1210
孟奕岑 张倩杰 马文静 周忠明 杨菁 李赛姣
- 《中华生殖与避孕杂志》第三届编辑委员会成员名单 1130
- 《中华生殖与避孕杂志》第三届通讯编辑委员会成员名单 1155
- 本刊稿约见本卷第1期封三,第7期封二
- 本期责任编辑 乔杰 本期责任编辑 王李艳 本期责任排版 牟丽红

CHINESE JOURNAL OF REPRODUCTION AND CONTRACEPTION

(Original title: *Reproduction and Contraception*)

Monthly

Established in December 1980

Volume 44, Number 11

November 25, 2024



Responsible Institution

China Association for Science and Technology

Sponsor

Chinese Medical Association,
Shanghai Institute for Biomedical and Pharmaceutical Technologies,
Obstetrics and Gynecology Hospital of Fudan University

Editing

Editorial Board of Chinese Journal of Reproduction and Contraception
779 Laohumin Road, Shanghai 200237, China
Tel: 0086-21-64438169
Fax: 0086-21-64438975
Email: rande@sibpt.com
http://zhzybyzz.yiigle.com

Editor-in-Chief

Qiao Jie

Managing Director

Wang Jian

Publishing

Chinese Medical Journals
Publishing House Co., Ltd.
42 Dongxi Xidajie, Beijing 100710, China
Tel(Fax): 0086-10-51322059
Email: office@cmaph.org

Printing

Shanghai Jielong Zhongbao Printing Co., Ltd

Overseas Distributor

China International Book
Trading Corporation
P.O. Box 399, Beijing 100048, China
Code No.M389

Mail-Order

Editorial Board of Chinese Journal of Reproduction and Contraception
779 Laohumin Road, Shanghai 200237, China
Tel: 0086-21-64438169
Fax: 0086-21-64438975
Email: rande@sibpt.com

CSSN

ISSN 2096-2916
CN 10-1441/R

Copyright © 2024 by the all sponsors

No content published by the journals of Chinese Medical Association may be reproduced or abridged without authorization. Please do not use or copy the layout and design of the journals without permission.

All articles published represent the opinions of the authors, and do not reflect the official policy of the Chinese Medical Association or the Editorial Board, unless this is clearly specified.

CONTENTS IN BRIEF

Standards and Specifications

- Consensus on clinical practice of emergency contraception (2024)**1107
The Safe Contraception Committee of the Chinese Maternal and Child Health Research Association

Standards and Discussions

- Protocol for the guidelines for the diagnosis and treatment of obesity/overweight in infertile populations (2025)**1116
Huang Jia, Jiang Linlin, Chen Hui, Bai Shiyu, Tang Jing, Wang Zheng, Li Rong, Yang Dongzi

Clinical Studies

- Comparison of clinical and perinatal outcomes of different gonadotropin starting dosages in the early-follicular phase long-acting GnRH agonist long protocol in young patients with expected poor prognosis according to POSEIDON criteria**1121
Zou Haijiao, Wang Fang, Shi Hao, Jiao Yunyun, Ma Yuan, Liu Yu, Guo Yihong
- Analysis of factors influencing the willingness of patients to have a second child after obtaining the first singleton live birth via IVF/ICSI-assisted conception**1131
Yu Shuang, Guan Yichun, Su Zhuolun, Xu Ninghua, Li Wenjing, Zhang Yongjie, Lou Hua
- Study on sex-related growth difference in the live birth cycle of single embryo transfer by IVF/ICSI**1138
Zhang Aiyu, Wang Dongmei, Jiang Shuai, Zhang Shengning

Laboratory Studies

- Methyltransferase-like 3 regulates FOXO1 expression and its effect on decidualization of endometrial stromal cells**1146
Ge Ting, Zhang Manli, Zhang Yunian, Xu Qiang, La Xiaolin
- Exploration of the effects of Yushen Yangluan decoction on improving ovarian reserve function in mice based on the HIF-1 α /VEGFA signaling pathway**1156
Huang Jiami, Xia Linjin, Zhang Zhaofeng, Zhong Yushun, Mao Yanyan, Du Jing, Zhang Tingting

Clinical Reports

- Analysis of the relationship between parameters of controlled ovarian stimulation and *de novo* chromosomal abnormalities in chromosomal structural abnormalities**1164
Zhang Jing, Tian Ye, Li Fang, Zhang Yan, Song Xueru, Tian Wenyan, Chen Haixia, Bai Xiaohong
- Analysis of factors related to chromosomal abnormalities in abortion tissue of patients after IVF/ICSI assisted conception**1170
Shi Ming, Zhang Chen, Kang Xin, Yang Huiyun, Shi Yang, Liu Xiaoxue, Zhang Jing

Analysis of immunological indicators in patients with unexplained recurrent pregnancy failure	1175
<i>Dong Jing, Gao Haihui, Wang Liqin, Pan Lin, Zhao Lei</i>	
Field Investigation	
Configuration and service utilization analysis of preimplantation genetic diagnosis in China	1180
<i>Bai Fu, Ma Yi, Gao Lina, Zhang Yixin, Wang Dongying, Li Zhixin</i>	
Evidence-based Medicine	
Efficacy of vitamin D in treating semen quality in patients with male infertility: a systematic review and meta-analysis	1184
<i>Huang Zhenwei, Zhang Jingru, Li Dechun</i>	
Reviews	
Research progress on copper homeostasis and copper-induced cell death in the pathogenesis of polycystic ovary syndrome	1191
<i>Li Yan, Li Hai, Liu Yang</i>	
Research progress on the role of HSP70 in early embryonic development	1196
<i>Ou Xiangyang, Ding Jinli, Yang Zhe, Zhang Qixuan, Wu Gengxiang</i>	
Research progress on the effects of mitophagy on oocyte development in women with diminished ovarian reserve	1200
<i>Sun Yaxuan, Ma Ruihong, Ma Saihua, Wu Linling, Wu Yu</i>	
Research progress on the regulation of DNA methylation in the occurrence and development of POI	1205
<i>Liu Peng, Sun Ningxia</i>	
Progress of programmed death of granulosa cells in ovarian aging	1210
<i>Meng Yicen, Zhang Qianjie, Ma Wenjing, Zhou Zhongming, Yang Jing, Li Saijiao</i>	

DOI: 10.3760/cma.j.cn101441-20240302-00079

收稿日期 2024-03-02 本文编辑 孙敏

引用本文: 汤小晗, 卢美松. 维生素 D 受体在子宫内膜异位症中的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 997-1001. DOI: 10.3760/cma.j.cn101441-20240302-00079.

综述

维生素 D 受体在子宫内膜异位症中的研究进展

汤小晗 卢美松

哈尔滨医科大学附属第一医院妇产科, 哈尔滨 150001

通信作者: 卢美松, Email: lumeisong0417@163.com, 电话:
+86-451-85556935

【摘要】 子宫内膜异位症作为常见的妇科慢性疾病, 可导致患者出现持续加重的盆腔粘连、疼痛和不孕等症状, 严重影响女性的生育力和生活质量。维生素 D 和子宫内膜异位症的相关研究受到了越来越多的关注, 而维生素 D 在靶器官中的作用依赖于维生素 D 受体 (vitamin D receptor, VDR) 的表达及其生物学功能。鉴此, 本文总结了 VDR 的功能和特点, 并针对 VDR 在子宫内膜异位症中的表达水平、基因多态性, VDR 在子宫内膜异位症病理过程中的作用机制以及 VDR 激动剂在子宫内膜异位症治疗中的研究进展作一综述, 为子宫内膜异位症诊断和治疗的基础与临床研究提供新的思路。

【关键词】 子宫内膜异位症; 维生素 D 受体; 维生素 D

基金项目: 国家自然科学基金青年项目 (82001520); 哈尔滨医科大学附属第一医院科研创新基金 (2021M22)

Research progress of vitamin D receptor in endometriosis

Tang Xiaohan, Lu Meisong

Obstetrics and Gynecology Department, the First Affiliated Hospital of Harbin Medical University, Harbin 150001, China

Corresponding author: Lu Meisong, Email: lumeisong0417@163.com, Tel: +86-451-85556935

【Abstract】 Endometriosis is a common chronic gynecological disease and leads to continuous aggravation of pelvic adhesion, pain and infertility, which seriously affects women's fertility and quality of life. Studies related to vitamin D and endometriosis have received increasing attention, the response of vitamin D in target organs depends on the expression level and biological function of vitamin D receptor (VDR). Thus, the function and characteristics of VDR were summarized in this study, and the expression level, gene polymorphism, mechanism of VDR in

endometriosis and the research progress of VDR agonists in the treatment of endometriosis were reviewed, providing new ideas for basic and clinical research on diagnosis and treatment of endometriosis.

【Key words】 Endometriosis; Vitamin D receptor; Vitamin D

Fund program: National Natural Science Youth Foundation of China (82001520); Research and Innovation Fund of the First Affiliated Hospital of Harbin Medical University (2021M22)

DOI: 10.3760/cma.j.cn101441-20240108-00014

收稿日期 2024-01-08 本文编辑 王李艳

引用本文: 廖琪, 徐芳, 冯晓玲, 等. 维生素 D 调控子宫内膜异位症免疫学发病机制的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1002-1008. DOI: 10.3760/cma.j.cn101441-20240108-00014.

综述

维生素 D 调控子宫内膜异位症免疫学发病机制的研究进展

廖琪¹ 徐芳² 冯晓玲² 匡洪影² 张晴³ 孙淼²

¹黑龙江中医药大学研究生院, 哈尔滨 150040; ²黑龙江中医药大学

附属第一医院妇科二科, 哈尔滨 150040; ³西安市中医医院妇科,

西安 710021

通信作者: 孙淼, Email: sunmiao82@163.com, 电话: +86-13704810319

【摘要】 维生素 D 作为一种重要的免疫调节素, 通过与免疫细胞的维生素 D 受体结合, 以影响其表达、增殖和凋亡等, 从而发挥免疫调节作用, 与慢性炎症性疾病、自身免疫性疾病等相关。近年研究显示, 子宫内膜细胞也表达维生素 D 受体, 并且子宫内膜异位症患者相关免疫因子表达水平与维生素 D 水平具有相关性。故本文就维生素 D 水平调控子宫内膜异位症免疫学发病机制的研究进展作一综述。

【关键词】 维生素 D; 子宫内膜异位症; 免疫学发病机制

基金项目: 中国中西医结合妇产科专项研究基金普正制药专项 (FCK-PZ-02); 中国中西医结合妇产科专项研究基金 (FCK-ZSYTW-02)

Research progress on the immunological pathogenesis of endometriosis regulated by vitamin D

Liao Qi¹, Xu Fang², Feng Xiaoling², Kuang Hongying², Zhang Qing³, Sun Miao²

¹ Graduate School of Heilongjiang University of Chinese Medicine, Harbin 150040, China; ² Department of Gynecology, the First Affiliated Hospital of Heilongjiang University of Chinese Medicine, Harbin 150040, China; ³ Department of Gynecology, Xi'an Hospital of Traditional Chinese Medicine, Xi'an 710021, China

Corresponding author: Sun Miao, Email: sunmiao82@163.com, Tel: +86-13704810319

【Abstract】 As an important immunomodulator, vitamin D is involved in the expression, proliferation and apoptosis of immune cells through binding with the vitamin D receptor of immune cells, so as to play an immunomodulatory role, which is related to chronic inflammatory diseases and autoimmune diseases. Recent studies have found that endometrial cells also express vitamin D receptors, and the expression level of relevant immune factors in endometriosis patients are correlated with vitamin D levels. Therefore, this article will review the research progress on the regulation of vitamin D levels on the immunological pathogenesis of endometriosis.

【Key words】 Vitamin D; Endometriosis; Immunological pathogenesis

Fund program: Chinese Special Research Foundation of Obstetrics and Gynecology of Integrated Chinese and Western Medicine, Puzheng Pharmaceutical Special Project (FCK-PZ-02); Chinese Special Research Foundation for Obstetrics and Gynecology of Integrated Traditional and Western Medicine (FCK-ZSYTW-02)

DOI: 10.3760/cma.j.cn101441-20240122-00036

收稿日期 2024-01-22 本文编辑 王李艳

引用本文: 胡曼曼, 燕美琴, 范洪媛, 等. 多囊卵巢综合征患者并发妊娠期糖尿病的预测因素及干预措施的研究进展 [J]. 中华生殖与避孕杂志, 2024, 44(10): 1009-1014. DOI: 10.3760/cma.j.cn101441-20240122-00036.

综述

多囊卵巢综合征患者并发妊娠期糖尿病的预测因素及干预措施的研究进展

胡曼曼¹ 燕美琴² 范洪媛³ 张翰笙¹

¹山西医科大学护理学院, 太原 030001; ²山西医科大学附属儿童医院教科, 太原 030013; ³山东中医药高等专科学校护理系, 烟台 264100

通信作者: 燕美琴, Email: sxtymq@126.com, 电话: +86-13509718238

【摘要】 多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 是育龄期女性最常见的内分泌紊乱疾病, 病因及发病机制尚不明确。PCOS 患者经常表现出胰岛素抵抗、肥胖和不孕, 增加诸如妊娠期糖尿病 (gestational diabetes mellitus, GDM) 等一系列妊娠期并发症的风险。研究显示 PCOS 患者 GDM 患病风险高于年龄和体质指数匹配的健康妊娠孕妇 3 倍, 而早期识别 GDM 高危孕妇并采取针对性的干预措施能显著改善患者妊娠结局。因此, 本文综述了 PCOS 患者并发 GDM 的预测因素, 提出高危因素筛查建议并探讨了生活方式改善措施, 旨在为 GDM 高危孕妇的识别、良好生活方式的建立提供一定的参考依据。

【关键词】 多囊卵巢综合征; 妊娠期糖尿病; 胰岛素抵抗

基金项目: 山西省卫生健康委科研课题 (2021130); 山西省科技战略研究专项 (202204031401159); 山西省研究生教育创新计划 (2024SJ197)

Progress in the study of predictive factors of gestational diabetes mellitus in patients with polycystic ovary syndrome as a complication of pregnancy

Hu Manman¹, Yan Meiqin², Fan Hongyuan³, Zhang Hansheng¹

¹ School of Nursing, Shanxi Medical University, Taiyuan 030001, China; ² Department of Education, Affiliated Children's Hospital of Shanxi Medical University, Taiyuan 030013, China; ³ Department of Nursing, Shandong Higher Specialized School of Traditional Chinese Medicine, Yantai 264100, China

Corresponding author: Yan Meiqin, Email: sxyymq@126.com, Tel: +86-13509718238

【 Abstract 】 Polycystic ovary syndrome (PCOS) is the most prevalent endocrine disorders in women of reproductive age, yet its etiology and pathogenesis remain unclear. Women with PCOS frequently present with insulin resistance, obesity, and infertility, which heightens the risk of various pregnancy complications such as gestational diabetes mellitus (GDM). Research has demonstrated that PCOS patients have a three-fold higher risk of developing GDM compared with healthy pregnant women matched with age and body mass index. Early identification of pregnant women at high risk for GDM and targeted intervention measures can significantly enhance patients' outcomes. Therefore, this article aims to review predictive factors for GDM in patients with PCOS, propose suggestions for screening high-risk factors, and discuss measures to improve lifestyle. The objective is to provide a reference for identifying high-risk pregnant women with GDM and establishing a healthy lifestyle.

【 Key words 】 Polycystic ovary syndrome; Diabetes, gestational; Insulin resistance

Fund program: Scientific Research Topics of Shanxi Provincial Health and Health Commission (2021130); Shanxi Provincial Science and Technology Strategy Research Special Project (202204031401159); Shanxi Province Graduate Education Innovation Program (2024SJ197)

DOI: 10.3760/cma.j.cn101441-20240612-00213

收稿日期 2024-06-12 本文编辑 宋培培

引用本文: 兰婷婷, 王静, 但敏, 等. 尿酸代谢在多囊卵巢综合征患者中的研究现状[J]. 中华生殖与避孕杂志, 2024, 44(10): 1015-1020. DOI: 10.3760/cma.j.cn101441-20240612-00213.

综述

尿酸代谢在多囊卵巢综合征患者中的研究现状

兰婷婷 王静 但敏 刘圆圆 曹明雅 赵志明

河北医科大学第二医院生殖科, 石家庄 050000

通信作者: 赵志明, Email: zhaozhiming@hebm.u.edu.cn

【摘要】 近年来随着对尿酸的研究不断深入, 发现尿酸代谢异常不仅与肾脏和心血管疾病有关, 也与多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 等生殖系统疾病有着密切的联系。尿酸可通过氧化应激、慢性炎症、干扰关键酶活性等机制在 PCOS 的发生、发展中发挥重要作用, PCOS 以高雄激素血症、胰岛素抵抗、糖脂代谢异常等为主要临床表现, 已有研究数据表明高尿酸血症与高雄激素血症、异常的糖脂代谢之间存在相互作用, 同时升高的血清尿酸还与 PCOS 患者更高的妊娠并发症发生率及不良妊娠结局相关。然而, 目前关于此方面的综述较少。因此, 本综述旨在通过深入探讨尿酸代谢与 PCOS 主要临床表现之间的相互关系, 以及尿酸代谢异常对 PCOS 不孕患者妊娠结局及并发症的影响, 以期 PCOS 的临床治疗和管理提供更为全面的科学依据。

【关键词】 尿酸; 多囊卵巢综合征; 高雄激素血症; 胰岛素抵抗; 脂代谢异常; 排卵抑制; 脂肪组织; 降尿酸治疗; 饮食

基金项目: 2022 年河北省省级科技计划 (22377742D); 2022 年河北医科大学第二医院科学研究基金项目 (2HC202203); 2023 年河北省财政府资助临床医学优秀人才培养项目 (ZF2023107)

Research status of uric acid metabolism in patients with polycystic ovary syndrome

Lan Tingting, Wang Jing, Dan Min, Liu Yuanyuan, Cao Mingya, Zhao Zhiming

Department of Reproductive Medicine, the Second Hospital of Hebei Medical University, Shijiazhuang 050000, China

Corresponding author: Zhao Zhiming, Email: zhaozhiming@hebm.u.edu.cn

【Abstract】 With the deepening of the research on uric acid, it has been found that abnormal uric acid metabolism is not only related to kidney and cardiovascular diseases, but also closely related to reproductive system diseases such as polycystic ovary syndrome (PCOS). Uric acid can play an important role in the occurrence and development of PCOS through oxidative stress, chronic inflammation and interference with key enzyme activities. PCOS is primarily characterized by hyperandrogenemia, insulin resistance, and dysregulation of

glucose and lipid metabolism. Researches have found that there is an interaction between hyperuricemia and hyperandrogenemia, as well as abnormal glucose and lipid metabolism. Additionally, elevated serum uric acid levels are associated with a higher incidence of pregnancy complications and adverse pregnancy outcomes in women with PCOS. However, there are few reviews on this aspect. Therefore, this review aims to provide a more comprehensive scientific basis for the clinical treatment and management of PCOS by deeply exploring the relationship between uric acid metabolism and the main clinical manifestations of PCOS, as well as the impact of abnormal uric acid metabolism on pregnancy outcomes and complications in PCOS patients.

【Key words】 Uric acid; Polycystic ovary syndrome; Hyperandrogenemia; Insulin resistance; Abnormal lipid metabolism; Ovulation inhibition; Adipose tissue; Urate lowering therapy; Diet

Fund program: Key Research and Development Plan Health Innovation Special of Hebei Province in 2022 (22377742D); The Second Hospital of Hebei Medical University Institute Funding in 2022 (2HC202203); Government Funded Clinical Medical Talents Training Project of Hebei Province in 2023 (ZF2023107)

DOI: 10.3760/cma.j.cn101441-20240310-00089

收稿日期 2024-03-10 本文编辑 孙敏

引用本文: 陈佳媛, 倪天翔, 颜军昊. PCOS 患者子宫内膜容受性缺陷研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1021-1026. DOI: 10.3760/cma.j.cn101441-20240310-00089.

综述

PCOS 患者子宫内膜容受性缺陷研究进展

陈佳媛 倪天翔 颜军昊

山东大学妇儿与生殖健康研究院 山东大学国家辅助生殖与优生工程
技术研究中心 山东省生殖健康临床医学研究中心, 济南 250012

通信作者: 颜军昊, Email: yyy306@126.com, 电话: +86-531-85651190

【摘要】 多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 是一种多发于育龄期女性的生殖内分泌疾病, 严重影响了女性的生活质量和生育能力, 对身心健康和经济能力都造成打击。目前针对 PCOS 患者的稀发排卵、内分泌失调等问题已可以通过促排卵药物纠正, 但患者的子宫内膜容受性仍处于不良状态, 依然存在无法受孕的情况。PCOS 患者子宫内膜容受性缺陷与代谢、免疫、激素及其受体异常表达等密切相关, 不过具体的病理机制以及病因尚未完全阐明。本文主要讨论

了 PCOS 患者子宫内膜容受性缺陷的因素，并围绕遗传及表观遗传学异常、代谢异常、免疫紊乱三个角度展开，试图为 PCOS 患者的治疗方案以及新的药物靶标提供一些线索。

【关键词】 多囊卵巢综合征； 子宫内膜容受性； 代谢； 全基因组关联研究

基金项目：山东省自然科学基金青年项目（ZR2021QH075）

Research progress of endometrial receptivity defects in patients with PCOS

Chen Jiayuan, Ni Tianxiang, Yan Junhao

Shandong University Institute of Women, Children and Reproductive Health; Shandong University National Research Center for Assisted Reproductive Technology and Reproductive Genetics; Shandong Provincial Clinical Research Center for Reproductive Health, Jinan 250012, China

Corresponding author: Yan Junhao, Email: yyy306@126.com, Tel: +86-531-85651190

【Abstract】 Polycystic ovary syndrome (PCOS) is a reproductive endocrine disorder that is more common in women of childbearing age, which seriously affects women's quality of life and fertility, taking a toll on both physical and mental health as well as economic capacity. At present, the problems of thin ovulation and endocrine disorders in PCOS patients can be corrected by fertility drugs, but the endometrial receptivity of the patients is still in a poor state, and there is still a situation of inability to conceive. Current studies have shown that endometrial receptivity defects in PCOS patients are closely related to abnormal expression of metabolism, immunity, hormones and their receptors, etc. However, the specific pathological mechanism and etiology have not been fully clarified. This paper mainly discusses the factors of endometrial receptivity defects in patients with PCOS, and focuses on three aspects: genetic and epigenetic abnormalities, metabolic abnormalities, and immune disorders, trying to provide some clues for future treatment options and new drug targets for PCOS patients.

【Key words】 Polycystic ovary syndrome; Endometrial receptivity; Metabolism; Genome-wide association study

Fund program: Shandong Natural Science Foundation Youth Project (ZR2021QH075)

DOI: 10.3760/cma.j.cn101441-20231229-00387

收稿日期 2023-12-29 本文编辑 李天琦

引用本文: 张琳琳, 李蓉. 子宫内膜容受性超声评估的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1027-1030. DOI: 10.3760/cma.j.cn101441-20231229-00387.

综述

子宫内膜容受性超声评估的研究进展

张琳琳 李蓉

北京大学第三医院妇产科生殖医学中心, 北京 100191

通信作者: 李蓉, Email: roseli001@sina.com, 电话:
+86-10-82266849

【摘要】 不孕症是世界性的生殖健康问题, 体外受精-胚胎移植技术为众多患者提供了生育的机会。尽管临床方案和实验技术不断发展成熟, 但单次胚胎移植仍有过半患者无法成功妊娠。妊娠结局的影响因子众多, 子宫内膜容受性是重要因素之一。多种方法已被用于评估子宫内膜容受性, 其中, 临床最常使用的是简便、无创的经阴道超声检查。本文将从子宫内膜厚度、分型、血流、蠕动波、容积及弹性等方面对子宫内膜容受性评估相关的超声指标研究进展进行综述。

【关键词】 受精, 体外; 胚胎移植; 超声检查; 子宫内膜容受性; 临床妊娠结局

基金项目: 国家杰出青年科学基金 (81925013)

Research progress in ultrasound markers for endometrial receptivity assessment

Zhang Linlin, Li Rong

Reproductive Medical Center, Department of Obstetrics and Gynecology, Peking University Third Hospital, Beijing 100191, China

Corresponding author: Li Rong, Email: roseli001@sina.com, Tel: +86-10-82266849

【Abstract】 Infertility is a worldwide reproductive health problem. Assisted reproductive technology has given numerous infertile women the chance to have their biological child. Despite the continuous development and maturation of clinical protocols and transfer techniques, more than a half of infertile women still fail to achieve a successful pregnancy with one cycle of embryo transfer. Endometrial receptivity is essential for pregnancy establishment and can be an important factor for pregnancy outcomes following *in vitro* fertilization and embryo transfer. Multiple modalities have been used to assess endometrial receptivity, the most commonly used in clinical practice is the convenient and non-invasive transvaginal ultrasound assessment. We reviewed ultrasound markers for endometrial receptivity assessment in terms of endometrial thickness, type, blood flow, peristaltic wave, volume and elasticity.

【Key words】 Fertilization *in vitro*; Embryo transfer; Ultrasound; Endometrial receptivity; Clinical pregnancy outcome

Fund program: National Natural Science Foundation of China for Distinguished Young Scholars (81925013)

DOI: 10.3760/cma.j.cn101441-20240120-00032

收稿日期 2024-01-20 本文编辑 宋培培

引用本文: 杨小玉, 李延, 胡方方, 等. 乳腺癌患者生育力保存及促排卵方案的选择[J]. 中华生殖与避孕杂志, 2024, 44(10): 1031-1035. DOI: 10.3760/cma.j.cn101441-20240120-00032.

综述

乳腺癌患者生育力保存及促排卵方案的选择

杨小玉 李延 胡方方 张翠莲 梁琳琳

郑州大学人民医院 河南省人民医院生殖医学中心, 郑州 450003

通信作者: 梁琳琳, Email: 21469532@qq.com, 电话: +86-13526678087

【摘要】 乳腺癌是目前全球女性发病率最高的恶性肿瘤。肿瘤在治疗过程中, 放疗、化疗及内分泌治疗会产生不同程度的生殖毒性, 对患者生育力造成损害。辅助生殖技术使乳腺癌患者的生育力有机会得到保存, 其过程多依赖于促排卵治疗。治疗过程需要考虑时效性、安全性等问题。患者在肿瘤治愈后的妊娠时机及安全性, 同样受到关注。本文就乳腺癌治疗对女性生育力的影响、乳腺癌女性生育力保存方案、促排卵方案的治疗、妊娠时机的选择及妊娠安全性方面进行综述, 以期为临床应用提供参考。

【关键词】 乳腺癌; 生育力保存; 促排卵方案; 个体化选择

基金项目: 河南省医学科技攻关计划省部共建项目 (SBGJ202001002)

Selection of fertility preservation and ovulation promotion in breast cancer patients

Yang Xiaoyu, Li Yan, Hu Fangfang, Zhang Cuilian, Liang Linlin

Reproductive Medicine Center of Henan Provincial People's Hospital; Zhengzhou University People's Hospital, Zhengzhou 450003, China

Corresponding author: Liang Linlin, Email: 21469532@qq.com, Tel: +86-13526678087

【Abstract】 Breast cancer is currently the most common malignant tumor. During the treatment of tumors, radiotherapy, chemotherapy and endocrine therapy will produce different reproductive toxicity and cause damage to the patient's fertility. Assisted reproductive technology allows breast cancer patients to preserve their fertility, and fertility preservation process relies on ovulation stimulating treatment. The treatment process needs to consider issues such as timeliness and safety. The timeliness and safety of pregnancy after tumor therapy are also considered. This article reviews the effects of breast cancer treatment on female fertility, female fertility preservation regimens, ovulation induction regimens, pregnancy timing selection, and pregnancy safety, to provide reference for clinical application.

【Key words】 Breast cancer; Fertility preservation; Ovulation induction protocol; Individualized selection

Fund program: Henan Province Medical Science and Technology Research Plan Provincial Co-construction Project (SBGJ202001002)

DOI:10.3760/cma.j.cn101441-20240425-00145

收稿日期 2024-04-25 本文编辑 王李艳

引用本文: 杨金泽, 巩建飞, 张萌萌, 等. 卵巢组织冻存和移植在女性儿童肿瘤患者生育力保存中的研究进展 [J]. 中华生殖与避孕杂志, 2024, 44(10): 1036-1041. DOI: 10.3760/cma.j.cn101441-20240425-00145.

综述

卵巢组织冻存和移植在女性儿童肿瘤患者生育力保存中的研究进展

杨金泽¹ 巩建飞¹ 张萌萌² 颜景灏³ 杨深³ 宋雪凌¹ 朱志云³ 王海燕¹ 王焕民³ 严杰¹

¹女性生育力促进全国重点实验室 国家妇产疾病临床医学研究中心 辅助生殖教育部重点实验室(北京大学) 北京大学第三医院妇产科生殖医学中心, 北京 100191; ²北京核工业医院妇科, 北京 100045; ³国家儿童医学中心 首都医科大学附属北京儿童医院肿瘤外科, 北京 100045

通信作者: 严杰, Email: yanjiebjmu@bjmu.edu.cn, 电话: +86-10-82265080

【摘要】 随着肿瘤治疗技术不断发展, 儿童恶性肿瘤治愈率不断提高。幸存患儿的卵巢发育与功能常受到放化疗的不可逆损害, 导致医源性卵巢早衰甚至不孕, 因此开展针对肿瘤患儿的生育力保存具有重要意义。国际国内指南共识指出女性儿童应首先考虑卵巢组织冻存和移植, 但这一技术在儿童中的应用尚不成熟, 儿童卵巢与成人存在结构和功能上的巨大差异, 导致针对成人的生育力保存策略并不完全适用于儿童。因此, 本文对儿童卵巢的结构和功能特点对于卵巢组织冻存和移植的

影响、放化疗对卵巢组织的损伤机制、卵巢组织冻存和移植在临床应用的现状进行分析和梳理, 展望了女性儿童生育力保存技术的研究前景。

【关键词】 生育力保存; 卵巢组织冻存; 卵巢组织移植; 肿瘤; 儿童

基金项目: 国家自然科学基金重大项目 (T2293764) ; 国家重点研发计划 (2022YFC2703000)

Progress of ovarian tissue cryopreservation and transplantation in the fertility preservation of female childhood cancer patients

Yang Jinze¹, Gong Jianfei¹, Zhang Mengmeng², Yan Jinghao³, Yang Shen³, Song Xueling¹, Zhu Zhiyun³, Wang Haiyan¹, Wang Huanmin³, Yan Jie¹

¹ State Key Laboratory of Female Fertility Promotion; National Clinical Research Center for Obstetrics and Gynecology; Key Laboratory of Assisted Reproduction (Peking University, Ministry of Education); Center for Reproductive Medicine, Department of Obstetrics and Gynecology, Peking University Third Hospital, Beijing 100191, China; ² Department of Gynecology, Beijing Nuclear Industry Hospital, Beijing 100045, China; ³ Department of Surgical Oncology, Beijing Children's Hospital, Capital Medical University; National Center for Children's Health, Beijing 100045, China
Corresponding author: Yan Jie, Email: yanjiebjmu@bjmu.edu.cn, Tel: +86-10-82265080

【 Abstract 】 With the continuous development of cancer treatment technology, the cure rate for tumors in children is increasing. However, the irreversible damage to ovarian development and function by chemotherapy and radiation in surviving children often leads to iatrogenic premature ovarian failure and even infertility. Therefore, it is of great significance to develop fertility preservation techniques for children with tumors. International and domestic guidelines indicate that ovarian tissue cryopreservation and transplantation should be considered first for female children. However, the application of this technique in children is not yet mature. Current research suggests that there are significant structural and functional differences between children's ovaries and adults', and fertility preservation strategies for adults are not fully applicable to children. Therefore, this paper analyzes and reviews the structure and function of children's ovaries, the mechanism of damage to ovarian tissues by chemotherapy and radiation, and the current research and application status of fertility preservation techniques for female children. It also looks forward to the development direction of fertility preservation techniques for female children.

【 Key words 】 Fertility preservation; Ovarian tissue cryopreservation; Ovarian tissue transplantation; Neoplasms; Child

Fund program: National Natural Science Foundation of China (T2293764); National Key Research and Development Program of China (2022YFC2703000)

DOI: 10.3760/cma.j.cn101441-20240327-00108

收稿日期 2024-03-27 收稿日期 孙敏

引用本文：梁明洁，王奇玲. 抗肿瘤化学药物对男性生育力影响的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1042-1046. DOI: 10.3760/cma.j.cn101441-20240327-00108.

综述

抗肿瘤化学药物对男性生育力影响的研究进展

梁明洁 王奇玲

广东省生殖科学研究所男科 广东省生殖医院人类精子库 国家卫生健康委员会男性生殖与遗传重点实验室, 广州 510600

通信作者：王奇玲, Email: wangqiling2006@126.com, 电话：
+86-13539463745

【摘要】 抗肿瘤化学药物 (anti-tumour chemotherapy agent, ATCA) 治疗常应用于实体瘤、血液肿瘤等肿瘤疾病, 同时对男性生殖系统具有损伤作用。男性接受 ATCA 治疗可引起睾丸、附睾及附属性腺等细胞结构损伤及功能异常, 导致精子浓度和活力降低, 精子正常形态率及精子 DNA 完整性下降, 睾酮及抑制素 B 水平下降, 造成生育力损伤, 且 ATCA 治疗对青春期前、后男性患者损伤效应不同。本文就 ATCA 治疗对睾丸、附睾和附属性腺的损伤机制, 及其对青春期前、后男性生殖系统的影响特征进行综述。

【关键词】 青春期; 抗肿瘤化学药物; 男性生育力

基金项目：广东省医学科研基金 (B2023487、B2023185)

Research progress on the effects of anti-tumour chemotherapy agent on male fertility

Liang Mingjie, Wang Qiling

Department of Andrology, Guangdong Provincial Reproductive Science Institute;
Human Sperm Bank of Guangdong Provincial Fertility Hospital; NHC Key Laboratory
of Male Reproduction and Genetics, Guangzhou 510600, China

Corresponding author: Wang Qiling, Email: wangqiling2006@126.com, Tel:
+86-13539463745

【Abstract】 Anti-tumour chemotherapy agents (ATCA) have been widely used in the treatment of solid tumours, haematological disorders and other oncological diseases affecting the male reproductive system. ATCA caused cellular structural damage and functional abnormalities in the testes, epididymides and accessory gonads, resulting in reduced sperm concentration, viability, normal morphology and sperm DNA integrity. ATCA also led to lower levels of testosterone and inhibin B, which affects fertility. ATCA have different adverse effects on pre- and post-pubertal male patients. This paper reviews the mechanisms of damage to

the testis, epididymis and accessory gonads by ATCA and the characteristics of the effects on male reproductive system before and after puberty.

【Key words】 Puberty; Anti-tumour chemotherapy agents; Male fertility

Fund program: Guangdong Medical Research Foundation (B2023487, B2023185)

DOI: 10.3760/cma.j.cn101441-20240420-00137

收稿日期 2024-04-20 本文编辑 王李艳

引用本文: 石举梅, 赵晓丽, 夏天. 慢性子宫内膜炎影响胚胎种植的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1047-1051. DOI: 10.3760/cma.j.cn101441-20240420-00137.

综述

慢性子宫内膜炎影响胚胎种植的研究进展

石举梅 赵晓丽 夏天

天津中医药大学第一附属医院生殖中心 国家中医针灸临床医学研究中心, 天津 300193

通信作者: 夏天, Email: xiatian76@163.com

【摘要】 慢性子宫内膜炎 (chronic endometritis, CE) 是导致育龄期女性不孕的重要病理因素, 子宫内膜免疫-炎症稳态失衡、微生物群多样性异常是其特征性表现。CE 是导致胚胎种植失败的重要因素, 与内膜的慢性炎症状态影响卵泡发育、异常微生物群介导内膜免疫-代谢微环境紊乱、阻断母-胎界面信号交流、降低子宫内膜容受性等机制密切相关。本文对 CE 的特征性表现及其影响胚胎种植的相关机制进行综述, 以期对 CE 合并胚胎种植失败提供治疗思路。

【关键词】 慢性子宫内膜炎; 胚胎种植; 子宫内膜容受性; 母胎交流
基金项目: 国家自然科学基金 (82205172)

Research progress of chronic endometritis affecting embryo implantation

Shi Jumei, Zhao Xiaoli, Xia Tian

Reproductive Center of First Teaching Hospital of Tianjin University of Traditional Chinese Medicine; National Clinical Research Center for Chinese Medicine Acupuncture and Moxibustion, Tianjin 300193, China

Corresponding author: Xia Tian, Email: xiatian76@163.com

【Abstract】 Chronic endometritis (CE) is an important pathological factor leading to infertility in women of childbearing age, and its characteristic manifestations are imbalanced immune-inflammatory homeostasis and abnormal

microbial diversity. CE is an important factor leading to embryo implantation failure, which is closely related to the mechanism of chronic endometrial inflammation affecting follicle development, abnormal microflora mediating endometrial immune-metabolic microenvironment disorder, blocking mother-to-fetus interface signal communication, and reducing endometrial receptivity. In this paper, the characteristics of CE and its related mechanisms affecting embryo implantation were reviewed in order to provide therapeutic ideas for CE combined with embryo implantation failure.

【Key words】 Chronic endometritis; Embryo implantation; Endometrial receptivity; Maternal-fetal communication

Fund program: National Natural Science Foundation of China (82205172)

DOI: 10.3760/cma.j.cn101441-20240420-00136

收稿日期 2024-04-20 本文编辑 王李艳

引用本文: 孟一闻, 朱琴玲, 孙贇. 未折叠蛋白反应与女性生殖障碍的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1052-1059. DOI: 10.3760/cma.j.cn101441-20240420-00136.

综述

未折叠蛋白反应与女性生殖障碍的研究进展

孟一闻 朱琴玲 孙贇

上海交通大学医学院附属仁济医院生殖医学中心 上海市辅助生殖
与优生重点实验室, 上海 200135

通信作者: 孙贇, Email: syun163@163.com, 电话: +86-21-58752345

【摘要】 内质网与线粒体在面应对应激刺激下产生的未折叠蛋白或错误折叠蛋白时, 会诱发未折叠蛋白反应以调控并维持细胞稳态。近年来研究表明未折叠蛋白反应在女性生殖障碍疾病发生发展发挥关键作用。本文旨在深入探讨内质网与线粒体未折叠蛋白反应的具体信号通路途径, 并总结其对女性正常生殖生理过程及常见生殖障碍疾病的影响, 以期能为相关疾病的诊疗提供全新潜在治疗靶点。

【关键词】 内质网; 线粒体; 未折叠蛋白反应; 生殖系统

基金项目: 国家自然科学基金重点项目 (82130046); 科技部重点研发计划 (2019YFA0802604); 上海交通大学医学院附属仁济医院临床科研创新培育基金计划 (RJYPY-DZX-003)

Research progress on the unfolded protein response and female reproductive disorders

Meng Yiwen, Zhu Qinling, Sun Yun

Center for Reproductive Medicine, Renji Hospital, School of Medicine, Shanghai Jiao Tong University; Shanghai Key Laboratory for Assisted Reproduction and Reproductive Genetics, Shanghai 200135, China

Corresponding author: Sun Yun, Email: syun163@163.com, Tel: +86-21-58752345

【Abstract】 The unfolded protein response is triggered by the presence of unfolded or misfolded proteins in the endoplasmic reticulum and mitochondria, aiming to regulate and maintain cellular homeostasis under stress stimuli. Recent studies have shown that unfolded protein response plays a crucial role in the pathogenesis of female reproductive-related diseases. This article delves into the specific signaling pathways of unfolded protein response in the endoplasmic reticulum and mitochondria and summarizes its impact on the physiological functions and common diseases of the female reproduction, trying to provide novel potential therapeutic targets for the diagnosis and treatment of reproductive disorder related diseases.

【Key words】 Endoplasmic reticulum; Mitochondria; Unfolded protein response; Reproductive system

Fund program: Key Projects of National Natural Science Foundation of China (82130046); National Key R&D Program of China (2019YFA0802604); Shanghai Jiao Tong University School of Medicine affiliated Renji Hospital Clinical Research and Innovation Cultivation Fund Plan (RJPY-DZX-003)

DOI: 10.3760/cma.j.cn101441-20240327-00107

收稿日期 2024-03-27 本文编辑 王李艳

引用本文: 王梅, 王维静, 王芳. 复发性流产患者活产预测模型的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1060-1063. DOI: 10.3760/cma.j.cn101441-20240327-00107.

综述

复发性流产患者活产预测模型的研究进展

王梅 王维静 王芳

兰州大学第二医院生殖医学中心, 兰州 730030

通信作者: 王芳, Email: ery_fwang@lzu.edu.cn, 电话: +86-13919302888

【摘要】 复发性流产 (recurrent spontaneous abortion, RSA) 是生殖医学领域研究的热点和难点问题。患者再次妊娠的结局受多种因素影响, 识别流产的危险因素、筛查高危人群、评估再次妊娠后的妊娠结局是 RSA 患者妊娠咨询和管理

的核心内容。然而，目前再次妊娠结局风险预测模型存在缺陷，影响了其在实际应用中的有效性和准确性。本文综述了现有的 RSA 患者再次妊娠活产预测模型，为构建新的预测模型和临床干预提供了依据。

【关键词】 复发性流产； 流产； 预测； 妊娠结局

基金项目：兰州大学医学教育创新发展项目 (lzuyxcx-2022-137)

Advances in predictive modeling of live birth in patients with recurrent spontaneous abortion

Wang Mei, Wang Weijing, Wang Fang

Department of Reproductive Medicine, Lanzhou University Second Hospital, Lanzhou 730030, China

Corresponding author: Wang Fang, Email: ery_fwang@lzu.edu.cn, Tel: +86-13919302888

【Abstract】 Recurrent spontaneous abortion (RSA) is a popular and difficult problem in the field of reproductive medicine. Many risk factors affect the RSA during the next pregnancy, so identifying risk factors, screening high-risk groups, and evaluating the risk of miscarriage or live birth rate during the next pregnancy are the main contents of pregnancy counseling and management for patients with RSA. However, the current risk prediction model for the next pregnancy outcome has defects, which affect its effectiveness and accuracy in practical application. In this paper, we reviewed the existing prediction models of repeat pregnancy live rate in patients with RSA, which provide the basis for the construction of new prediction models and clinical intervention.

【Key words】 Recurrent spontaneous abortion; Abortion; Forecasting; Pregnancy outcome

Fund program: Lanzhou University Medical Education Innovation and Development Program (lzuyxcx-2022-137)

DOI: 10.3760/cma.j.cn101441-20240201-00051

收稿日期 2024-02-01 本文编辑 孙敏

引用本文：杜双双，李斌. 精源性卵母细胞激活因子缺乏导致 ICSI 受精失败的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1064-1068. DOI: 10.3760/cma.j.cn101441-20240201-00051.

综述

精源性卵母细胞激活因子缺乏导致 ICSI 受精失败的研究进展

杜双双 李斌

上海交通大学医学院附属第九人民医院辅助生殖科, 上海 200011

通信作者: 李斌, Email: libinliccc@163.com

【摘要】 受精是一个复杂的生物学过程, 其中任意一个环节出现异常都会导致受精问题的出现。虽然卵胞质内单精子注射 (intracytoplasmic sperm injection, ICSI) 技术的出现极大改善了男性精子因素引起的不孕问题, 但临床医生仍会遇到一些不明原因的 ICSI 受精失败问题。随着基因检测技术的迅猛发展, 临床科研人员已先后在此类 ICSI 受精失败患者人群中发现了导致精源性卵母细胞激活因子 (sperm-borne oocyte activation factor, SOAF) 减少的致病基因 *PLCZ1*、*ACTL7A*、*ACTL9* 及 *IQCN*, 但目前尚缺乏对此类受精失败的系统总结。本文将结合近期的相关报道, 对 SOAF 缺乏导致 ICSI 受精失败的遗传因素及治疗方法作系统综述。

【关键词】 精子; 精源性卵母细胞激活因子; 受精失败

基金项目: 国家自然科学基金面上项目 (81971448)

Advances in genetic factors of ICSI fertilization failure due to the deficiency of sperm-borne oocyte activation factor

Du Shuangshuang, Li Bin

Department for Assisted Reproduction, Shanghai Ninth People's Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai 200011, China

Corresponding author: Li Bin, Email: libinliccc@163.com

【Abstract】 Fertilization is a complex biological process, in which any abnormality will lead to the occurrence of fertilization failure. Although the emergence of intracytoplasmic sperm injection (ICSI) technology has greatly improved infertility caused by male sperm factors, clinicians still encounter the problem of some unexplained ICSI fertilization failure. With the development of genetic testing technology, clinical researchers have identified pathogenic gene mutations such as *PLCZ1*, *ACTL7A*, *ACTL9*, *IQCN* in patients associated with the deficiency of sperm-borne oocyte activation factor (SOAF). However, there is currently a lack of a systematic summary of such fertilization failure. Here, we will provide a systematic review of genetic factors and treatment methods of SOAF deficiency leading to ICSI fertilization failure.

【Key words】 Sperm; Sperm-borne oocyte activation factor; Fertilization failure

Fund program: General Program of National Natural Science Foundation of China (81971448)

DOI:10.3760/cma.j.cn101441-20240505-00158

收稿日期 2024-05-05 本文编辑 李天琦

引用本文: 郭文强, 郭世峰, 杨康, 等. 先天性双侧输精管缺如相关致病基因及临床诊疗进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1069-1074. DOI: 10.3760/cma.j.cn101441-20240505-00158.

先天性双侧输精管缺如相关致病基因及临床诊疗进展

郭文强 郭世峰 杨康 陈厚仰

江西省妇幼保健院辅助生殖中心, 南昌 330000

通信作者: 陈厚仰, Email: chenhouyang2007@163.com, 电话:
+86-15180159851

【摘要】 先天性双侧输精管缺如 (congenital bilateral absence of vas deferens, CBAVD) 可导致梗阻性无精子症, 是男性不育的常见病因之一。CBAVD 致病有关的基因种类繁多, 其致病机制各有特点, 但又有一定的联系; 同时鉴于 CBAVD 在不育症的比例, 合适的临床诊治和遗传咨询显得尤为重要。本文就 CBAVD 的致病机制和临床诊疗进行综述, 以期待为中国 CBAVD 患者的诊治和遗传咨询提供参考。

【关键词】 先天性双侧输精管缺如; 囊性纤维化跨膜转导调节因子; 粘连型 G 蛋白偶联受体 G2; 溶质载体家族 9 成员 3; 泛酸激酶 2; 上皮细胞钠离子通道 β 亚单位; 碳酸酐酶 12

基金项目: 江西省杰出青年项目 (20224ACB216008); 国家自然科学基金面上项目 (81871207)

Progress in related pathogenic genes and clinical diagnosis and treatment of congenital bilateral absence of vas deferens

Guo Wenqiang, Guo Shifeng, Yang Kang, Chen Houyang

Reproductive Medical Center of Jiangxi Maternal and Child Health Hospital, Nanchang 330000, China

Corresponding author: Chen Houyang, Email: chenhouyang2007@163.com, Tel: +86-15180159851

【Abstract】 Congenital bilateral absence of vas deferens (CBAVD) can lead to obstructive azoospermia, which is one of the common causes of male infertility. The genes involved in the pathogenesis of CBAVD are diverse, and their pathogenic mechanisms are distinctive but related. Meanwhile, given the proportion of CBAVD in infertility, appropriate clinical diagnosis and treatment and genetic counseling are particularly important. In this article, we review the pathogenic mechanism and clinical diagnosis and treatment of CBAVD, to provide reference for clinical diagnosis and treatment and genetic counseling for Chinese patients with CBAVD.

【Key words】 Congenital bilateral absence of vas deferens; Cystic fibrosis transmembrane conductance regulator; Adhesion G protein-coupled receptor G2; Solute carrier family 9 isoform 3; Pantothenate kinase 2; Sodium channel epithelial 1 β subunit; Carbonic anhydrase 12

Fund program: Jiangxi Provincial Natural Science Foundation (20224ACB216008); National Natural Science Foundation of China (81871207)

DOI: 10.3760/cma.j.cn101441-20240122-00034

收稿日期 2024-01-22 本文编辑 王李艳

引用本文: 李丹萍, 鞠文涵, 连方, 等. 巨噬细胞极化在卵巢衰老中的研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1075-1079. DOI: 10.3760/cma.j.cn101441-20240122-00034.

综述

巨噬细胞极化在卵巢衰老中的研究进展

李丹萍¹ 鞠文涵¹ 连方² 相珊¹

¹ 山东中医药大学第一临床医学院, 济南 250014; ² 山东中医药大学附属医院中西医结合生殖与遗传中心, 济南 250011

通信作者: 相珊, Email: axiangshan@163.com, 电话: +86-531-68901412

【摘要】 巨噬细胞是卵巢中最丰富的免疫细胞, 参与机体先天免疫应答过程, 在卵泡生成、排卵、黄体形成和消退等卵巢生理过程以及维持卵巢稳态中发挥重要作用。巨噬细胞可以极化为 M1/M2 型, 可在卵巢衰老微环境中响应衰老特定的信号, 参与卵巢衰老过程, 对卵巢衰老发挥不同的作用。本文分别从巨噬细胞极化调控通路, 巨噬细胞在正常卵巢功能中的生理作用, 以及巨噬细胞极化在卵巢衰老中的影响等方面进行综述。

【关键词】 炎症; 卵巢衰老; 卵巢储备; 巨噬细胞极化; 调控通路

基金项目: 山东省自然科学基金 (ZR2023MH112); 中国博士后科学基金 (2021M702044); 国家自然科学基金 (81974577)

Research progress of macrophage polarization in ovarian aging

Li Danping¹, Ju Wenhan¹, Lian Fang², Xiang Shan¹

¹ The First Clinical Medical College of Shandong University of Traditional Chinese Medicine, Jinan 250014, China; ² Reproductive and Genetic Center of Integrated Traditional Chinese and Western Medicine, Affiliated Hospital of Shandong University of Traditional Chinese Medicine, Jinan 250011, China

Corresponding author: Xiang Shan, Email: axiangshan@163.com, Tel: +86-531-68901412

【Abstract】 Macrophages are the most abundant immune cells in the ovary. They participate in the innate immune response and play an important role in ovarian physiological processes such as follicle formation, ovulation, luteal formation and regression, as well as in maintaining ovarian homeostasis. Macrophages can be polarized into M1/M2 type, which can respond to senescence specific signals in the ovarian aging microenvironment, participate in the ovarian aging process, and play different roles in ovarian aging. This article reviews the polarization regulation pathway of macrophages, the physiological role of macrophages in normal ovarian function, and the impact of macrophage polarization on ovarian aging.

【 Key words 】 Inflammation; Ovarian senescence; Ovarian reserve; Macrophage polarization; Regulating pathways

Fund program: Natural Science Foundation of Shandong Province (ZR2023MH112); China Postdoctoral Science Foundation (2021M702044); National Natural Science Foundation of China (81974577)

DOI: 10.3760/cma.j.cn101441-20240307-00085

收稿日期 2024-03-07 本文编辑 孙敏

引用本文: 厉晨雪, 马瑞红, 刘彤瑶, 等. 调控线粒体生物发生改善卵母细胞质量的药物研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1080-1084. DOI: 10.3760/cma.j.cn101441-20240307-00085.

综述

调控线粒体生物发生改善卵母细胞质量的药物研究进展

厉晨雪 马瑞红 刘彤瑶 田宁 张少巍 夏天

天津中医药大学第一附属医院 国家中医针灸临床医学研究中心,
天津 300193

通信作者: 夏天, Email: xiatian76@163.com, 电话:
+86-15822238896

【摘要】 线粒体在卵母细胞中具有供应能量、维持卵母细胞激活、调节钙离子稳态等作用, 线粒体功能是影响卵母细胞质量的关键因素。线粒体生物发生是为

满足能量需求而增加细胞线粒体质量和数量的过程, 增加线粒体生物发生可有效改善卵母细胞质量。本文就能够增加线粒体生物发生的药物研究进展作一综述。

【关键词】 卵母细胞; 褪黑素; C型利钠肽; 烟酰胺腺嘌呤二核苷酸; 线粒体生物发生; 白藜芦醇; 辅酶 Q10; 虾青素
基金项目: 国家自然科学基金 (82374508)

Advances in drug research for improving oocyte quality by regulating mitochondrial biogenesis

Li Chenxue, Ma Ruihong, Liu Tongyao, Tian Ning, Zhang Shaowei, Xia Tian
First Teaching Hospital of Tianjin University of Traditional Chinese Medicine;
National Clinical Research Center for Chinese Medicine Acupuncture and Moxibustion,
Tianjin 300193, China

Corresponding author: Xia Tian, Email: xiatian76@163.com, Tel: +86-15822238896

【Abstract】 Mitochondria plays an important role in supplying energy, maintaining oocyte activation, and regulating calcium homeostasis in oocytes. Mitochondrial function is a key factor affecting oocyte quality. Mitochondrial biogenesis is the process of increasing the mass and number of mitochondria in cells to meet the energy demand. Increasing mitochondrial biogenesis can effectively improve the quality of oocytes. This article reviews the research progress of drugs that can increase mitochondrial biogenesis.

【Key words】 Oocytes; Melatonin; C-type natriuretic peptide; Nicotinamide adenine dinucleotide; Mitochondrial biogenesis; Resveratrol; Coenzyme Q10; Astaxanthin

Fund program: National Natural Science Foundation of China (82374508)

DOI:10.3760/cma.j.cn101441-20240529-00198

收稿日期 2024-05-29 本文编辑 李天琦
引用本文: 任普佳, 李德邦, 代特日格勒, 等. ncRNA 调控颗粒细胞程序性死亡影响多囊卵巢综合征的研究进展 [J]. 中华生殖与避孕杂志, 2024, 44(10): 1085-1091. DOI: 10.3760/cma.j.cn101441-20240529-00198.

综述

ncRNA 调控颗粒细胞程序性死亡影响多囊卵巢综合征的研究进展

任普佳 李德邦 代特日格勒 陈秀娟 杜琛
内蒙古医科大学附属医院生殖医学中心, 呼和浩特 010050

通信作者: 杜琛, Email: duchen198607@126.com

【摘要】 多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 是育龄期女性最常见的生殖内分泌紊乱性疾病之一, 病理机制尚未阐明。诸多研究证实细胞程序性死亡 (programmed cell death, PCD) 可影响 PCOS 的发生发展, 调控 PCD 可能成为防治 PCOS 的关键。最近研究揭示了许多与表观遗传相关的非编码 RNA (non-coding RNA, ncRNA), 包括微小 RNA、长链非编码 RNA 及环状 RNA 等, 它们虽不直接作为遗传信息载体, 但能通过调节相关蛋白和基因的表达来启动各种细胞的反应机制, 如细胞凋亡、自噬、铁死亡、坏死性凋亡和焦亡等, 从而影响颗粒细胞发育, 干扰内分泌稳态, 参与 PCOS 的病理过程并影响其预后。本文对 ncRNA 通过调控颗粒细胞的 PCD 影响 PCOS 的致病机理展开讨论, 以期为 PCOS 的治疗提供新的思路。

【关键词】 多囊卵巢综合征; 细胞程序性死亡; 颗粒细胞

基金项目: 内蒙古自治区“十四五”重点研发及成果转化项目 (2022YFSH0067); 内蒙古医科大学附属医院青年骨干项目 (2023NYFYGG002); 内蒙古医科大学笃学人才项目 (ZY20243116); 内蒙古医科大学面上项目 (YKD2022MS017); 内蒙古教育厅高校科研项目 (NJZY19104)

Advances in ncRNA regulation of programmed cell death affecting polycystic ovary syndrome

Ren Pujia, Li Debang, Dai Terigele, Chen Xiujuan, Du Chen

Center for Reproductive Medicine, Affiliated Hospital of Inner Mongolia Medical University, Hohhot 010050, China

Corresponding author: Du Chen, Email: duchen198607@126.com

【Abstract】 Polycystic ovary syndrome (PCOS) is one of the most common reproductive endocrine disorders in women of reproductive age, and its pathogenesis is not yet fully understood. Many studies have confirmed that programmed cell death (PCD) can affect the occurrence and development of PCOS, and regulating PCD may be the key to prevent and treat PCOS. Recent researches have revealed many non-coding RNA (ncRNA) related to epigenetics, including microRNA, long ncRNA, and circular RNA. Although these ncRNA do not directly serve as carriers of genetic information, they can activate various cellular response mechanisms by regulating the expression of related proteins and genes, such as apoptosis, autophagy, ferroptosis, necroptosis, and pyroptosis, thereby affecting granulosa cell development, disrupting endocrine homeostasis, participating in the pathological process of PCOS, and influencing its prognosis. This paper discusses the pathogenesis of PCOS through the regulation of PCD by ncRNA, aiming to provide new insights for the treatment of PCOS.

【 Key words 】 Polycystic ovary syndrome; Programmed cell death; Granulosa cells

Fund program: Science and Technology Planning Project of Inner Mongolia Autonomous Region (2022YFSH0067); Inner Mongolia Medical College Hospital Youth Backbone Project (2023NYFYGG002); Inner Mongolia Medical College Talent

Programme (ZY20243116); Inner Mongolia Medical University Project (YKD2022MS017); Inner Mongolia Education Department Foundation (NJZY19104)

DOI: 10.3760/cma.j.cn101441-20240118-00031

收稿日期 2024-01-18 本文编辑 孙敏

引用本文: 王祎玟, 杨淑珺, 李艳如, 等. 外泌体在胚胎植入中的作用[J]. 中华生殖与避孕杂志, 2024, 44(10): 1092-1097. DOI: 10.3760/cma.j.cn101441-20240118-00031.

综述

外泌体在胚胎植入中的作用

王祎玟 杨淑珺 李艳如 王倩 张翠莲

郑州大学人民医院 河南大学人民医院 河南省人民医院生殖医学

中心, 郑州 450003

通信作者: 张翠莲, Email: luckyzcl@qq.com, 电话:

+86-371-87160762

【摘要】 胚胎植入是妊娠过程中的重要限速步骤, 是一个动态发育的过程, 包括胚胎和子宫内膜细胞间的一系列细胞间通信及相互作用。外泌体是细胞外囊泡的一种亚型, 广泛存在于细胞及体液中, 可作为新的细胞间通信介质在体内发挥作用。研究表明, 外泌体可参与调节胚胎发育、子宫内膜容受性、胚胎黏附、免疫耐受和血管生成等多个过程, 在复杂的胚胎植入过程中发挥着重要作用。本文将对外泌体在胚胎植入中的作用进行综述, 为深入探究人类胚胎植入失败原因提供新的思路。

【关键词】 外泌体; 胚胎植入; 细胞间通信

基金项目: 国家自然科学基金 (U2004130); 河南省医学科技攻关计划联合共建项目 (LHGJ20220045)

Research progress in the role of exosomes in embryo implantation

Wang Yiwen, Yang Shujun, Li Yanru, Wang Qian, Zhang Cuilian

Reproductive Medicine Center, Zhengzhou University People's Hospital; Henan University People's Hospital; Henan Provincial People's Hospital, Zhengzhou 450003, China

Corresponding author: Zhang Cuilian, Email: luckyzcl@qq.com, Tel: +86-371-87160762

【Abstract】 Embryo implantation, as an important speed limiting step in pregnancy, is a dynamic developmental process that involves a series of intercellular communication and interactions between the embryo and endometrial cells. Exosomes are a subtype of extracellular vesicles that are widely present in cells and bodily fluids and can serve as new intercellular communication mediators in the body. Research has shown that exosomes can participate in regulating embryonic development, endometrial receptivity, embryo adhesion, immune tolerance, and angiogenesis, playing an important role in regulating complex embryo implantation processes. This article will review the role of exosomes in embryo implantation, in order to provide new insights into the failure of embryo implantation in human reproduction.

【Key words】 Exosomes; Embryo implantation; Cell communication

Fund program: National Natural Science Foundation of China (U2004130); Henan Provincial Medical Science and Technology Research Program (LHGJ20220045)

DOI: 10.3760/cma.j.cn101441-20240709-00246

收稿日期 2024-07-09 本文编辑 孙敏

引用本文: 李文竹, 邓志敏, 魏伊秋, 等. 黏附分子在胚胎着床中的作用机制研究进展[J]. 中华生殖与避孕杂志, 2024, 44(10): 1098-1105. DOI: 10.3760/cma.j.cn101441-20240709-00246.

综述

黏附分子在胚胎着床中的作用机制研究进展

李文竹¹ 邓志敏¹ 魏伊秋¹ 杨冬咏¹ 蔡松辰² 杨玲桃² 尹太
郎¹ 刁梁辉²

¹武汉大学人民医院生殖医学中心, 武汉 430060; ²深圳中山妇产医院 (原深圳中山泌尿外科医院) 生殖医学临床研究中心 深圳中山
生殖与遗传研究所 广东省围产期生殖免疫工程技术研究中心,
深圳 518045

通信作者: 刁梁辉, Email: diaolianghui@gmail.com, 电话:
+86-755-88361001*9280

【摘要】 胚胎着床是一个复杂且精密的动态过程, 涉及子宫内膜容受性的建立、胚胎定位、黏附和侵袭。黏附分子作为细胞间或细胞与细胞外基质的重要通信调节器, 在维持子宫内膜容受性、调节胚胎定位、黏附和侵袭方面起着关键作用。然而, 对于母体和胚胎来源的黏附分子如何有序地调控着床期的关键事件仍然有待深入研究。本文结合最新研究进展, 根据胚胎着床的几个关键节点, 总结了不同类型的黏附分子在母-胎界面的作用及其可能的调控机制, 特别介绍了在着床过程中黏附分子调节蜕膜免疫细胞与其他细胞的相互作用, 为黏附分子功能失调介导的着床失败提供新视角和洞见。

【关键词】 胚胎着床; 黏附分子; 子宫内膜容受性; 胚胎侵袭; 蜕膜免疫细胞

基金项目: 国家自然科学基金 (82371684、82271672)

Advances in the mechanism of adhesion molecules during embryo implantation

Li Wenzhu¹, Deng Zhimin¹, Wei Yiqiu¹, Yang Dongyong¹, Cai Songchen², Yang Lingtao², Yin Tailang¹, Diao Lianghui²

¹ Reproductive Medical Center, Renmin Hospital of Wuhan University, Wuhan 430060, China; ² Shenzhen Key Laboratory of Reproductive Immunology for Peri-implantation; Shenzhen Zhongshan Institute for Reproductive Medicine and Genetics; Shenzhen Zhongshan Obstetrics & Gynecology Hospital (formerly Shenzhen Zhongshan Urology Hospital), Shenzhen 518045, China

Corresponding author: Diao Lianghui, Email: diaolianghui@gmail.com, Tel: +86-755-88361001*9280

【 Abstract 】 The process of embryo implantation is a multifaceted and intricate dynamic event that includes the development of endometrial receptivity, embryo localization, adhesion, and invasion. Adhesion molecules, acting as crucial mediators of communication between cells or between cells and the extracellular matrix, are essential for the maintenance of endometrial receptivity and the regulation of embryo localization, adhesion, and invasion. However, the mechanisms by which adhesion molecules of maternal and embryo are organized to regulate key events in the peri-implantation period have yet to be fully explored. Based on recent research findings, this review provides a summary of the functions of different adhesion molecules at the maternal-fetal interface and their potential regulatory mechanisms according to the key progress of embryo implantation. In particular, we discussed the interactions between decidual immune cells and other cells mediated by adhesion molecules during the invasion process, which will provide novel perspectives into the role of adhesion molecule dysfunction in contributing to implantation failure.

【 Key words 】 Embryo implantation; Adhesion molecules; Endometrial receptivity; Embryo invasion; Decidual immune cells

Fund program: National Natural Science Foundation of China (82371684, 82271672)