

# 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39卷 第2期 2019年2月25日出版

## 主 管

中国科学技术协会

## 主 办

中华医学会  
上海市计划生育科学研究所  
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: randc@sippr.org.cn  
http://www.randc.cn

## 总编辑

乔 杰

## 编辑部主任

王黎茜

## 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): 010-85158180  
Email: office@cma.org.cn

## 广告发布登记号

京东工商广登字 20170015 号

## 印 刷

上海商务联西印刷有限公司

## 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, 100044)  
代号: M389

## 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: randc@sippr.org.cn

## 定 价

每期 20.00 元, 全年 240.00 元

## 中国标准连续出版物号

ISSN 2096-2916  
CN 10-1441/R

## 2019 年版权归主办者所有

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, 可向本刊编辑部调换

## 目 次

### 临床研究

- 重组人生长激素在首次早卵泡期长效方案  
治疗失败患者再次助孕中的应用 ..... 苏琼 伍琼芳 田莉峰等 87
- 体外受精 - 胚胎移植术后发生官内外同时妊娠的  
高危因素及妊娠结局分析 ..... 娄华 孙玲 杨险峰等 92
- 玻璃化冷冻对体外受精 - 胚胎移植出生子代胎盘  
印记基因 *Snrpn* 表达的影响 ..... 姚建凤 黄燕芳 黄荣富等 97

### 实验研究

- 促性腺激素释放激素类似物对小鼠种植期子宫内膜  
白血病抑制因子、同源框基因 *a10* 及胞饮突的  
影响 ..... 周云 林燕玲 林坦等 103
- 谷氨酰胺对多囊卵巢综合征模型大鼠  
炎症状态的调节作用 ..... 胡雪 吴庚香 杨菁 107

### 循证医学

- 胰高血糖素样肽 -1 受体激动剂治疗多囊卵巢综合征  
疗效和安全性的 Meta 分析 ..... 韩艺 李莹洁 何冰 112

### 新技术

- 单基因遗传病家系中女性为新发突变携带者的  
胚胎植入前遗传学诊断策略 ..... 朱小辉 王玉倩 严智强等 120

### 临床报道

- 卵泡敏感指数评估体外受精 / 卵胞质内单精子显微注射  
患者的卵巢反应性 ..... 邢阿英 耿蒙慧 王大琳等 125
- 清瘀温通法治疗子宫内位症痛经的  
临床疗效观察 ..... 曹阳 田露露 翁雷等 130
- 中文版 Cardiff 生育知识量表在育龄人群中的  
信效度评价 ..... 周艳辉 郭紫璐 宋晓艳等 135

### 现场报道

- 继发不孕人群二孩生育意愿及其影响因素的  
研究 ..... 邓明芬 曹革 覃华等 139

### 个案报道

- 冻融胚胎移植自发性卵巢过度刺激综合征 1 例  
和文献综述 ..... 曹晓敏 梁菊艳 王媛媛等 143

### 综 述

- 原发性与继发性反复妊娠丢失病因  
及预后的比较 ..... 张静 宋佳怡 马瑞红等 147
- 氧化应激下卵母细胞线粒体 DNA 损伤  
及修复研究进展 ..... 黄倩倩 王晖 钱云 151
- 卵低温保存过程中透明带提前硬化的影响因素  
和调控机制 ..... 石晓卫 胡焕焕 姬国杰等 156
- 精卵识别分子机制研究进展 ..... 杨沫 杨兴雯 李默 161
- 染料木黄酮宫内暴露对子代健康的影响 ..... 孙小伟 梁红 165

### 经验交流

- 胚胎反复着床失败病因及临床对策经验分享 ..... 林娜 马艳萍 武泽等 169
- 《中华生殖与避孕杂志》稿约 ..... 封二

本期责任编辑 乔杰 本期责任编辑 宋培培 本期责任编辑 宋培培

# CHINESE JOURNAL OF REPRODUCTION AND CONTRACEPTION

(Original title: *Reproduction and Contraception*)



Monthly Established in December 1980 Volume 39, Number 2 February 25, 2019

## Responsible Institution

China Association for Science and Technology

## Sponsor

Chinese Medical Association, Shanghai Institute of Planned Parenthood Research, 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: randc@sippr.org.cn  
http://zhshzybyzz.yiggle.com  
http://www.medline.org.cn

## Editor-in-Chief

Qiao Jie (乔杰)

## Managing Director

Wang Lixi (王黎茜)

## Publishing

Chinese Medical Journal Publishing House Co., Ltd  
42 Dongsixidajie, Beijing 100710, China  
Tel(Fax):0086-10-85158180  
Email: office@cma.org.cn

## Printing

Business Book Printing Shop  
Shanghai Publishing Printing Co., Ltd.

## Overseas Distributor

China International Book Trading Corporation  
P.O.Box 339, Beijing 100044  
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: randc@sippr.org.cn

## CSSN

ISSN 2096-2916  
CN 10-1441/R

## Copyright © 2019 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

### Clinical Study

- Application of recombinant human growth hormone during the second cycle of *in vitro* fertilization and embryo transfer patients who were failed in the first cycle with early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol**..... 87  
*Su Qiong, Wu Qiongfang, Tian Lifeng, et al*
- Risk factors and pregnancy outcome for heterotopic pregnancy after *in vitro* fertilization-embryo transfer cycles**..... 92  
*Lou Hua, Sun Ling, Yang Xianfeng, et al*
- Effect of vitrification on the expression of imprinted gene *Snrpn* of neonatal placental tissues**..... 97  
*Yao Jianfeng, Huang Yanfang, Huang Rongfu, et al*

### Laboratory Study

- Impact of gonadotropin-releasing hormone analogous on leukaemia inhibitory factor, homeobox gene *a10* and pinopodes in mouse endometrium during implantation window**..... 103  
*Zhou Yun, Lin Yanling, Lin Tan, et al*
- Glutamine attenuates inflammation in rats with polycystic ovary syndrome**... 107  
*Hu Xue, Wu Gengxiang, Yang Jing*

### Evidence-based Medicine

- Efficacy and safety of glucagon-like peptide-1 receptor agonists for treating polycystic ovary syndrome: a Meta-analysis**..... 112  
*Han Yi, Li Yingjie, He Bing*

### New Technology

- New testing strategy applied in monogenic disease preimplantation genetic diagnosis for the couples with female *de novo* gene mutation carriers**..... 120  
*Zhu Xiaohui, Wang Yuqian, Yan Zhiqiang, et al*

### Clinical Report

- Assessment of ovarian response in *in vitro* fertilization/intracytoplasmic sperm injection patients by follicular sensitivity index**..... 125  
*Xing Aying, Geng Menghui, Wang Dalin, et al*
- Clinical study on treatment of endometriosis dysmenorrhea with Qingyu Wentong method**..... 130  
*Cao Yang, Tian Lulu, Weng Lei, et al*
- Cultural adaptation and validation of the Cardiff fertility knowledge scale among Chinese childbearing age population**..... 135  
*Zhou Yanhui, Guo Ziqiu, Song Xiaoyan, et al*

### Field Investigation

- A study on the second-child intention and its influencing factors in secondary infertile people**..... 139  
*Deng Mingfen, Cao Ping, Tan Hua, et al*

### Case Report

- A case report and literature review of spontaneous ovarian hyperstimulation syndrome**..... 143  
*Cao Xiaomin, Liang Juyan, Wang Yuanyuan, et al*

### Review

- The causes and prognosis of primary and secondary recurrent pregnancy loss**..... 147  
*Zhang Jing, Song Jiayi, Ma Ruihong, et al*
- Oxidative damage and the repair of mitochondrial DNA in oocyte**..... 151  
*Huang Qianqian, Wang Hui, Qian Yun*
- Influencing factors and control mechanisms of premature zona hardening during oocyte cryopreservation**..... 156  
*Shi Xiaowei, Hu Huahuan, Ji Guojie, et al*
- Molecular mechanisms of sperm-egg recognition**..... 161  
*Yang Mo, Yang Xingwen, Li Mo*
- Effect of in-utero exposure to Genistein on offspring health**..... 165  
*Sun Xiaowei, Liang Hong*

### Experience Exchange

- Experience sharing of the etiology and clinical management of recurrent implantation failure**..... 169  
*Lin Na, Ma Yangping, Wu Ze, et al*

# 重组人生长激素在首次早卵泡期长效长方案治疗失败患者再次助孕中的应用

苏琼 伍琼芳 田莉峰 李游 许定飞 高敏

江西省妇幼保健院辅助生殖中心, 南昌 330006

通信作者: 伍琼芳, Email: wuqiongfang898@sina.com, 电话: +86-13970017651

**【摘要】** 目的 探讨重组人生长激素 (rhGH) 预处理治疗对首次体外受精 - 胚胎移植 (IVF-ET) 中采用早卵泡期长效方案助孕失败而再次 IVF 治疗患者的胚胎质量和临床结局的影响。方法 通过回顾性队列研究, 分析首次使用早卵泡期长效方案助孕失败且采用相同降调节方案再次助孕治疗的 170 例患者, 按照是否进行 rhGH 预处理分为研究组 (采用 rhGH 预处理治疗,  $n=70$ ) 及对照组 (未使用 rhGH 预处理治疗,  $n=100$ )。比较两组间临床及实验室指标。结果 患者年龄、体质量指数 (BMI)、不孕年限、基础促卵泡生成素 (FSH)、抗苗勒管激素 (AMH)、窦卵泡数 (AFC)、促性腺激素 (Gn) 使用时间、Gn 使用总剂量、hCG 注射日血清雌二醇水平、孕酮水平、子宫内膜厚度、获卵数、双原核 (2PN) 受精率、卵巢过度刺激综合征 (OHSS) 发生率、平均移植胚胎数、周期取消率、着床率、宫外孕率和早期流产率组间差异均无统计学意义 ( $P>0.05$ ), 但是研究组卵裂率 (87.9%)、优质胚胎率 (27.8%)、临床妊娠率 (51.6%) 显著高于对照组 (82.9%、21.6%、29.8%) ( $P=0.019$ 、 $P=0.022$ 、 $P=0.007$ )。结论 对于首次使用早卵泡期长效方案助孕失败的患者, 再次助孕时该方案联合 rhGH 预处理能提高胚胎质量和临床妊娠率。

**【关键词】** 受精, 体外; 胚胎移植; 重组人生长激素; 早卵泡期长效方案; 胚胎质量; 临床结局

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.001

**Application of recombinant human growth hormone during the second cycle of *in vitro* fertilization and embryo transfer patients who were failed in the first cycle with early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol**

Su Qiong, Wu Qiongfang, Tian Lifeng, Li You, Xu Dingfei, Gao Min

Assisted Reproductive Center, Jiangxi Maternal and Child Health Hospital, Nanchang 330006, China

Corresponding author: Wu Qiongfang, Email: wuqiongfang898@sina.com, Tel: +86-13970017651

**【Abstract】 Objective** To explore the effects of recombinant human growth hormone (rhGH) pretreatment on the embryo quality and clinical outcomes of patients who experienced a failure cycle with early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol and received the secondary *in vitro* fertilization (IVF) cycle with the same down regulation protocol. **Methods** This retrospective cohort study was performed among 170 patients who underwent a failure cycle with early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol. The patients were divided into two groups according to whether received rhGH pretreatment: study group (70 patients with rhGH pretreatment) and control group (100 patients without rhGH pretreatment). The differences of clinical and laboratory indicators between the two groups were retrospectively analyzed. **Results** Patients' demographic characteristics did not differ significantly ( $P>0.05$ ) between the two groups [including age, body mass index (BMI), infertility duration, baseline follicle-stimulating hormone (FSH), baseline anti-Müllerian hormone (AMH) and baseline antral follicle count (AFC)]. And there were no significant differences in the duration of gonadotropin (Gn) used and total dosage of Gn used, serum estradiol and progesterone levels and endometrial thickness on the day of human chorionic gonadotropin (hCG) administration ( $P>0.05$ ). In study group, similar number of oocytes retrieved, 2 pronucleus (PN) fertilization rate, ovarian hyperstimulation syndrome (OHSS) rate, average number of embryos transferred, cycle cancellation rate, implantation rate, ectopic pregnancy rate and early abortion rate were achieved as compared with control group ( $P>0.05$ ). The cleavage rate, the good-quality embryo rate, and the clinical pregnancy rate were significantly higher in study group than in control group ( $P=0.019$ ,  $P=0.022$ ,  $P=0.007$ ). **Conclusion** For patients who were failed in the first cycle with early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol, rhGH pretreatment in the secondary treatment cycle could improve the embryo quality and clinical pregnancy rate.

**【Key words】** Fertilization *in vitro*; Embryo transfer; Recombinant human growth hormone; Early follicular-phase long-acting gonadotropin-releasing hormone agonist long protocol; Embryo quality; Clinical outcomes

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.001

# 体外受精 - 胚胎移植术后发生宫内外同时妊娠的高危因素及妊娠结局分析

娄华<sup>1</sup> 孙玲<sup>1</sup> 杨险峰<sup>1</sup> 王兴玲<sup>1</sup> 崔世红<sup>2</sup>

<sup>1</sup> 郑州大学第三附属医院生殖中心 450052; <sup>2</sup> 郑州大学第三附属医院产科 450052

通信作者: 崔世红, Email: louhua0926@sina.com, 电话: +86-13837100926

**【摘要】** 目的 探讨影响体外受精 - 胚胎移植 (*in vitro* fertilization and embryo transfer, IVF-ET) 术后发生宫内外同时妊娠 (heterotopic pregnancy, HP) 的高危因素及其妊娠结局。方法 回顾性分析 2008 年 1 月—2016 年 12 月期间在郑州大学第三附属医院生殖医学科行 IVF-ET 术后 HP 患者的临床资料。①分析 29 例 HP 患者 (HP 组) 与随机筛选的 87 例宫内妊娠患者 (对照组) 的临床资料, 比较组间基本资料及妊娠结局; ②分析 19 例宫内有胎心搏动的 HP 患者行去除异位妊娠手术后影响宫内妊娠存活因素分析。**结果** ① HP 组输卵管因素占比 (68.97%) 和  $\geq 2$  个胚胎移植率 (100.00%) 显著高于对照组 (44.83%, 82.76%), 差异有统计学意义 ( $P=0.024$ ,  $P=0.038$ ), logistic 回归分析提示输卵管因素和  $\geq 2$  个胚胎移植是 HP 的影响因素, HP 组早期流产率 (34.48%) 显著高于对照组 (10.34%,  $P=0.006$ ), HP 组活产率 (51.72%) 显著低于对照组 (83.91%,  $P=0.001$ ); ②手术时间及包块大小影响 HP 宫内妊娠存活率, 差异有统计学意义 ( $P=0.023$ ,  $P=0.004$ )。**结论** 输卵管因素和移植  $\geq 2$  枚胚胎是发生 HP 的高危因素; 手术时间长及异位妊娠包块较大可能降低宫内妊娠存活率, 因此尽早诊断及治疗可提高 HP 患者活产率。

**【关键词】** 受精, 体外; 胚胎移植; 宫内外同时妊娠; 妊娠结局; 高危因素

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.002

### Risk factors and pregnancy outcome for heterotopic pregnancy after *in vitro* fertilization-embryo transfer cycles

Lou Hua<sup>1</sup>, Sun Ling<sup>1</sup>, Yang Xianfeng<sup>1</sup>, Wang Xingling<sup>1</sup>, Cui Shihong<sup>2</sup>

<sup>1</sup>Reproduction Center of the Third Affiliated Hospital of Zhengzhou University, Zhengzhou 450052, China;

<sup>2</sup>Obstetrical Department of the Third Affiliated Hospital of Zhengzhou University, Zhengzhou 450052, China

Corresponding author: Cui Shihong, Email: louhua0926@sina.com, Tel: +86-13837100926

**【Abstract】 Objective** To investigate risk factors that are associated with heterotopic pregnancy (HP) following *in vitro* fertilization-embryo transfer (IVF-ET) and to review surgical management and clinical outcomes of patients with heterotopic pregnancy. **Methods** Clinical data of HP patients in Reproduction Center of the Third Affiliated Hospital of Zhengzhou University from January 2008 to December 2016 were retrospectively analyzed. 1) There were 29 HP patients (HP group), and totally 87 additional patients were randomly selected as controls from the IVF registry database. Baseline characteristics, reproductive and obstetric outcomes were compared between HP group and control group. 2) We retrospectively analyzed 19 HP patients with viable intrauterine pregnancy surgical management, and clinical outcomes according to medical records and follow-up telephone interviews. **Results** 1) HP group had more tubal factor infertility (68.97%) and more embryos transfer (100.00%) compared with control group (44.83%, 82.76%) ( $P=0.024$ ,  $P=0.038$ ). Logistic regression analysis showed that multiple embryo transfer and tubal factor infertility were identified as the independent factors of HP. The early abortion rate in HP group (34.48%) was higher than that in control group (10.34%) ( $P=0.006$ ). The live birth rate in HP group (51.72%) was lower than that in control group (83.91%) ( $P=0.001$ ). 2) The operation time and mass size affected survival rate of intrauterine pregnancy with statistically significant differences ( $P=0.023$ ,  $P=0.004$ ). **Conclusion** Factors such as multiple embryo transfer and tubal factor infertility increase the risk of HP. The related factors affecting the survival rate of intrauterine pregnancy is operation time and mass size. With increased awareness of HP in patients who have undergone IVF-ET, early diagnosis and appropriate surgical treatment may lead to a favorable prognosis.

**【Key words】** Fertilization *in vitro*; Embryo transfer; Pregnancy, heterotopic; Pregnancy outcome; Risk factors

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.002

# 玻璃化冷冻对体外受精 - 胚胎移植出生子代胎盘印记基因 *Snrpn* 表达的影响

姚建凤<sup>1</sup> 黄燕芳<sup>2</sup> 黄荣富<sup>3</sup> 林素霞<sup>1</sup> 郭彩琼<sup>1</sup> 吴培雅<sup>1</sup> 李友筑<sup>4</sup> 胡继芬<sup>2</sup>

<sup>1</sup> 泉州市妇幼保健院生殖医学中心 362000; <sup>2</sup> 福建医科大学附属第一医院健康体检中心, 福州 350004; <sup>3</sup> 福建医科大学附属第二医院检验科, 泉州 362000; <sup>4</sup> 厦门大学附属第一医院生殖医学中心 361002

姚建凤和黄燕芳对本文有同等贡献

通信作者: 李友筑, Email: 232398106@qq.com, 电话: +86-13774664443; 胡继芬, Email: 935953573@qq.com, 电话: +86-13906911306

**【摘要】目的** 探讨玻璃化冷冻技术对出生子代胎盘组织印记基因 *Snrpn* 表达的影响。**方法** 收集 2015 年 3 月 1 日—2017 年 10 月 31 日期间在泉州市妇幼保健院生殖医学中心接受体外受精 - 胚胎移植 (IVF-ET) 治疗的不孕患者分娩后的胎盘组织, 按移植胚胎是否冻融分为新鲜周期组和玻璃化冷冻组; 收集同期正常妊娠妇女分娩后的胎盘组织作为对照组。运用 Real-time RT-PCR 和 Western blotting 分别检测胎盘组织中印记基因 *Snrpn* 表达水平。**结果** 与正常对照组相比, 新鲜周期组和玻璃化冷冻组胎盘组织 *Snrpn* mRNA 水平和 SNRPN 蛋白质水平均表达升高, 差异有统计学意义 (mRNA:  $P$  均  $<0.001$ ; 蛋白质:  $P=0.008$ ,  $P=0.005$ ), 但新鲜周期组和玻璃化冷冻组间差异均无统计学意义 ( $P=0.212$ ,  $P=0.286$ )。**结论** IVF 一定程度上影响了胎盘组织 *Snrpn* 基因的表达, 而玻璃化冷冻技术本身可能并不加重或减轻这种影响。

**【关键词】** 受精, 体外; 胚胎移植; 玻璃化冷冻; *Snrpn* 基因

**基金项目:** 泉州市科技局 2016 年度科技计划项目 (2016Z38); 泉州市科技项目 B 类课题 ([2004]0010)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.003

· 临床研究 ·

**Effect of vitrification on the expression of imprinted gene *Snrpn* of neonatal placental tissues**

Yao Jianfeng<sup>1</sup>, Huang Yanfang<sup>2</sup>, Huang Rongfu<sup>3</sup>, Lin Suxia<sup>1</sup>, Guo Caiqiong<sup>1</sup>, Wu Peiya<sup>1</sup>, Li Youzhu<sup>4</sup>, Hu Jifeng<sup>2</sup>

<sup>1</sup>Reproductive Medicine Center, Quanzhou Maternity & Child Healthcare Hospital, Quanzhou 362000, China;

<sup>2</sup>Health Checkup Center, The First Affiliated Hospital, Fujian Medical University, Fuzhou 350004, China;

<sup>3</sup>Clinical Testing Center, The Second Affiliated Hospital, Fujian Medical University, Quanzhou 362000, China;

<sup>4</sup>Reproductive Medicine Center, The First Affiliated Hospital, Xiamen University, Xiamen 361002, China

Yao Jianfeng and Huang Yanfang are contributed equally to the article

Corresponding author: Li Youzhu, Email: 232398106@qq.com, Tel: +86-13774664443; Hu Jifeng,

Email: 935953573@qq.com, Tel: +86-13906911306

**【Abstract】 Objective** To investigate the effect of vitrification on the expression of imprinted gene *Snrpn* of neonatal placental tissues. **Methods** The neonatal placental tissue after delivery from infertility patients undergoing *in vitro* fertilization-embryo transfer (IVF-ET) treatment at the Reproductive Medicine Center of Quanzhou Maternal and Child Health Hospital during the period from 1 March 2015 to 31 October 2017, were collected respectively. Samples were divided into fresh group and vitrified group according to the pregnancy outcomes following fresh or vitrified embryo transfer. The placenta tissue from the natural pregnancy was collected as control group. Real-time RT-PCR and Western blotting were used to detect the *Snrpn* mRNA levels and SNRPN protein levels in placenta tissues from the above three groups. **Results** Compared with control group, the expression of *Snrpn* mRNA and SNRPN protein in the placenta from the fresh group and the vitrified group increased, with a statistically significant difference (mRNA: all  $P < 0.001$ ; protein:  $P = 0.008$ ,  $P = 0.005$ ). There was no significant difference between the fresh group and the vitrified group ( $P = 0.212$ ,  $P = 0.286$ ). **Conclusion** IVF may affect the imprinting gene *Snrpn* transcriptional expression in mRNA and protein levels to some extent, and the vitrification technology may not increase or reduce this impact.

**【Key words】** Fertilization *in vitro*; Embryo transfer; Placenta; *Snrpn* gene

**Fund program:** Quanzhou Science and Technology Plan Project in 2016 (2016Z38); Quanzhou Science and Technology Plan Project-Class B ([2004]0010)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.003



# 促性腺激素释放激素类似物对小鼠种植期子宫内膜白血病抑制因子、同源框基因 a10 及胞饮突的影响

周云<sup>1</sup> 林燕玲<sup>1</sup> 林坦<sup>1</sup> 吴青<sup>2</sup>

<sup>1</sup>福建省立医院妇产科, 福建医科大学省立临床医学院, 福州 350001; <sup>2</sup>浙江省人民医院妇科, 杭州医学院附属人民医院 310014

通信作者: 吴青, Email: okwq31@163.com, 电话: +86-571-85893890

**【摘要】目的** 探讨促性腺激素释放激素 (GnRH) 类似物对小鼠种植期子宫内膜白血病抑制因子 (LIF)、同源框基因 (HOX)a10 及胞饮突的影响。**方法** 将 8 周龄雌性小鼠采用随机数字表法随机分为 3 组, 各组 20 只, 于妊娠第 3.5 日分别腹腔注射短效 GnRH 激动剂 (GnRH-a)(GnRH-a 组)、GnRH 拮抗剂 (GnRH-A)(GnRH-A 组)、生理盐水 (对照组), 于妊娠第 4.5 日取小鼠血测雌孕激素、人绒毛膜促性腺激素 (hCG) 水平; 小鼠子宫内膜扫描电子显微镜观察种植窗期胞饮突, RT-PCR 检测 *LIF* mRNA、*HOX*a10 mRNA 的表达。**结果** 妊娠第 4.5 日 3 组孕酮、雌二醇、hCG 水平差异均无统计学意义 ( $P>0.05$ )。种植期 GnRH-a 组、对照组子宫内膜胞饮突发育优于 GnRH-A 组。GnRH-a 组小鼠着床期子宫内膜 *LIF* mRNA( $1.26\pm 0.10$ ) 和 *HOX*a10 mRNA( $1.30\pm 0.12$ ) 表达水平明显高于对照组 ( $1.20\pm 0.06$ ,  $1.23\pm 0.09$ )( $P=0.043$ 、 $P=0.028$ ), GnRH-A 组小鼠着床期子宫内膜 *LIF* mRNA( $1.14\pm 0.07$ ) 和 *HOX*a10 mRNA( $1.15\pm 0.08$ ) 表达水平明显低于对照组 ( $P=0.002$ 、 $P=0.007$ )。**结论** 黄体期 GnRH-a 有益于种植期子宫内膜 *LIF*、*HOX*a10 表达及胞饮突发育, 可提高子宫内膜容受性, 而 GnRH-A 则反之。

**【关键词】** 白血病抑制因子; 促性腺激素释放激素类似物; 同源框基因 a10; 胞饮突

**基金项目:** 福建省卫生和计划生育委员会青年科研课题 (2016-1-32)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.004

**Impact of gonadotropin-releasing hormone analogous on leukaemia inhibitory factor, homeobox gene a10 and pinopodes in mouse endometrium during implantation window**

Zhou Yun<sup>1</sup>, Lin Yanling<sup>1</sup>, Lin Tan<sup>1</sup>, Wu Qing<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, Fujian Provincial Hospital, Fujian Provincial Clinical Medical College, Fujian Medical University, Fuzhou 350001, China; <sup>2</sup>Department of Gynecology, Zhejiang Provincial People's Hospital, People's Hospital of Hangzhou Medical College, Hangzhou 310014, China

Corresponding author: Wu Qing, Email: okwq31@163.com, Tel: +86-571-85893890

**【Abstract】 Objective** To evaluate the effects of gonadotropin-releasing hormone (GnRH) analogous on the expression of leukaemia inhibitory factor (LIF), homeobox gene a10 (*HOXA10*) and pinopodes in mouse endometrium during the implantation window. **Methods** Sixty female mice were divided into three groups equally and randomly, which were abdominal injected by GnRH agonist (GnRH-a) (GnRH-a group), GnRH antagonist (GnRH-A) (GnRH-A group), normal saline (control group) individually 3.5 d after pregnancy (day 3.5), and serum hormone test was performed on day 4.5; mouse uteri were collected on day 4.5 to detect the expression of *LIF* mRNA and *HOXA10* mRNA by RT-PCR, and pinopodes were observed by electronic microscopy. **Results** There were no significant differences in estradiol, progesterone and human chorionic gonadotropin (hCG) among three groups. Pinopodes grew better in GnRH-a group and control group than in GnRH-A group. The expressions of *LIF* mRNA ( $1.26 \pm 0.10$ ) and *HOXA10* mRNA ( $1.30 \pm 0.12$ ) in GnRH-a group were significantly higher than those in control group ( $1.20 \pm 0.06$ ,  $1.23 \pm 0.09$ ) ( $P=0.043$ ,  $P=0.028$ ), and the expressions of *LIF* mRNA ( $1.14 \pm 0.07$ ) and *HOXA10* mRNA ( $1.15 \pm 0.08$ ) in GnRH-A group were significantly lower than those in control group ( $P=0.002$ ,  $P=0.007$ ). **Conclusion** GnRH-a during luteal phase can increase the expression of *LIF*, *HOXA10* in endometrium and formation of pinopode, improve endometrium receptivity, while GnRH-A has the opposite function.

**【Key words】** Leukemia inhibitory factor; Gonadotropin-releasing hormone analogous; Homeobox gene a10; Pinopode

**Fund program:** Youth Scientific Research Project of Fujian Provincial Health and Family Planning Commission (2016-1-32)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.004

# 谷氨酰胺对多囊卵巢综合征模型大鼠炎症状态的调节作用

胡雪 吴庚香 杨菁

武汉大学人民医院生殖医学中心, 湖北省辅助生殖与胚胎发育医学临床研究中心 430060

通信作者: 杨菁, Email: 13507182023@163.com, 电话: +86-13507182023

**【摘要】**目的 探讨谷氨酰胺 (Glutamine, Gln) 对多囊卵巢综合征 (polycystic ovary syndrome, PCOS) 大鼠炎症状态的调节作用及其作用机制。方法 将 30 只 23 日龄雌性 SD 大鼠按随机数字表法随机分为 PCOS 组、PCOS+Gln 组和正常对照组, PCOS 组和 PCOS+Gln 组每日颈部皮下注射脱氢表雄酮 6 mg/100 g, 连续注射 20 d, 正常对照组颈部皮下注射等量油剂; 造模后次日晨 8 : 00, PCOS+Gln 组腹腔注射 Gln 0.75 g/kg, 间隔 4 h 后再次注射 1 次 Gln (0.75 g/kg), PCOS 组及正常对照组以等量生理盐水替代, 首次腹腔注射后 24 h 处死各组大鼠, 对卵巢组织 HE 染色进行形态学分析, 检测血清性激素雌二醇、睾酮、卵泡刺激素 (FSH)、黄体生成素 (LH) 和炎症因子白细胞介素 (IL)-6、IL-18、C 反应蛋白 (CRP)、肿瘤坏死因子 (TNF)- $\alpha$  表达水平。结果 血清性激素检测结果显示, 与正常对照组 [(2.55 $\pm$ 0.24)  $\mu$ g/L, (7.68 $\pm$ 3.67) IU/L] 相比, PCOS 组和 PCOS+Gln 组血清睾酮 [(8.16 $\pm$ 0.59)  $\mu$ g/L, (10.41 $\pm$ 1.13)  $\mu$ g/L]、LH[(31.67 $\pm$ 13.66) IU/L, (24.31 $\pm$ 11.14) IU/L] 均明显升高, 差异均有统计学意义 ( $P<0.05$ ); 血清炎症因子检测结果提示, PCOS 组和 PCOS+Gln 组大鼠血清 IL-6、IL-18、CRP、TNF- $\alpha$  浓度均明显高于正常对照组, 差异均有统计学意义 ( $P<0.01$ ), 而 PCOS+Gln 组大鼠血清 IL-6[(44.19 $\pm$ 6.61) ng/L]、IL-18[(9.55 $\pm$ 1.34) ng/L]、CRP[(50.91 $\pm$ 5.21) mg/L]、TNF- $\alpha$ [(34.04 $\pm$ 4.61) ng/L] 浓度较 PCOS 组 [(63.22 $\pm$ 8.51) ng/L, (15.28 $\pm$ 1.03) ng/L, (70.40 $\pm$ 6.30) mg/L, (43.22 $\pm$ 6.27) ng/L] 均明显下降, 差异有统计学意义 ( $P<0.01$ )。结论 PCOS 模型大鼠体内炎症因子水平明显升高, Gln 能降低 PCOS 模型大鼠体内 IL-6、IL-18、CRP、TNF- $\alpha$  水平, 改善 PCOS 大鼠炎症状态。

**【关键词】** 谷氨酰胺; 多囊卵巢综合征; 炎症

基金项目: 国家自然科学基金 (81601240)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.005

· 实验研究 ·

**Glutamine attenuates inflammation in rats with polycystic ovary syndrome**

Hu Xue, Wu Gengxiang, Yang Jing

Reproductive Medical Center, Renmin Hospital of Wuhan University, Hubei Clinic Research Center for Assisted Reproductive Technology and Embryonic Development, Wuhan 430060, China

Corresponding author: Yang Jing, Email: 13507182023@163.com, Tel: +86-13507182023

**【Abstract】 Objective** To explore the regulation effect of glutamine (Gln) on inflammatory state of rats with polycystic ovary syndrome (PCOS) and its mechanism. **Methods** Thirty female Sprague-Dawley rats aged 23 days were randomly divided into three groups: PCOS group, PCOS+Gln group and normal control group. PCOS group and PCOS+Gln group were subcutaneously injected with dehydroepiandrosterone (DHEA) 6 mg/100g, meanwhile, control group was subcutaneously injected with 0.2 mL of olive oil only. After 20 consecutive days of treatment, at 8 : 00 am the next morning, PCOS+Gln group was given intraperitoneal injection of Gln 0.75 g/kg. Four hours later, Gln was injected again as the same dose of the first time, and PCOS group and normal control group were given intraperitoneal injection of normal saline. All rats were sacrificed at 24 h later after the first intraperitoneal injection. HE staining of ovaries was performed for morphological analysis, and the expression levels of serum sex hormones including estradiol, testosterone, follicle stimulating hormone (FSH), luteinizing hormone (LH) and inflammatory cytokines including interleukin (IL)-6, IL-18, C-reactive protein (CRP), and tumor necrosis factor (TNF)- $\alpha$  were detected. **Results** Compared with the normal control group [(2.55 $\pm$ 0.24)  $\mu$ g/L, (7.68 $\pm$ 3.67) IU/L], the concentrations of serum testosterone and LH in PCOS group [(8.16 $\pm$ 0.59)  $\mu$ g/L, (31.67 $\pm$ 13.66) IU/L] and PCOS+Gln group [(10.41 $\pm$ 1.13)  $\mu$ g/L, (24.31 $\pm$ 11.14) IU/L] were significantly higher ( $P$ <0.05), the level of serum IL-6, IL-18, CRP, and TNF- $\alpha$  in PCOS group and PCOS+Gln group were significantly increased ( $P$ <0.01). But the level of serum IL-6 [(44.19 $\pm$ 6.61) ng/L], IL-18 [(9.55 $\pm$ 1.34) ng/L], CRP [(50.91 $\pm$ 5.21) mg/L] and TNF- $\alpha$  [(34.04 $\pm$ 4.61) ng/L] in PCOS+Gln group were significantly lower than those in PCOS group [(63.22 $\pm$ 8.51) ng/L, (15.28 $\pm$ 1.03) ng/L, (70.40 $\pm$ 6.30) mg/L, (43.22 $\pm$ 6.27) ng/L] ( $P$ <0.01). **Conclusion** The level of inflammatory cytokines in PCOS rats was significantly increased. Gln can reduce the levels of IL-6, IL-18, CRP, and TNF- $\alpha$  in PCOS rats, and attenuate the inflammatory state of PCOS rats.

**【Key words】** Glutamine; Polycystic ovary syndrome; Inflammation

**Fund program:** National Natural Science Foundation of China (81601240)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.005

# 胰高血糖素样肽 -1 受体激动剂治疗多囊卵巢综合征疗效和安全性的 Meta 分析

韩艺 李莹洁 何冰

中国医科大学附属盛京医院内分泌科, 沈阳 110004

通信作者: 何冰, Email: hb3h@hotmail.com, 电话: +86-18940259707

**【摘要】目的** 系统评价胰高血糖素样肽 -1(GLP-1)受体激动剂治疗多囊卵巢综合征(PCOS)的有效性和安全性。**方法** 计算机检索 PubMed、EMbase、The Cochrane Library、万方数据库和中国知网(CNKI)数据库,检索 GLP-1 受体激动剂治疗 PCOS 的随机对照试验(RCT),检索时限均为建库至 2018 年 4 月。由 2 名研究者独立筛选文献、提取资料并评价纳入研究的偏倚风险,采用 RevMan5.3 软件进行 Meta 分析。**结果** 共纳入 8 个 RCT。Meta 分析结果显示:与二甲双胍相比, GLP-1 受体激动剂在降低体质量指数(BMI)(MD=-1.61, 95% CI=-2.28~-0.94,  $P<0.000\ 01$ )、减小腹围(MD=-3.11, 95% CI=-4.40~-1.82,  $P<0.000\ 01$ )、改善胰岛素敏感性(MD=-0.42, 95% CI=-0.59~-0.25,  $P<0.000\ 01$ )及降低血清总睾酮(MD=0.13, 95% CI=0.11~0.15,  $P<0.000\ 01$ )方面疗效均优于二甲双胍,但在降低游离雄激素指数(FAI)及改善月经频率方面比较差异无统计学意义( $P>0.05$ )。GLP-1 受体激动剂出现恶心及头痛不良反应发生率高于二甲双胍( $P=0.04$ ),但腹泻、腹胀、呕吐等不良反应发生率与二甲双胍组差异无统计学意义( $P>0.05$ )。**结论** GLP-1 受体激动剂治疗 PCOS 在降低 BMI、减小腹围、改善胰岛素敏感性及降低血清总睾酮方面均优于二甲双胍,但恶心及头痛不良反应发生率更高。

**【关键词】** 多囊卵巢综合征; 二甲双胍; Meta 分析; 随机对照试验; 胰高血糖素样肽 -1 受体激动剂; 系统评价

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.006

**Efficacy and safety of glucagon-like peptide-1 receptor agonists for treating polycystic ovary syndrome: a Meta-analysis**

Han Yi, Li Yingjie, He Bing

Department of Endocrinology, Shengjing Hospital of China Medical University, Shenyang 110004, China

Corresponding author: He Bing, Email: hb3h@hotmail.com, Tel: +86-18940259707

**【Abstract】 Objective** To systematically review the efficacy and safety of glucagon-like peptide-1 (GLP-1) receptor agonists for treating polycystic ovary syndrome (PCOS). **Methods** PubMed, EMBase, The Cochrane Library, Wanfang Data and CNKI were searched online to collect randomized controlled trials (RCTs) of GLP-1 receptor agonists for treating PCOS from the data of their establishment to April 2018. Two reviewers independently screened literature, extracted data, and assessed the risk of bias of included studies. Then results of Meta-analysis were performed by using RevMan5.3 software. **Results** A total of 8 RCTs was included. The meta-analysis showed that compared with metformin, GLP-1 receptor agonists were more effective in reducing body mass index (BMI) (MD=-1.61, 95% CI=-2.28—-0.94,  $P<0.000\ 01$ ) and abdominal girth (MD=-3.11, 95% CI=-4.40—-1.82,  $P<0.000\ 01$ ), improving insulin sensitivity (MD=-0.42, 95% CI=-0.59—-0.25,  $P<0.000\ 01$ ) and lowering serum total testosterone (MD=0.13, 95% CI=0.11—0.15,  $P<0.000\ 01$ ). There were no significant differences between GLP-1 receptor agonists and metformin in case of lowering free androgen index (FAI) and improving menstrual frequency. GLP-1 receptor agonists had a higher incidence of nausea and headache than metformin ( $P=0.04$ ), but no significant differences were observed in adverse events such as diarrhea, bloating and vomiting ( $P>0.05$ ). **Conclusion** GLP-1 receptor agonists are superior to metformin in reducing BMI and abdominal girth, improving insulin sensitivity and lowering serum total testosterone in PCOS patients. However, the incidence of adverse events such as nausea and headache is higher.

**【Key words】** Polycystic ovary syndrome; Metformin; Meta-analysis; Randomized controlled trial; GLP-1 receptor agonists; Systematic review

DOI: 10.3760/ema.j.issn.2096-2916.2019.02.006

## 单基因遗传病家系中女性为新发突变携带者的胚胎植入前遗传学诊断策略

朱小辉 王玉倩 严智强 智旭 闫丽盈 乔杰  
北京大学第三医院妇产科生殖医学中心 100191

通信作者: 闫丽盈, Email: yanliyingkind@aliyun.com, 电话: +86-10-82266757

**【摘要】目的** 探讨适用于特殊单基因遗传病家系(本研究针对夫妻中女方为新发突变携带者)胚胎植入前基因诊断(PGD)的新方法,阻断致病性基因突变向下一代传递。**方法** 以多发性骨软骨瘤致病基因 *EXT1* 女性新发突变携带者的胚胎基因诊断为例,阐述针对特殊遗传家系胚胎诊断策略的优势。我们采用直接致病位点检测结合连锁分析的检测策略,利用突变位点检测成功的胚胎和极体单细胞样本的连锁信息,对其他胚胎进行连锁分析,从而判断胚胎是否携带母源基因突变。**结果** 获得 12 枚胚胎进行遗传学检测,其中 3 枚胚胎、2 个极体突变位点检测成功,随后用于其他胚胎的连锁分析。5 枚胚胎经检测不携带母源基因突变,染色体未见异常,可移植。患者移植其中 1 枚胚胎后,成功妊娠、分娩。PGD 新生儿不携带母源突变。**结论** 采用携带突变的胚胎或极体进行连锁分析的创新性检测策略,可以在女方缺少连锁分析所必要成员的情况下,准确判断胚胎母源突变携带情况,从而扩展了单基因胚胎移植前基因诊断技术的适用人群。

**【关键词】** 新发突变; 遗传性多发性骨软骨瘤 I 型; 极体; 胚胎植入前基因诊断; 连锁分析

**基金项目:** 国家自然科学基金项目(31522034, 31571544, 81521002)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.007

**New testing strategy applied in monogenic disease preimplantation genetic diagnosis for the couples with female *de novo* gene mutation carriers**

Zhu Xiaohui, Wang Yuqian, Yan Zhiqiang, Zhi Xu, Yan Liying, Qiao Jie

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

Corresponding author: Yan Liying, Email: yanliyingkind@aliyun.com, Tel: +86-10-82266757

**【Abstract】 Objective** To investigate new preimplantation genetic diagnosis (PGD) strategy applying to special cases with monogenic inheritance diseases (this study focused on female carriers with *de novo* gene mutations), to block the transmission of pathogenic gene mutations to the next generation. **Methods** To clarify the diagnosis strategy, we took an example of a PGD for a hereditary multiple osteochondroma female patient who carries *de novo* gene mutation in *EXT1* gene. Pathogenic mutation site detection combined with Linkage analysis was applied in embryonic gene diagnosis, which relied on the embryos and polar bodies with successful mutation site detection. **Results** Totally 12 embryos as well as their polar bodies were performed genetic testing. The mutation site was detected successfully in 3 embryos and 2 polar bodies (including one heterozygous embryo and one second polar body) which could be applied in linkage analysis for other embryos' PGD. Finally, 5 embryos were diagnosed as transplantable embryos, free of mutation with normal copy number variation (CNV). One of them was transplanted, and as consequence a healthy PGD baby girl was born who was identified as free of maternal mutation after genetic validation. **Conclusion** The innovative strategy of using embryo carrying mutation or polar body in embryo genetic diagnosis can expand the applicable patient population.

**【Key words】** *de novo* mutation; A hereditary multiple exostoses type I; Polar body; Preimplantation genetic diagnosis; Linkage analysis

**Fund program:** National Nature Science Foundation of China (31522034, 31571544, 81521002)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.007



## 卵泡敏感指数评估体外受精 / 卵胞质内单精子显微注射患者的卵巢反应性

邢阿英<sup>1</sup> 耿蒙慧<sup>1</sup> 王大琳<sup>2</sup> 胡艳秋<sup>3</sup>

<sup>1</sup> 大连医科大学 116044; <sup>2</sup> 扬州大学医学院 225001; <sup>3</sup> 苏北人民医院生殖中心, 扬州 225001

胡艳秋现在南京医科大学第一附属医院 (江苏省人民医院) 生殖中心 210029

通信作者: 胡艳秋, Email: huyanqiu78@163.com, 电话: +86-18051060567

**【摘要】** 目的 探讨卵泡敏感指数 (follicular sensitivity index, FSI) 对接受体外受精 (*in vitro* fertilization, IVF)/ 卵胞质内单精子显微注射 (intracytoplasmic sperm injection, ICSI) 患者卵巢反应性的预测价值。方法 回顾性队列研究分析 2009 年 4 月—2015 年 12 月期间苏北人民医院生殖中心选择长方案促排卵治疗, 行 IVF/ICSI- 胚胎移植 (embryo transfer, ET) 的不孕症妇女的资料, 共纳入 1354 个取卵周期, 分析 FSI 等因素与获卵数之间的相关性, 把 FSI 按照三分位法共分为低 FSI 组 ( $n=452$ )、中 FSI 组 ( $n=451$ )、高 FSI 组 ( $n=451$ ), 分别统计 3 组患者基本临床特征、控制性超促排卵 (COH) 周期资料及实验室资料等。**结果** 促性腺激素 (Gn) 使用总量、体质量指数 (BMI)、年龄和不孕年限与获卵数呈负相关, 卵泡输出率 (FORT)、窦卵泡数 (AFC)、FSI、排卵前卵泡数 (PFC)、卵巢敏感指数 (OSI) 与获卵数呈正相关, 3 组间比较差异均有统计学意义 ( $P$  均  $<0.05$ )。OSI、FORT、FSI 与基础卵泡刺激素 (FSH)/ 黄体生成素 (LH) 比值、不孕年限、年龄、BMI、Gn 使用总量、Gn 使用时间呈负相关, 与获卵数呈正相关, 且相关系数  $r_{OSI} > r_{FSI} > r_{FORT}$ 。患者不孕年限、平均年龄、BMI、基础 FSH/LH 比值、基础 PRL 水平、FSH 启动剂量、FSH 总用量、人绝经期促性腺激素 (hMG) 用量、Gn 使用时间、Gn 使用总量、获卵数、OSI、FORT 3 组间比较差异有统计学意义 ( $P < 0.05$ )。**结论** FSI 值与患者卵巢反应性有一定相关性, FSI 高者卵巢反应性高。

**【关键词】** 卵泡敏感指数; 控制性超促排卵; 卵巢反应性

**基金项目:** 江苏省妇幼健康科研项目 (F201674)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.008

**Assessment of ovarian response in *in vitro* fertilization/intracytoplasmic sperm injection patients by follicular sensitivity index**

Xing Aying<sup>1</sup>, Geng Menghui<sup>1</sup>, Wang Dalin<sup>2</sup>, Hu Yanqiu<sup>3</sup>

<sup>1</sup>Dalian Medical University, Dalian 116044, China; <sup>2</sup>Clinical Medical School of Yangzhou University, Yangzhou 225001, China; <sup>3</sup>Reproductive Medicine Center, Northern Jiangsu, People's Hospital, Yangzhou 225001, China

Hu Yanqiu is working on Reproductive Medicine Center of the First Affiliated Hospital with Nanjing Medical University (Jiangsu Province Hospital), Nanjing 210029, China

Corresponding author: Hu Yanqiu, Email: huyanqiu78@163.com, Tel: +86-18051060567

**【Abstract】 Objective** To investigate the value of follicular sensitivity index (FSI) in evaluating ovarian response in patients receiving *in vitro* fertilization (IVF)/intracytoplasmic sperm injection (ICSI). **Methods** This present retrospective cohort study included infertility women who choosed a long-term program to promote ovulation treatment, and underwent IVF/ICSI-embryo transfer (ET) from April 2009 to December 2015 in the Reproductive Center of the People's Hospital of Northern Jiangsu Province. Totally 1354 oocyte retrieval cycles were included, the correlation was analyzed between factors such as FSI and the number of oocytes retrieved, and the patients were divided into three groups: low FSI group ( $n=452$ ), medium FSI group ( $n=451$ ) and high FSI group ( $n=451$ ) according to the tertile method. The basic clinical characteristics, controlled ovarian hyperstimulation (COH) cycle data and laboratory data of the three groups were statistically analyzed. **Results** The total dosage of gonadotropin (Gn) used, body mass index (BMI), age, infertility duration and the number of oocytes retrieved were negatively correlated. Follicular output rate (FORT), antral follicles count (AFC), FSI, preovulatory follicles (PFCs) and ovarian sensitivity index (OSI) were positively correlated with the number of oocytes retrieved. The differences among the three groups were statistically significant ( $P<0.05$ ). OSI, FORT, FSI were negatively correlated with factors like basal follicle stimulating hormone (FSH)/luteinizing hormone (LH) ratio, infertility duration, age, BMI, total dosage and duration of Gn used, and positively correlated with the number of oocytes retrieved, and the correlation coefficient was  $r_{OSI}>r_{FSI}>r_{FORT}$ . Infertility duration, age, BMI, basal FSH/LH ratio, basal prolactin (PRL) level, FSH starting dosage, total FSH dosage, human menopausal gonadotropin (hMG) dosage, duration of Gn used, total Gn dosage, the number of oocytes retrieved, OSI and FORT were statistically significant among the three groups ( $P<0.05$ ). **Conclusion** FSI value has a certain correlation with ovarian reactivity, and patients with high FSI have high ovarian response.

**【Key words】** Follicular sensitivity index; Controlled ovarian hyperstimulation; Ovarian response

**Fund program:** Jiangsu Province Maternal and Child Health Research Project (F201674)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.008

## 清瘀温通法治疗子宫内膜异位症痛经的临床疗效观察

曹阳<sup>1</sup> 田露露<sup>1</sup> 翁雷<sup>2</sup> 束兰娣<sup>3</sup> 张婷婷<sup>1</sup>

<sup>1</sup>上海中医药大学附属岳阳中西医结合医院 200437; <sup>2</sup>上海同济大学附属第一妇婴保健院 200040; <sup>3</sup>上海中医药大学附属曙光医院 200021

通信作者: 张婷婷, Email: tingting185@aliyun.com, 电话: +86-21-65161782; 翁雷, Email: klausweng@hotmail.com, 电话: +86-13371985113

**【摘要】目的** 探讨清瘀温通法治疗子宫内膜异位症(EMS)痛经的临床疗效。**方法** 将2015年12月—2017年10月期间于上海中医药大学附属岳阳中西医结合医院妇科、曙光医院妇科、上海同济大学第一妇婴保健院妇科就诊的91例EMS术后患者采用随机数字表法分为治疗组(给予清瘀温通方,  $n=45$ )和对照组(给予安慰剂,  $n=46$ ), 经连续治疗3个月经周期后观察两组患者治疗前后痛经情况、中医证候疗效及血清CA125、前列腺素E<sub>2</sub>(PGE<sub>2</sub>)水平, 并采用EMS健康相关质量量表(EHP-30)对患者生存质量进行评估。**结果** 治疗组与对照组痛经缓解率分别为82.2%、23.9%; 痛经程度也较治疗前降低( $P<0.001$ ), 且治疗组优于对照组( $P=0.037$ )。治疗组与对照组中医证候总有效率分别为80.0%、30.4%, 中医证候评分亦较治疗前均有显著改善( $P<0.001$ ), 组间比较差异有统计学意义( $P=0.044$ )。治疗后, 治疗组CA125[(41.50±34.85) U/mL]、PGE<sub>2</sub>水平[(350.52±125.98) ng/L]均显著降低( $P<0.001$ ), 且治疗组下降幅度优于对照组( $P<0.001$ )。治疗组与对照组患者治疗后生存质量均得到一定改善。在对疼痛的控制力、情绪稳定性、社会支持方面组间差异亦有统计学意义( $P<0.001$ )。**结论** 清瘀温通法可以降低EMS患者的痛经程度, 改善临床症状, 降低患者血清PGE<sub>2</sub>、CA125的水平, 提高患者生存质量, 值得临床推荐。

**【关键词】** 子宫内膜异位症; 生存质量; 清瘀温通法; 痛经

**基金项目:** 上海市中医药事业发展三年行动计划资助项目(ZY3-CCCX-3-3019); 上海市科委科技创新行动计划(18401972000); 岳阳中西医结合医院院级课题(2018YJ15)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.009

### Clinical study on treatment of endometriosis dysmenorrhea with Qingyu Wentong method

Cao Yang<sup>1</sup>, Tian Lulu<sup>1</sup>, Weng Lei<sup>2</sup>, Shu Landi<sup>3</sup>, Zhang Tingting<sup>1</sup>

<sup>1</sup>Yueyang Hospital of Integrated Traditional Chinese and Western Medicine, Shanghai University of Traditional Chinese Medicine, Shanghai 200437, China; <sup>2</sup>Shanghai First Maternity and Infant Hospital, Shanghai 200040, China; <sup>3</sup>Shuguang Hospital Affiliated to Shanghai University of Traditional Chinese Medicine, Shanghai 200021, China

Corresponding author: Zhang Tingting, Email: tingting185@aliyun.com, Tel: +86-21-65161782; Weng Lei, Email: klausweng@hotmail.com, Tel: +86-13371985113

**【Abstract】 Objective** To observe the clinical efficacy of Qingyu Wentong method in treating endometriosis (EMS) dysmenorrhea. **Methods** Ninety-one cases of EMS patients were randomly divided into two groups, 45 cases in treatment group and 46 cases in control group. The treatment group was given Qingyu Wentong formula and control group was given placebo. All patients were continuously treated for 3 menstrual cycles. The dysmenorrhea, traditional Chinese medicine (TCM) symptom effect, serum CA125 and prostaglandin E2 (PGE2) were observed and analyzed statistically. And the quality of life was assessed by the Endometriosis Health Profile-30 (EHP-30) in two groups. **Results** The remission rate of dysmenorrhea was 82.2% and 23.9%, respectively ( $P<0.001$ ). After treatment, dysmenorrhea scale scores of two groups were lower than before treatment ( $P<0.001$ ), and the treatment group was superior to control group ( $P=0.037$ ). The total effective rates of TCM syndromes in treatment group and control group were 80.0% and 30.4%, respectively. After treatment, the scores of TCM syndromes in both groups were significantly improved ( $P<0.001$ ), and there was a significant difference between the two groups ( $P=0.044$ ). After treatment, the CA125 [ $(41.50\pm 34.85)$  U/mL] and PGE2 values [ $(350.52\pm 125.98)$  ng/L] in the treatment group decreased ( $P<0.001$ ), and treatment group was better than control group ( $P<0.001$ ). Two groups of patients' quality of life was improved. There was a significant difference in pain control, emotional stability and social support between the two groups ( $P<0.001$ ). **Conclusion** Qingyu Wentong method can reduce the degree of dysmenorrhea in EMS patients, reduce the levels of CA125 and PGE2, improve the quality of life and clinical efficacy. It is worthy of recommendation.

**【Key words】** Endometriosis; Quality of life; Qingyu Wentong method; Dysmenorrheal

**Fund program:** Three-year Action Plan for the Development of Traditional Chinese Medicine in Shanghai (ZY3-CCCX-3-3019); Shanghai Science and Technology Commission's Action Plan for Science and Technology Innovation (18401972000); Scientific Research Project of Yueyang Integrated Traditional Chinese and Western Medicine Hospital (2018YJ15)

DOI: 10.3760/cma.j.issn 2096-2916.2019.02.009

## 中文版 Cardiff 生育知识量表在育龄人群中的信效度评价

周艳辉 郭紫璆 宋晓艳 王婷 罗阳

中南大学湘雅护理学院, 长沙 410001

通信作者: 罗阳, Email: ly603202@csu.edu.cn, 电话: +86-731-82650269

**【摘要】** 目的 分析汉化 Cardiff 生育知识量表 (Cardiff fertility knowledge scale, CFKS), 测评育龄人群生育知识的信效度。方法 遵循 Brislin 双人翻译与回译原则, 对量表进行科学、严谨的跨文化调试并对 60 名育龄人员进行预实验形成中文版 CFKS, 选取湖南省 3 所高校的 800 名大学生和 6 个社区的 1115 名育龄人员进行调查, 以评价问卷的信度和效度。结果 中文版 CFKS 的总 Cronbach's  $\alpha$  系数为 0.811, 重测信度为 0.816, 各条目的内容效度为 0.875~1.000, 总条目的内容效度指数 (CVI) 平均值为 0.950。问卷共提取 3 个公因子, 累计方差贡献率为 51.149%, 13 个条目在相应公因子上的载荷值均  $>0.4$ 。结论 中文版 CFKS 量表具有较好的信度和效度, 可用于评价我国育龄人群的生育知识水平, 为制定科学有效的生育健康教育提供参考依据。

**【关键词】** 生育知识; 量表; 育龄人群; 信度; 效度

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.010

### **Cultural adaptation and validation of the Cardiff fertility knowledge scale among Chinese childbearing age population**

Zhou Yanhui, Guo Ziqiu, Song Xiaoyan, Wang Ting, Luo Yang

Xiangya Nursing School of Central South University, Changsha 410001, China

Corresponding author: Luo Yang, Email: ly603202@csu.edu.cn, Tel: +86-731-82650269

**【Abstract】Objective** To assess translate the Chinese version of Cardiff fertility knowledge scale (CFKS) reliability and validity among Chinese childbearing age population. **Methods** The Chinese version of CFKS was developed through Brislin's translation/back-translation method and modified through cultural adaptation and semantic analysis. The reliability and validity of the Chinese version of CFKS was tested based on an investigation containing 800 students from 3 universities and 1115 childbearing age people from 6 communities in Hunan Province. **Results** The Cronbach's  $\alpha$  coefficient for the overall Chinese CFKS was 0.811, and the test-retest reliability was 0.816. The Scale-Content Validity Index (S-CVI) was 0.950 with the Item-Content Validity Index (I-CVI) ranging from 0.875 to 1.000. Three common factors were extracted and the accumulated variance contribution rate was 51.149%. In addition, the load value of 13 items on the corresponding common factor was greater than 0.4. **Conclusion** The Chinese version of CFKS could be valuable to evaluate fertility knowledge among the childbearing age population.

**【Key words】** Fertility knowledge; Scale; Childbearing age population; Reliability; Validity

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.010

## 继发不孕人群二孩生育意愿及其影响因素的研究

邓明芬 曹苹 覃华 罗璐 李宇彬

中山大学附属第一医院生殖中心, 广州 510080

通信作者: 李宇彬, Email: liyubin97200@163.com, 电话: +86-13556067519

**【摘要】目的** 探讨现阶段继发不孕人群的二孩生育意愿程度及其影响因素。**方法** 调查 2017 年 5 月—6 月期间在本院生殖中心就诊咨询的 20~45 岁继发不孕女性患者, 采用不记名问卷方式收集备孕夫妻的一般情况、二孩准备情况以及所关心的医学问题等资料进行二孩生育意愿的影响因素分析。**结果** 在调查的 382 例继发不孕人群中, 91.6% 的被调查者表现出强烈的二孩生育意愿。单因素分析结果提示: 女方年龄 ( $P=0.002$ )、男方年龄 ( $P=0.044$ )、一孩年龄 ( $P=0.002$ )、居住地 ( $P<0.001$ )、一孩性别 ( $P=0.027$ )、一孩分娩方式 ( $P=0.015$ )、一孩对二孩的态度 ( $P<0.001$ ) 及认为自己目前怀孕难易程度 ( $P=0.014$ ) 与二孩生育意愿是否强烈之间差异具有统计学意义; 而女方学历、经济收入、未避孕年限与二孩生育意愿是否强烈差异无统计学意义 ( $P>0.05$ )。多因素分析结果提示: 女方年龄 ( $P=0.023$ )、居住地 ( $P=0.023$ )、一孩分娩方式 ( $P=0.019$ )、认为妊娠难易程度 ( $P=0.036$ ) 及一孩对二孩态度 ( $P<0.001$ ) 与二孩生育意愿是否强烈差异有统计学意义; 男方年龄、一孩性别与二孩生育意愿间差异无统计学意义 ( $P>0.05$ )。**结论** 女方年龄、居住地、一孩分娩方式、一孩对二孩的态度及自我评估妊娠难易程度是影响二孩生育意愿程度的主要因素。

**【关键词】** 继发不孕; 二孩生育意愿; 影响因素

**基金项目:** 广东省医学科研基金项目 (A2018483)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.011

**A study on the second-child intention and its influencing factors in secondary infertile people**

Deng Mingfen, Cao Ping, Tan Hua, Luo Lu, Li Yubin

Reproductive Medical Center, the First Affiliated Hospital of Sun Yat-sen University, Guangzhou 510080, China

Corresponding author: Li Yubin, Email: liyubin97200@163.com, Tel: +86-13556067519

**【Abstract】 Objective** To explore second-child intention and its influencing factors of secondary infertile people. **Methods** Secondary infertile women aged 20 to 45 years who were admitted to the Reproductive Medical Center of the First Affiliated Hospital of Sun Yat-sen University were investigated from May to June in 2017, and the general situation of pregnant couples was collected by anonymous questionnaire. The factors influencing the family's second-child intention were analyzed according to the data of the preparation and the medical problems concerned about the childbearing. **Results** In 382 cases of secondary infertility, 91.6% of investigators had a strong desire to give birth to another child. Univariate analysis of the factors influencing second-child intention showed significant differences in female age ( $P=0.002$ ), male age ( $P=0.044$ ), the first child's age and gender ( $P=0.002$  and  $P=0.027$ , respectively), residence ( $P<0.001$ ), delivery mode of the first child ( $P=0.015$ ), child's attitude to rebirth ( $P<0.001$ ), and self assessment to conceive ( $P=0.014$ ). However, there was no significant difference in female educational background, income and time of pregnancy preparation ( $P>0.05$ ). The results of multivariate analysis showed that female age ( $P=0.023$ ), residence ( $P<0.001$ ), delivery mode of the first child ( $P=0.019$ ), self assessment to conceive ( $P=0.036$ ) and the first child's attitude to rebirth ( $P=0.001$ ) were significantly affecting the rebirth intention, and no significant difference was found in male's age, sex of the first child. **Conclusion** Female age, residence, delivery mode of the first child, child's attitude to rebirth and self-assessment of re-pregnancy were the main factors influencing the fertility willingness.

**【Key words】** Secondary infertile; The second-child intention; Influencing factors

**Fund program:** Medical Scientific Research Foundation of Guangdong Province (A2018483)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.011



## 冻融胚胎移植自发性卵巢过度刺激综合征 1 例和文献综述

曹晓敏 梁菊艳 王媛媛 刘丽 徐凤琴

天津市第一中心医院生殖医学科 300192

通信作者: 徐凤琴, Email: xufengqin1968@126.com, 电话: +86-18698030922

**【摘要】** **目的** 探讨自然周期冻融胚胎移植妊娠后发生自发性卵巢过度刺激综合征 (sOHSS) 的机理及处理措施。**方法** 对 1 例自然周期冻融胚胎移植妊娠发生 sOHSS 的诊断及治疗过程进行报道并对相关病例资料进行回顾分析。**结果** 本文患者自然周期冻融胚胎移植妊娠后发生 sOHSS 是首例报道并成功分娩。**结论** sOHSS 是一种罕见病, 发病机理尚无定论, sOHSS 会影响胚胎发育和胎儿成活率, 病情严重者可能危及生命应引起高度关注。

**【关键词】** 自发性卵巢过度刺激综合征; 冷冻胚胎移植; 自然周期; 多胎妊娠

**基金项目:** 天津市卫生局科技基金 (2013KZ033)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.012

· 个案报道 ·

**A case report and literature review of spontaneous ovarian hyperstimulation syndrome**

*Cao Xiaomin, Liang Juyan, Wang Yuanyuan, Liu Li, Xu Fengqin*

*Department of Reproductive Medicine, Tianjin First Central Hospital, Tianjin 300192, China*

*Corresponding author: Xu Fengqin, Email: xufengqin1968@126.com, Tel: +86-18698030922*

**【Abstract】 Objective** To explore the mechanism and treatment of spontaneous ovarian hyperstimulation syndrome (sOHSS) after natural cycle frozen-thawed embryo transfer pregnancy. **Methods** We reported and reviewed the diagnosis and treatment of a patient carrying intrauterine pregnancy combined with sOHSS in the natural cycle freeze-thawed embryo transfer. **Result** This patient with sOHSS was the first case reported and successfully delivered after natural cycle frozen-thawed embryo transfer. **Conclusion** sOHSS is a rare disease, and may affect embryo development and fetal survival rate. Its pathogenesis is still unknown. Serious cases may be life-threatening and should be closely monitored.

**【Key words】** Spontaneous ovarian hyperstimulation syndrome; Frozen embryo transfer; Natural cycle; Multifetation

**Fund program:** Science and Technology Foundation of Tianjin Health (2013KZ033)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.012

## 原发性与继发性反复妊娠丢失病因及预后的比较

张静<sup>1</sup> 宋佳怡<sup>1</sup> 马瑞红<sup>2</sup> 夏天<sup>2</sup>

<sup>1</sup>天津中医药大学研究生院 300073; <sup>2</sup>天津中医药大学第一附属医院生殖中心 300193

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

**【摘要】** 反复妊娠丢失 (recurrent pregnancy loss, RPL) 病因复杂多样且缺乏特异性临床表现, 属于妇科疑难病种。欧洲人类生殖和胚胎学协会 (European Society of Human Reproduction and Embryology, ESHRE) 将 RPL 分为原发性与继发性, 两者可能由于妊娠史的不同, 病因及预后有所差异, 临床诊疗应更有针对性。本文着重探讨两者之间病因以及预后的差异, 以期为该病的临床诊治提供依据。

**【关键词】** 预后; 反复妊娠丢失; 原发性; 继发性; 病因

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.013

**The causes and prognosis of primary and secondary recurrent pregnancy loss**

Zhang Jing<sup>1</sup>, Song Jiayi<sup>1</sup>, Ma Ruihong<sup>2</sup>, Xia Tian<sup>2</sup>

<sup>1</sup>Graduate School of Tianjin University of TCM, Tianjin 300073, China; <sup>2</sup>Center for Reproductive Medicine, the First Affiliated Hospital of Tianjin University of TCM, Tianjin 300193, China

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

**【Abstract】** Recurrent pregnancy loss (RPL) has complex and varied etiology, lacking of specific clinical manifestations. It has been a difficult disease of gynecology. European Society of Human Reproduction and Embryology suggest that RPL can be divided into primary and secondary RPL, which two are different in the pregnancy history, etiology and prognosis. Therefore the diagnosis and treatment should be more targeted. This paper focuses on the differences between the two RPL in causes and prognosis, in order to provide a basis for clinical diagnosis and treatment.

**【Key words】** Prognosis; Recurrent pregnancy loss; Primary; Secondary; Etiology

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.013

## 氧化应激下卵母细胞线粒体 DNA 损伤及修复研究进展

黄倩倩<sup>1</sup> 王晖<sup>2</sup> 钱云<sup>1</sup>

<sup>1</sup>南京医科大学第二附属医院生殖医学科 210011; <sup>2</sup>南京医科大学基础医学院组织胚胎学系 南京医科大学生殖医学国家重点实验室 210011

通信作者: 钱云, Email: qianyun@njmu.edu.cn, 电话: +86-15366136559

**【摘要】** 随着不孕症发病率增加, 卵母细胞质量下降作为引起胚胎发育不良甚至不孕的重要原因而日益受到关注, 如何预测及提高卵母细胞质量成为研究热点。卵母细胞中线粒体数量和质量可影响卵母细胞发育潜能, 尤其线粒体基因组(mtDNA)受到氧化损伤后引起的基因突变、DNA 链断裂等, 可导致线粒体功能不同程度损伤, 进而使卵母细胞质量下降。本文简述了 mtDNA 对卵母细胞的重要性, 主要介绍 mtDNA 氧化损伤后的碱基切除修复、错配修复等自身修复机制。但 mtDNA 自身修复相比核 DNA 具有局限性, 出现氧化应激时, 损伤修复效率低, 故同时分析并讨论了 mtDNA 外源性修复途径。各种抗氧化剂的应用可在一定程度上弥补自身抗氧化系统的不足, 减轻氧化应激损伤, 改善卵母细胞质量。线粒体移植和线粒体替代治疗, 可对原有线粒体进行更直接的补充和置换, 明显改善受精率和胚胎发育, 为临床研究提供新方向及理论基础。

**【关键词】** 卵母细胞; DNA, 线粒体; 氧化应激; DNA 修复

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.014

### **Oxidative damage and the repair of mitochondrial DNA in oocyte**

Huang Qianqian<sup>1</sup>, Wang Hui<sup>2</sup>, Qian Yun<sup>1</sup>

<sup>1</sup>Clinical Center of Reproductive Medicine, the Second Affiliated Hospital of Nanjing Medical University, Nanjing 210011, China; <sup>2</sup>Department of Histology and Embryology, Basic Medical College, State Key Laboratory of Reproductive Medicine, Nanjing Medical University, Nanjing 211166, China

Corresponding author: Qian Yun, Email: qianyun@njmu.edu.cn, Tel: +86-15366136559

**【Abstract】** With the increase of infertility, there is growing concern about the decreased oocyte quality, as the essential reason to induce dysembryoplasia even female infertility. How to predict and improve oocyte quality also receives more attention. Researches has shown that the quantity and quality of mitochondria within oocyte can reduce developmental potentiality, including mitochondrial DNA (mtDNA) damage. The mtDNA is peculiarly susceptible to oxidative damage. And it tends to cause gene mutation and DNA strand break, which causes mitochondrial function to be injured in different degrees, then reduce the quality of oocyte. This paper describes the importance of mtDNA to oocyte, and mainly demonstrates a series of repair mechanisms after oxidative damage, such as base excision repair or mismatch repair. However, self-pair of mtDNA is limited. So, the new approach is vital to repair mtDNA. First, different antioxidants can decrease oxidative stress damage to a certain extent. Furthermore, mitochondrial transplantation and mitochondrial replacement straightly enhance and substitute within mitochondria, which improves fertilization rate and the quality of embryo. This paper may provide a useful reference for future research.

**【Key words】** Oocytes; DNA, mitochondrial; Oxidative stress; DNA repair

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.014

## 卵低温保存过程中透明带提早硬化的影响因素和调控机制

石晓卫 胡焕焕 姬国杰 李明文

新乡医学院三全学院 新乡市生育力保存重点实验室 453003

通信作者: 李明文, Email: mingwenli369@163.com, 电话: +86-373-7375268

**【摘要】** 人卵低温保存是女性生育力保存和不育症治疗的重要辅助生殖技术, 但其导致的透明带提早硬化使体外受精率显著降低, 且其机制尚不明确。本文对透明带在卵低温保存过程中发生提早硬化的影响因素和调控机制进行了综述, 有助于加强研究以提高卵低温保存技术和辅助生殖技术的有效性和安全性。

**【关键词】** 受精, 体外; 卵; 低温保存; 透明带提早硬化

**基金项目:** 国家自然科学基金 (NSFC)- 河南联合基金项目 (U1604179); 河南省高等学校青年骨干教师培养计划项目 (2016GGJS-220); 河南省高等学校重点科研项目 (19B310003)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.015

**Influencing factors and control mechanisms of premature zona hardening during oocyte cryopreservation**

Shi Xiaowei, Hu Huahuan, Ji Guojie, Li Mingwen

Sanquan College of Xinxiang Medical University, Xinxiang Key Laboratory of Fertility Preservation, Xinxiang 453003, China

Corresponding author: Li Mingwen, Email: mingwenli369@163.com, Tel: +86-373-7375268

**【Abstract】** Oocyte cryopreservation is an important assisted reproductive technology for the preservation of female fertility and the treatments of various fertility problems, but the premature hardening of the zona pellucida induced during oocyte cryopreservation leads to a significant decrease in fertilization rate of the cryopreserved oocytes by *in vitro* fertilization (IVF). The mechanism of premature hardening of the zona pellucida is unclear. In this paper we systematically reviewed the influencing factors and the control of the premature zona hardening during oocyte cryopreservation for the purpose of strengthening research to improve the effectiveness and safety of oocyte cryopreservation and assisted reproductive technologies.

**【Key words】** Fertilization *in vitro*; Oocyte; Cryopreservation; Premature zona hardening

**Fund program:** Joint Funds of National Natural Science Foundation of China (NSFC) and Henan Province (U1604179); Program for Training Young and Key Teachers in Colleges and Universities in Henan Province (2016-GGJS-220); Key Scientific Research Projects of Henan Colleges and Universities (19B310003)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.015



## 精卵识别分子机制研究进展

杨沫<sup>1</sup> 杨兴雯<sup>2</sup> 李默<sup>1</sup>

<sup>1</sup> 北京大学第三医院妇产科生殖医学中心, 辅助生殖教育部重点实验室, 北京市生殖内分泌与辅助生殖技术重点实验室 100091; <sup>2</sup> 北京大学医学部基础医学院 100091

通信作者: 李默, Email: limo@hsc.pku.edu.cn, 电话: +86-10-82266760

**【摘要】** 目前, 体外受精 - 胚胎移植 (*in vitro* fertilization and embryo transfer, IVF-ET) 技术已经十分成熟, 但是在精液检查指标正常的患者中, 使用 IVF 方法仍然可能出现受精失败或低受精率。精液指标正常的患者 IVF 失败, 可能是存在精卵结合障碍或透明带顶体反应缺陷等问题。然而精卵识别的分子机制目前仍不明确, 且多数为动物模型研究, 本文将以前受精中精子与卵丘细胞、透明带以及卵膜识别这一过程为主线, 就精卵识别的分子机制做一探讨, 以期对与精卵识别障碍相关的不明原因不孕症治疗方案有所启示。

**【关键词】** 不孕不育; 精卵识别; 分子机制

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.016

### **Molecular mechanisms of sperm-egg recognition**

Yang Mo<sup>1</sup>, Yang Xingwen<sup>2</sup>, Li Mo<sup>1</sup>

<sup>1</sup>Center for Reproductive Medicine, Department of Obstetrics and Gynecology, Peking University Third Hospital, Key Laboratory of Assisted Reproduction, Ministry of Education, Beijing Key Laboratory of Reproductive Endocrinology and Assisted Reproductive Technology, Beijing 100091, China; <sup>2</sup>Peking University School of Basic Medical Sciences, Beijing 100091, China

Corresponding author: Li Mo, Email: limo@hsc.pku.edu.cn, Tel: +86-10-82266760

**【Abstract】** *In vitro* fertilization and embryo transfer (IVF-ET) technology has become mature. While when IVF failed with normal semen laboratory indexes, there may exist recognition defects of sperm and oocyte or acrosome reaction defects. Molecular mechanism of sperm-egg recognition is not clear. This review will focus on the process of the sperm-egg binding, includes sperm penetrates cumulus cells, zona pellucida and oolemma, discuss the advances of sperm-egg binding researches, hoping to provide some enlightenment for infertility therapy.

**【Key words】** Infertility; Sperm-egg recognition; Molecular mechanism

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.016

## 染料木黄酮宫内暴露对子代健康的影响

孙小伟 梁红

上海市计划生育科学研究所流行病学与社会医学研究室 200237

通信作者：梁红，Email: lucylhcn@163.com，电话：+86-21-64771683

**【摘要】** 染料木黄酮 (GEN) 主要存在于豆科植物中，是植物雌激素中最常见的活性成分。越来越多的动物研究提示宫内 GEN 暴露可能对子代健康产生不良影响，尤其是对子代男性生殖系统及神经行为发育。然而，仅有少数人群流行病学研究验证 GEN 宫内暴露对子代健康的影响。本研究对 GEN 宫内暴露与子代健康的关联进行综述，揭示其对子代生长发育、神经行为、肿瘤以及生殖系统的影响，为科学认识 GEN 及指导孕期合理膳食提供参考。

**【关键词】** 染料木黄酮；宫内暴露；子代生长发育

**基金项目：**上海市卫生和计划生育委员会项目 (20174Y0037, 201640048)；国家卫生健康委员会计划生育药具重点实验室科技创新导向项目 (CX2017-06)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.017

### Effect of in-utero exposure to Genistein on offspring health

Sun Xiaowei, Liang Hong

Department of Epidemiology and Social Medicine, Shanghai Institute of Planned Parenthood Research, Shanghai 200237, China

Corresponding author: Liang Hong, Email: lucylhcn@163.com, Tel: +86-21-64771683

**【Abstract】** Genistein (GEN) is the most common active ingredient in phytoestrogens and mainly found in legumes. There is growing evidence that GEN may have an adverse effect on animals, especially on male reproductive and nervous system. Until recently, there were a few epidemiological studies examining the relationship between GEN and health effects on humans. This study reviewed the literature on the associations between in-utero exposure to GEN and offspring's health outcomes, including physical development, neurobehavioral development, cancer, reproductive system diseases, and so on. We hope to provide scientific knowledge about GEN and the reference for proper diet during pregnancy in human.

**【Key words】** Genistein; In-utero exposure; Growth and development in offspring

**Fund program:** Shanghai Municipal Health and Family Planning Commission (20174Y0037, 201640048); Innovation-oriented Science and Technology Grant from NHC Key Laboratory of Reproduction Regulation (CX2017-06)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.017

## 胚胎反复着床失败病因及临床对策经验分享

林娜 马艳萍 武泽 李云秀 邓波 邵静宜 李蕾 唐邹颖 吴月蓉  
云南省第一人民医院, 昆明理工大学附属医院生殖医学科 650000

通信作者: 马艳萍, Email: mayanpinghome@hotmail.com, 电话: +86-13759173488

**【摘要】** 胚胎反复着床失败 (RIF) 病因复杂, 是制约辅助生殖技术 (ART) 成功率的主要原因之一。经阴道超声、宫腔镜检查及宫腔声学造影检查对明确病因有益。对子宫纵隔、子宫黏膜下肌瘤、子宫内膜息肉及宫腔粘连的预处理有益于提高着床率。采用个体化、多学科综合治疗措施提高胚胎质量, 改善子宫内膜容受性, 能获得满意的妊娠结局。

**【关键词】** 宫腔镜; 反复着床失败; 子宫内膜容受性; 阴道超声

基金项目: 云南省基础研究计划 ( 昆医联合专项 ) [2018FE001(-120), 2017FE467(-114)]; 云南省出生缺陷和遗传病研究重点实验室开放课题 (2016ZDKFKT001); 云南省卫生科技计划项目 (2016NS212)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.018

**Experience sharing of the etiology and clinical management of recurrent implantation failure**

*Lin Na, Ma Yangping, Wu Ze, Li Yunxiu, Deng Bo, Shao Jingyi, Li Lei, Tang Zouying, Wu Yuerong  
Reproductive Medical Centre, the First People's Hospital of Yunnan Province, the Affiliated Hospital of Kunming  
University of Science and Technology, Kunming 650000, China*

*Corresponding author: Ma Yanping, Email: mayanpinghome@hotmail.com, Tel: +86-13759173488*

**【Abstract】** The causes of recurrent implantation failure (RIF) are so complex that restrict the clinical pregnancy rate of assisted reproductive technology. Thorough investigations by ultrasonography, hysteroscopy and hysterosalpingography are beneficial and necessary. Pretreatments of septate uterus, submucous fibroids, endometrial polyps and intrauterine adhesions by hysterosalpingography and hysteroscopy are beneficial for improving the pregnancy outcomes. An individualized and multidisciplinary approach should be adopted in the management of RIF to improve embryo quality and endometrial receptivity.

**【Key words】** Hysteroscopy; Recurrent implantation failure; Endometrial receptivity; Transvaginal ultrasonography

**Fund program:** Basic Research Program of Yunnan Province (Joint Funding of Science and Technology Agency and Kunming Medical University)[2018FE001(-120), 2017FE467(-114)]; Opening Research Funding of Key Laboratory of Birth Defects and Genetic Diseases in Yunnan Province (2016ZDKFKT001); Health Science and Technology Research Program of Yunnan Province (2016NS212)

DOI: 10.3760/cma.j.issn.2096-2916.2019.02.018