

• 实验研究 •

## 温肾活血方改善胚胎着床障碍小鼠 子宫内膜容受性的研究

张琦<sup>1</sup> 张勤华<sup>2</sup> 贾亚楠<sup>1</sup>

(1. 上海中医药大学, 上海, 201203)

(2. 上海中医药大学附属曙光医院生殖中心, 上海, 201203)

**【摘要】目的:** 探讨温肾活血方对胚胎着床障碍模型小鼠妊娠结局及子宫内膜容受性的影响。  
**方法:** 由米非司酮建立胚胎着床障碍模型小鼠200只, 随机分为正常(N)组、模型(M)组、中药低剂量(L)组、中药高剂量(H)组和孕酮(P)组各40只。妊娠第1~4日早晨, H组、L组小鼠灌胃给予0.3 mL水煎剂, N组、M组小鼠每日以等体积生理盐水灌胃, P组小鼠以配制的黄体酮-橄榄油剂按照2 mg/只进行颈后皮下注射, 妊娠第4日上午9:00造模, N组小鼠颈后皮下注射0.1 mL橄榄油溶剂, 其他各组小鼠颈后皮下注射米非司酮-橄榄油剂0.1 mL(1.93 mg/kg米非司酮)。分别于妊娠第4日、第5日、第8日上午9:00脱颈椎处死每组各10只小鼠, 检测妊娠率、着床位点数、子宫内膜组织形态、雌激素(E<sub>2</sub>)及其受体(ER)、孕激素(P)及其受体(PR)、胞饮突。  
**结果:** N组着床位点数多于其它各组, H组与N组比较无统计学差异( $P>0.05$ )。子宫内膜发育水平N组最优, H组接近N组, M组滞后。妊娠第4日, N组的E<sub>2</sub>、P和ER、PR的表达水平与M组比较无统计学差异( $P>0.05$ ), 低于P组与H组( $P<0.01$ ); 妊娠第5日, N组的E<sub>2</sub>、P和ER、PR的表达水平显著高于M组( $P<0.05$ ), N组的ER水平与P、H、L三组比较无统计学差异( $P>0.05$ ), N组的PR高于P组和L组( $P<0.05$ ), 与H组比较均无统计学差异( $P>0.05$ )。P组P水平高于其它组( $P<0.01$ ), E<sub>2</sub>水平与ER结果相吻合。M组胞饮突发育滞后, H组胞饮突发育程度接近N组, P组偶见退化期胞饮突。  
**结论:** 温肾活血方能够改善子宫内膜容受性, 且其效果优于黄体酮。

**关键词:** 温肾活血; 胚胎着床障碍; 子宫内膜容受性; 胞饮突

中图分类号: R271.14

文献标识码: A

文章编号: 0253-357X(2016)11-0875-07

本课题为国家自然青年科学基金项目, 项目号: 81202715

通讯作者: 张勤华; Tel: +86-21-20256688;

E-mail: shumeier@163.com

## Experimental research of Wenshen Huoxue decoction in the improvement of endometrial receptivity in mouse model of embryo implantation dysfunction

Qi ZHANG<sup>1</sup>, Qin-hua ZHANG<sup>2</sup>, Ya-nan JIA<sup>1</sup>

(1. Shanghai University of Traditional Chinese Medicine, Shanghai, 201203)

(2. Shuguang Hospital of Shanghai University of Traditional Chinese Medicine, Shanghai, 201203)

**【ABSTRACT】 Objective:** To explore the effects of Wenshen Huoxue decoction on pregnancy outcome and endometrial receptivity for mouse model of embryo implantation dysfunction. **Methods:** A total of 200 mice of embryo implantation dysfunction model built by mifepristone were randomized into normal (N) group, model (M) group, low dose (L) group of Wenshen Huoxue decoction, high dose (H) group of Wenshen Huoxue decoction and progesterone (P) group, 40 mice in each group. From day 1 to 4, groups H and L were given the dose of high or low of 0.3 mL Wenshen Huoxue decoction everyday, groups N and M were daily filled with equal volume of normal saline, and group P was given 0.2 mL of the prepared P-olive oil via neck subcutaneous injection. To build mouse model, group N was injected with 0.1 mL olive oil in neck subcutaneous in the morning of 9 o'clock of D4, other mice in each group were injected with 0.1 mL mifepristone-olive oil (1.93 mg/kg mifepristone). Ten mice of each group were sacrificed at 9 o'clock on day 4, 5 and 8 of pregnancy respectively. Pregnancy rate, the number of implantation sites, morphology of endometrial tissue, estrogen (E<sub>2</sub>), estrogen receptor (ER), P, progesterone receptor (PR) and the pinopode were detected. **Results:** For implantation sites: group H was not significantly different with group N ( $P>0.05$ ), and group N was better than other groups. For morphology of endometrial tissue: the endometrial development in group M lagged behind other groups, especially for group N, but group H was close to group N. For the level of E<sub>2</sub>, P, ER and PR: on D4 of pregnancy, there was no significant difference between groups N and M ( $P>0.05$ ), and they were less in groups N and M than in groups P and H ( $P<0.01$ ); on D5 of pregnancy, they were higher in group N than in group M ( $P<0.05$ ). Compared with groups P, H or L, the ER level in group N was not significantly different from ER ( $P>0.05$ ). PR level in group N was higher than that in groups P and L ( $P<0.05$ ), but was not different compared with group H ( $P>0.05$ ). The P level in group P was higher than that in other groups ( $P<0.01$ ), and the expression of E<sub>2</sub> was basically consistent with that of ER. The pinopodes in group M were lagged than others, and was the most close to normal in group H. Degradation period of the pinopode was seen in group P. **Conclusion:** Wenshen Huoxue decoction can improve endometrial receptivity, which was better than progestin.

**Key words:** Wenshen Huoxue decoction; embryo implantation dysfunction; endometrial receptivity; pinopodes

本课题为国家自然青年科学基金项目, 项目号: 81202715

通讯作者: 张勤华; Tel: +86-21-20256688;

E-mail: shumeier@163.com

• 临床研究 •

# 多囊卵巢综合征患者卵泡发育不良 与干细胞因子表达水平的相关性研究

温肖依<sup>1</sup> 谭俊<sup>2</sup> 伍琼芳<sup>1,2</sup>

(1. 南昌大学医学部, 南昌, 330006)

(2. 江西省妇幼保健院辅助生殖中心, 南昌, 330006)

**【摘要】**目的: 研究辅助生殖治疗的多囊卵巢综合征(PCOS)患者卵泡中干细胞因子(SCF)、生长分化因子-9(GDF-9)和骨形态发生蛋白-15(BMP-15)的表达水平与卵泡发育异常的关系。方法: 收集30例PCOS患者和40例正常对照者的卵泡液和颗粒细胞。采用酶联免疫吸附实验(ELISA)检测卵泡液中SCF、GDF-9和BMP-15的表达水平, 采用免疫荧光染色法测定颗粒细胞中SCF的表达水平。结果: PCOS患者( $n=30$ )卵泡液中GDF-9、BMP-15和SCF的浓度均明显低于正常对照组( $n=40$ ), 差异有统计学意义( $P<0.05$ )。与对照组相比, PCOS患者颗粒细胞中SCF的表达水平显著下降( $P<0.05$ )。结论: PCOS患者卵泡液中GDF-9、BMP-15和SCF的表达均明显降低, 并且PCOS患者颗粒细胞中SCF的表达也显著下降, 这可能与其卵泡发育不良有关。

**关键词:** 干细胞因子(SCF); 多囊卵巢综合征(PCOS); 卵泡发育不良; 生长分化因子-9(GDF-9); 骨形态发生蛋白-15(BMP-15)

中图分类号: R321-33

文献标识码: A

文章编号: 0253-357X(2016)11-0882-05

通讯作者: 伍琼芳; Tel: +86-791-86254524;

E-mail: wuqiongfang898@sina.com

## Research on the correlation between follicular dysplasia and stem cell factor (SCF) expression in patients with polycystic ovary syndrome

Xiao-yi WEN<sup>1</sup>, Jun TAN<sup>2</sup>, Qiong-fang WU<sup>1,2</sup>

(1. Medical College of Nanchang University, Nanchang, 330006)

(2. Reproductive Center of Maternal and Child Health, Hospital of Jiangxi Province, Nanchang, 330006)

**【ABSTRACT】 Objective:** To explore the expression levels of stem cell factor (SCF), growth differentiation factor-9 (GDF-9), bone morphogenetic protein-15 (BMP-15) in follicles of polycystic ovary syndrome (PCOS) patients undergoing assisted reproductive treatment. **Methods:** Follicular fluid and granulosa cells were collected from 30 cases of PCOS patients and 40 cases of normal controls. Enzyme linked immunosorbent assay (ELISA) was used to detect the expression levels of BMP-15, GDF-9 and SCF in follicular fluid, and the expression of SCF in granulosa cells was determined by immunofluorescence staining. **Results:** The concentrations of BMP-15, GDF-9 and SCF of PCOS patients in follicular fluid were significantly lower than those in the control ( $P<0.05$ ). Similarly, the expression level of SCF in PCOS patients was remarkably decreased compared with the control ( $P<0.05$ ). **Conclusion:** The expressions of GDF-9, BMP-15 and SCF in follicular fluid of PCOS patients was significantly decreased, moreover, the expression of SCF in granulosa cells with PCOS patients was also obviously decreased. However, SCF plays an important role in the development of follicles, and the decreased expression of SCF in the follicular fluid and granulosa cells of PCOS patients may be related to the abnormal follicular development.

**Key words:** stem cell factor (SCF); polycystic ovary syndrome (PCOS); follicular dysplasia; growth differentiation factor-9 (GDF-9); bone morphogenetic protein-15 (BMP-15)

# 授精第3日发育迟缓胚胎的冷冻价值 及可行性方案探讨

夏 兰 赵 甦 徐慧慧 吴 娴 徐步芳 张爱军

(上海交通大学医学院附属瑞金医院生殖中心, 上海, 200025)

**【摘要】**目的: 探讨授精第3日发育迟缓(5~6-细胞)的胚胎冷冻价值及如何提高其利用价值的可行性方案。方法: 回顾性分析进行冷冻复苏移植第3日发育迟缓胚胎的124个周期的临床资料, 根据不同的复苏移植方案和培养条件, 分为第3日冷冻, 复苏移植周期提前1 d解冻者(A组, 32个周期)、解冻后培养至囊胚再移植组(B组, 62个周期)、当日解冻组(C组, 30个周期), 再与同期新鲜周期第3日发育迟缓行囊胚培养再冷冻复苏囊胚(复苏囊胚组, D组)的58个周期比较。结果: ①各组在女方年龄、不孕年限、排卵日子宫内膜厚度、移植日激素水平等方面无统计学差异( $P>0.05$ )。②D组的周期临床妊娠率(55.4%)和种植率(42.2%)都高于其他组( $P<0.05$ )。A组和B组的周期取消率(12.5%和35.5%)均高于其他组( $P<0.05$ ), B组的临床妊娠率(40.0%)高于C组(33.7%)( $P<0.05$ ), 但与A组(39.3%)比较无统计学差异( $P>0.05$ )。结论: ①授精第3日5~6-细胞胚胎可以通过新鲜周期延长体外培养时间至第6日, 获得囊胚后再进行冷冻复苏, 可以得到更好的临床结局。②对于胚胎少的患者, 可以在患者知情同意下选择5~6-细胞胚胎第3日直接冷冻, 复苏周期提前解冻来挑选具有发育潜能的胚胎进行移植。

**关键词:** 发育迟缓胚胎; 冷冻复苏; 囊胚; 妊娠率

中图分类号: R711.6

文献标识码: A

文章编号: 0253-357X(2016)11-0887-05

本课题为国家自然科学基金项目(No. 81300548, No. 81370763)

通讯作者: 张爱军; Tel: +86-21-64370045;

E-mail: zhaj1268@163.com

## Clinical outcomes and the operational strategy of growth retardation embryos for *in vitro* fertilization embryo transfer

Lan XIA, Shen ZHAO, Hui-hui XU, Xian WU, Bu-fang XU, Ai-jun ZHANG

(Reproductive Medicine Center of Ruijin Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, 200025)

**【ABSTRACT】 Objective:** To investigate the freezing value of retardation embryos, and explore the operational strategy for these embryos. **Methods:** The clinical data of 124 frozen-thawed embryo transfer (FET) cycles with growth retardation (5–6 cells) embryos and 58 FET cycles with growth retardation embryos but frozen blastocysts in fresh cycles were retrospectively analyzed. The frozen-thawed cycles of growth retardation embryos were divided into early thawed group (32 cycles), blastocyst culture group (62 cycles) and control group according to the different recovery scheme and culture conditions. The recovery rate, the cycle cancellation rate, the clinical pregnancy rate, the implantation rate were compared among these groups. **Results:** 1) There were no differences among these groups in the women's age, duration of infertility, endometrial thickness on the ovulation day, hormone levels on the transfer day ( $P>0.05$ ). 2) The clinical pregnancy rate (55.4%) and the implantation rate (42.2%) of frozen-thawed blastocyst were higher than those in other groups ( $P<0.05$ ). The cycle cancellation rate of early thawed group and blastocyst culture group were significantly higher than that in other groups ( $P<0.05$ ), the cycle cancellation rate in blastocyst culture group was significantly higher than that in other groups ( $P<0.01$ ). **Conclusion:** Growth retardation (5–6-cells) embryos can prolong *in vitro* culture time to D6 in fresh cycles, then conduct frozen-thawed blastocysts cycles, which can get better clinical outcomes, and reduce the economic burden of patients and relieve psychological pressure. In order to prevent the block embryo development *in vitro*, 5–6-cells can be frozen on D3 and thawed in advance to pick out the embryos with developmental potential, which can increase the implantation rate.

**Key words:** retardation embryo; cryopreservation; blastocysts; pregnancy rate

本课题为国家自然科学基金项目(No. 81300548, No. 81370763)

通讯作者: 张爱军; Tel: +86-21-64370045;

E-mail: zhaj1268@163.com

# 降调节联合激素替代冻融胚胎移植周期中 不同内膜转化时间对反复种植失败患者 临床结局的影响

杨柳\* 赵翠 张祥 张瑞 岳丰 刘琳 张学红 李丽斐

(兰州大学第一医院生殖医学专科医院, 兰州, 730000)

**【摘要】**目的: 探讨反复种植失败(RIF)患者冻融胚胎移植(FET)周期移植时机的选择及对临床结局的影响。方法: 选择采用 GnRH-a 降调节激素替代方案准备子宫内膜进行 FET 的 RIF 患者 106 例, 随机分为 A 组(常规法)53 个周期, 即孕酮作用内膜 3 d 后移植第 3 日胚胎; B 组(改良法)53 个周期, 即延迟内膜扳机和黄体支持用药, 比较组间血清性激素水平、临床妊娠率、早期流产率等相关指标。结果: 患者的基本情况组间具有可比性( $P>0.05$ ); 移植日雌二醇( $E_2$ )、孕酮(P)、 $E_2/P$ 、临床妊娠率组间均有统计学差异( $P<0.05$ ); 移植前 1 日血清 P 水平组间差异有统计学意义( $P<0.05$ )。结论: 对于 RIF 患者, 在降调节联合激素替代-FET 周期中, 延长雌、孕激素用药时间可刺激内膜达到理想状态, 进而获得满意的妊娠结局。

**关键词:** 冻融胚胎移植(FET); 种植窗; 子宫内膜容受性; 反复种植失败(RIF)

中图分类号: R711.6

文献标识码: A

文章编号: 0253-357X(2016)11-0892-05

本课题为中央高校基本科研业务费专项资金面上项目(lzujbky-

2013-155)和甘肃省科技重大专项(092NKDA009)

通讯作者: 李丽斐; E-mail: candyjoe34@yahoo.com

\*: 现工作单位为江苏省苏北人民医院生殖医学中心

## Pregnancy outcome of frozen-thawed embryo transfers in repeated implantation failure patients at different transplanting time

Liu YANG, Cui ZHAO, Xiang ZHANG, Rui ZHANG, Lin LIU,  
Feng YUE, Xue-hong ZHANG, Li-fei LI

(Reproductive Medicine Research Center of the First Hospital of Lanzhou University, Lanzhou, 730000)

**【ABSTRACT】 Objective:** To investigate the pregnancy outcome of frozen-thawed embryo transfers (FET) in repeated implantation failure (RIF) patients at different transplanting time. **Methods:** Totally 106 FET cycles using artificial cycle to prepare endometrium were collected. These cycles were randomly divided into 2 groups: group A [ $n=53$ , transfer day 3 embryo after 3 d progesterone (P) preparation in endometrium], group B ( $n=53$ , transfer day 3 embryo after 4 d or 5 d P preparation in endometrium). The serum hormone and rates of clinical pregnancy, ectopic pregnancy, multiple pregnancy, and the first trimester abortion were compared between the two groups. **Results:** The basic information of the two groups was comparable ( $P>0.05$ ). There were significant differences in estradiol ( $E_2$ ) level on transplanting day, serum P level on transplanting day, ratio of  $E_2/P$  on transplanting day and clinical pregnancy rate ( $P<0.05$ ). There were significant differences between pregnancy outcome and P level on the day before transplanting day. **Conclusion:** The successful implantation of embryo depends on seizing the right time of implantation window in FET. The results show that, it is very convenient to clinical and laboratory work arrangements that moving implantation window backward in time when choosing artificial cycle to prepare endometrium in FET.

**Key words:** frozen-thawed embryo transfer (FET); implantation window; endometrial receptivity (ER); repeated implantation failure (RIF)

---

本课题为中央高校基本科研业务费专项资金面上项目(lzujbky-2013-155)和甘肃省科技重大专项(092NKDA009)

通讯作者: 李丽斐; E-mail: candyjoe34@yahoo.com

\*: 现工作单位为江苏省苏北人民医院生殖医学中心

# 血清及卵泡液中抑制素 B 动态变化及其 与促排卵结局的相关性研究

刘小惠<sup>1</sup> 吴小华<sup>2</sup>

(1. 河北医科大学, 石家庄, 050017)

(2. 白求恩国际和平医院, 石家庄, 050082)

**【摘要】**目的: 探讨不同控制性超促排卵(controlled ovarian hyperstimulation, COH)方案中血清及卵泡液(follicular fluid, FF)中抑制素 B (inhibin B, INHB)的动态变化及其与 COH 结局的相关性。方法: 收集因输卵管因素和 / 或男方因素首次接受体外受精 / 卵细胞质内单精子注射 - 胚胎移植(IVF/ICSI-ET)助孕患者 COH 过程各时间节点的血清及取卵(ovum pick up, OPU)日不同大小卵泡的 FF, 按筛选要求选取长方案组(A组,  $n=38$ )及非降调节方案组(B组,  $n=38$ )患者, 对其血清及 FF 中 INHB 水平进行检测并行相关性分析。结果: ①降调节过程中, 血清 INHB 水平显著下降( $P<0.01$ ), 且 Gn 启动日 A 组血清 INHB 水平较 B 组明显下降( $P=0.000$ )。② A 组和 B 组 Gn 启动后血清 INHB 水平呈上升趋势, 至 hCG 注射日达高峰后下降, OPU 后 2 d 显著下降( $P<0.01$ ); A 组和 B 组基础及 Gn 启动后的血清 INHB 水平无统计学差异( $P>0.05$ )。③ Gn 第 5 日血清 INHB 水平与 COH 结局相关性最强, 且 Gn 启动日血清 INHB 水平与 Gn 用量呈高度负相关( $P<0.01$ )。④ A 组和 B 组 FF 中血清 INHB 水平随卵泡直径增大而升高, 大卵泡的 FF 中 INHB 水平无统计学差异( $P>0.05$ ), 但 A 组中小卵泡的 FF 中 INHB 水平显著高于 B 组( $P<0.01$ ); 且大卵泡的 FF 中 INHB 水平与 COH 结局相关性最好。结论: ①降调节后血清 INHB 水平预示降调节对卵泡同步化作用较好; ② COH 过程中血清及大中卵泡的 FF 中 INHB 水平能很好地预测卵巢反应性及 COH 结局。

**关键词:** 抑制素 B(INHB); 体外受精 / 卵细胞质内单精子注射 - 胚胎移植(IVF/ICSI-ET); 控制性超促排卵(COH)

中图分类号: R321.33

文献标识码: A

文章编号: 0253-357X(2016)11-0897-07

本课题为 2013 年全军后勤科研项目, 项目编号: BBJ13C001

通讯作者: 吴小华; Tel: +86-13383313839;

E-mail: xiaohuawu65@sohu.com

## Dynamic changes of inhibin B in serum and follicular fluid and its effects on controlled ovarian hyperstimulation outcomes

Xiao-hui LIU<sup>1</sup>, Xiao-hua WU<sup>2</sup>

(1. Hebei Medical University, Shijiazhuang, 050017)

(2. The Bethune International Peace Hospital, Shijiazhuang, 050082)

**【ABSTRACT】 Objective:** To study the dynamic changes of inhibin B (INHB) in serum and follicular fluid (FF) during different controlled ovarian hyperstimulation (COH) protocols and their correlation with COH outcomes. **Methods:** INHB on many time nodes in serum and FF grouped by different follicular sizes on oocytes retrieval day were collected in COH from women who underwent *in vitro* fertilization/intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) therapy for the first time due to the tubal or male factors. Ultimately, 38 women were grouped into a down-regulation protocol (group A) and another 38 women were grouped into non-pituitary down-regulation protocol (group B) and their INHB in serum and FF were respectively detected. Meanwhile, the relationships of INHB with COH outcomes were analyzed. **Results:** 1) The average level of INHB in serum after down-regulation significantly decreased ( $P<0.01$ ). And the INHB level on gonadotrophins (Gn) starting day in group A was remarkably lower than that in group B ( $P=0.000$ ). 2) After exogenous stimulation, the INHB level in the two protocols were beginning to increase. INHB level went to a peak on hCG injection day and then began to decline, especially after 2 d of ovum pick up (dOUP2) ( $P<0.01$ ). There was no statistical difference with the two protocols after Gn stimulation as well as the basal ( $P>0.05$ ). 3) INHB level on the 5th day of stimulation had the best relationship with COH outcomes, and there was a strongly negative relationship on Gn starting day with Gn dose ( $P<0.01$ ). 4) INHB in follicles was positively correlated with the follicular size. There was no statistical difference about INHB level in big follicles ( $P>0.05$ ). However, the levels of INHB in middle and small follicles were significantly higher in group A ( $P=0.003$ ,  $P=0.000$ ). And INHB in big follicles presented the best colleration with COH outcomes. **Conclusions:** 1) The level of INHB after down-regulation indicates the better result of follicular synchronization with down-regulation. 2) Levels of INHB in serum, big follicles as well as middle follicles are good markers to predict ovarian response and COH outcomes.

**Key words:** inhibin B (INHB); *in vitro* fertilization/intracytoplasmic sperm injection-embryo transfer (IVF/ICSI-ET); controlled ovarian hyperstimulation (COH)

本课题为 2013 年全军后勤科研项目, 项目编号: BBJ13C001

通讯作者: 吴小华; Tel: +86-13383313839;

E-mail: xiaohuawu65@sohu.com

• 循证医学 •

# 中药复方对体外受精 - 胚胎移植干预治疗的 Meta 分析和系统评价

刘慧萍 曾柳庭 杨凯麟 张国民

(湖南中医药大学, 长沙, 410208)

**【摘要】**目的: 基于目前的证据系统评估中药复方干预体外受精 - 胚胎移植(IVF-ET)的有效性和安全性。方法: 计算机检索 CNKI、万方、维普、中国生物医学文献数据库(CBM)、the Cochrane Library、PubMed、Web of Science、Medline、EMbase、Alt Health Watch, 以及部分妇产科相关杂志; 纳入中药复方与空白、安慰剂或西药对照干预 IVF-ET 的随机对照试验(RCT), 由 2 名研究者按照 Cochrane Handbook Version 5.1.0 标准独立评价文献质量、提取数据并交叉核对, 使用 RevMan5.3 软件进行 Meta 分析。结果: 共纳入 30 个研究, 合计 2 385 例患者。结果显示: 中药复方干预 IVF-ET 相对于对照组而言能提高临床妊娠率( $RR=1.45$ , 95%CI: 1.33~1.59)、受精率( $RR=1.12$ , 95%CI: 1.08~1.15)、种植率( $RR=1.36$ , 95%CI: 1.17~1.58)、优质胚胎率( $RR=1.16$ , 95%CI: 1.06~1.26), 增加子宫内膜厚度( $MD=0.77$ , 95%CI: 0.18~1.37)及降低 Gn 使用量( $SMD=-0.69$ , 95%CI: -0.96~-0.42); 在并发症的发生率上, 中药组能降低流产率( $OR=0.30$ , 95%CI: 0.13~0.69)和 OHSS 的发生率( $OR=0.35$ , 95%CI: 0.17~0.73)。结论: 在 IVF-ET 时施以中药复方干预能提高临床妊娠率以及卵子质量、胚胎质量和子宫环境质量, 并能降低 Gn 使用量和流产率、OHSS 的发生率。因此, 基于目前的证据可以证明, 中药复方干预 IVF-ET 具有良好的效果和安全性。

**关键词:** 体外受精 - 胚胎移植(IVF-ET); 中药复方; 随机对照试验(RCT); 系统评价; Meta 分析

中图分类号: R711

文献标识码: A

文章编号: 0253-357X(2016)11-0904-13

本课题为国家自然科学基金(81303123), 湖南省教育厅创新平台项目(15K090), 湖南省重点实验室开放基金(2014XNFZ06), 国家级大学生创新创业训练计划项目(2015-12720,12721), 湖南省大学生研究性学习与创新性实验计划项目(2015-202,203,219)

通讯作者: 张国民; Tel: +86-13574819158;

E-mail: 1074983953@qq.com

## Traditional Chinese Medicine in IVF-ET: a Meta-analysis and systematic review

Hui-ping LIU, Liu-ting ZENG, Kai-lin YANG, Guo-min ZHANG

(Hunan University of Chinese Medicine, Changsha, 410208)

**【ABSTRACT】 Objective:** To assess the effects and security of Traditional Chinese Medicine (herbal formulae) in *in vitro* fertilization-embryo transfer (IVF-ET) based on the current evidence. **Methods:** We searched ten databases, including CNKI, Wan Fang, VIP, CBM, the Cochrane Library, PubMed, Web of Science, Medline, EMbase and Alt Health Watch; and we also searched several journals. All randomized controlled clinical trials of Chinese traditional medicine in IVF-ET, placebo medicine or western drug were included, two reviewers independently assessed the quality of each study by using Cochrane Handbook version 5.1.0 criteria and extracted the data. Meta-analyses were conducted by the RevMan 5.3 software. **Results:** Thirty trials involving 2 385 patients were included. The Meta-analyses results showed that the effect of Traditional Chinese Medicine can improve the clinical pregnancy rate ( $RR=1.45$ , 95%CI: 1.33–1.59), the fertilization rate ( $RR=1.12$ , 95%CI: 1.08–1.15), the blastocyst implantation rate ( $RR=1.36$ , 95%CI: 1.17–1.58), the high-quality embryo rate ( $RR=1.16$ , 95%CI: 1.06–1.26) and increase endometrial thickness ( $MD=0.77$ , 95%CI: 0.18–1.37) and reduce the dosage of Gn used ( $SMD=-0.69$ , 95%CI: -0.96–-0.42). In the probability of occurrence of complication, Traditional Chinese Medicine can reduce abortion rate ( $OR=0.30$ , 95%CI: 0.13–0.69) and incidence rate of OHSS ( $OR=0.35$ , 95%CI: 0.17–0.73). **Conclusion:** Based on current evidences, we can conclude that Traditional Chinese Medicine has good efficacy and safety in IVF-ET intervention

**Key words:** *in vitro* fertilization-embryo transfer (IVF-ET); Traditional Chinese Medicine; randomized controlled trials (RCT); systematic review; Meta-analysis

本课题为国家自然科学基金(81303123), 湖南省教育厅创新平台项目(15K090), 湖南省重点实验室开放基金(2014XNFZ06), 国家级大学生创新创业训练计划项目(2015-12720,12721), 湖南省大学生研究性学习与创新性实验计划项目(2015-202,203,219)

通讯作者: 张国民; Tel: +86-13574819158;  
E-mail: 1074983953@qq.com

• 综述 •

## 肌肉因子鸢尾素与多囊卵巢综合征 关系的研究进展

郭晓晓 孙小燕 张学红

(兰州大学第一医院生殖专科医院, 兰州, 730000)

**【摘要】**新近发现的肌肉因子鸢尾素(irisin)是由 FDNC5 剪切修饰形成, 鸢尾素 /FDNC5 的表达受 PGC-1 $\alpha$  的调控, 鸢尾素可以促进白色脂肪向棕色脂肪转化, 具有明显地改善胰岛素抵抗的作用。PCOS 患血清鸢尾素水平较正常人明显升高, 胰岛素增敏药物的干预使其降低。运动会刺激 PCOS 患者鸢尾素的分泌, 不同的运动强度对鸢尾素分泌的调节作用不同。

**关键词:** 鸢尾素(irisin); 多囊卵巢综合征(PCOS); 药物及运动干预

中图分类号: R349-64

文献标识码: A

文章编号: 0253-357X(2016)11-0917-06

---

通讯作者: 张学红; Tel: +86-13893215266;  
E-mail: zhangxueh@lzu.edu.cn

## Research progress of the relationship between a new myokine—irisin and polycystic ovary syndrome

Xiao-xiao GUO, Xiao-yan SUN, Xue-hong ZHANG

*(Department of Reproductive Medicine, the First Affiliated Hospital, Lanzhou University, Lanzhou, 730000)*

**【ABSTRACT】** The myokine irisin, a recently discovered muscle factor, is formed by the shear and modification of FDNC5. The expression of irisin / FDNC5 is regulated by peroxisome proliferator-activated receptor  $\gamma$  coactivator 1  $\alpha$  (PGC1- $\alpha$ ). Irisin can promote the conversion of white fat to brown fat, and has a significant role in improving insulin resistance. Studies have shown that the serum irisin levels of polycystic ovary syndrome (PCOS) patients were significantly higher than those of the normal. The intervention of insulin-sensitive drugs can reduce the serum irisin level. Exercise stimulates the secretion of irisin in PCOS patients, different exercising intensity has different regulatory effects on irisin secretion.

**Key words:** irisin; polycystic ovary syndrome (PCOS); intervention of drugs and exercise

---

通讯作者: 张学红; Tel: +86-13893215266;  
E-mail: zhangxueh@lzu.edu.cn

# 糖尿病对卵巢卵泡发育的影响

包日强 王 静 张春平

(南昌大学, 南昌, 330006)

**【摘要】**随着糖尿病患者数量急剧增加, 女性糖尿病患者不孕不育及生殖内分泌异常疾病的问题日益严重。研究表明糖尿病患者体内的高血糖水平, 异常的胰岛素浓度和瘦素浓度能够阻碍下丘脑和垂体对卵巢的调控或直接作用于卵巢影响卵泡的正常发育和卵母细胞的成熟导致排卵障碍, 损伤卵巢的正常功能进而影响妊娠和内分泌稳态。本文结合最新的研究进展, 深入讨论了糖尿病对卵巢卵泡发育影响的具体机制, 为相关疾病的治疗提供新的思路和见解。

**关键词:** 糖尿病; 卵泡发育; 瘦素; 糖基化终产物; AMPK 信号通路

中图分类号: R339.2<sup>+2</sup>

文献标识码: A

文章编号: 0253-357X(2016)11-0923-08

本课题为江西省科技支撑项目, 项目号: 20141BBG70065

通讯作者: 张春平; Tel: +86-15179109075;

E-mail: zhangcp81@163.com

## Impact of diabetes mellitus on ovary folliculogenesis

Ri-qiang BAO, Jing WANG, Chun-ping ZHANG

*(Nanchang University, Nanchang, 330006)*

**【ABSTRACT】** With the dramatic increase in the number of diabetes mellitus patients, female mellitus patients suffered infertility and reproductive endocrine disorders were becoming a serious problem. Studies have shown that in diabetes mellitus patients, the high blood sugar levels, abnormal insulin and leptin concentrations can impede the hypothalamus and pituitary regulation or directly affect the ovary to disrupt the normal folliculogenesis and oocyte maturation leading to ovulation disorders. Ovarian damage thereby affects the pregnancy and endocrine homeostasis. Here we, based on latest research progress in this area, reviewed the possible mechanisms of diabetes to ovarian follicle development, which will provide a new idea and shed light on the treatment of related diseases.

**Key words:** diabetes mellitus; folliculogenesis; leptin; advanced glycation end products; AMPK signaling pathway

---

本课题为江西省科技支撑项目, 项目号: 20141BBG70065  
通讯作者: 张春平; Tel: +86-15179109075;  
E-mail: zhangcp81@163.com

# Kisspeptin 对女性生殖功能调控 机制的研究进展

张睿喆 方兰兰 孙莹璞

(郑州大学第一附属医院生殖中心, 郑州, 450052)

**【摘要】**在女性生殖活动中, kisspeptin 参与调控下丘脑-垂体-性腺(HPG)轴的功能, 并通过介导雌激素的正负反馈调节促性腺激素释放激素(GnRH)的分泌, 解除促性腺激素抑制激素(GnIH)对 HPG 轴的负性调控作用, 继而调节促性腺激素(Gn)的分泌及类固醇甾体激素的分泌, 并与多种卵巢功能异常疾病的病理过程密切相关。Kisspeptin 可调控卵泡发育和排卵发生, 并影响子宫内膜容受性的形成。此外, 在辅助生殖技术(ART)过程中 kisspeptin 可代替传统 hCG 扳机, 并降低接受 ART 治疗的不孕症女性卵巢过度刺激综合征(OHSS)的发生。

**关键词:** Kisspeptin; 生殖内分泌; 辅助生殖技术(ART)

中图分类号: R34

文献标识码: A

文章编号: 0253-357X(2016)11-0931-07

本课题为国家自然科学基金项目(项目号: 31471404)与国家  
自然科学基金青年基金项目(项目号: 81601253)

通讯作者: 孙莹璞; Tel: +86-371-66913311; Fax: +86-371-66913635;

E-mail: syp2008@vip.sina.com

## Research progress on regulation mechanism of Kisspeptin on female reproductive function

Rui-zhe ZHANG, Lan-lan FANG, Ying-pu SUN

*(Reproductive Center, the First Affiliated Hospital of Zhengzhou University, Zhengzhou, 450052)*

**【ABSTRACT】** In the complex process of female reproductive activities, kisspeptin can regulate the function of thalamus-pituitary-gonad axis (HPG) and influence the secretion of gonadotropin-releasing hormone (GnRH) through mediating estrogen negative feedback. Then it lifts negative effects of gonadotropin-inhibitory hormone (GnIH) on the HPG axis and promotes secretion of gonadotropin hormone (Gn) and steroid hormones. It is also related to pathology process of various ovarian disorders. Kisspeptin may regulate follicular growth and ovulation, and also influence the formation of endometrial receptivity. In addition, kisspeptin can replace traditional hCG trigger in assisted reproductive technology (ART) procedures, and reduce the incidence of ovarian hyperstimulation syndrome (OHSS) of those who underwent ART.

**Key words:** kisspeptin; reproductive endocrine; assisted reproductive technology (ART)

---

本课题为国家自然科学基金项目(项目号: 31471404)与国家

自然科学基金青年基金项目(项目号: 81601253)

通讯作者: 孙莹璞; Tel: +86-371-66913311; Fax: +86-371-66913635;

E-mail: syp2008@vip.sina.com

# 基因测序技术在生殖领域的应用进展

赵杰<sup>1</sup> 陈秀娟<sup>1</sup> 刘芳<sup>1</sup> 杜琛<sup>1</sup> 何江峰<sup>2</sup>

(1. 内蒙古医科大学附属医院生殖医学中心, 呼和浩特, 010050)

(2. 内蒙古农牧业科学院, 呼和浩特, 010031)

**【摘要】** 基因测序技术自被发明以来在生命科学领域的研究中发挥着重要作用, 利用测序技术对辅助生殖技术(ART)后代进行基因水平检测来评估 ART 的安全性, 是一种非常有效的手段。而利用测序技术对植入前胚胎进行基因检测, 不仅可以进行非整倍体筛查来选择优质胚胎进行移植, 提高胚胎种植率, 还可以避免遗传性疾病在家系内的传递; 另外, 利用测序技术对不孕不育患者进行基因方面检测, 从而发现一些高敏感的致病基因, 对于了解不孕不育疾病机理、发现治疗方案提供新的思路。

**关键词:** 基因测序; 辅助生殖技术(ART); 胚胎植入前遗传学诊断(PGD); 不孕不育

中图分类号: R711

文献标识码: A

文章编号: 0253-357X(2016)11-0938-07

本课题为内蒙古教育厅基金(NJZY16118); 内蒙古医科大学科技百万工程项目(YKD2014KJBW007); 内蒙古自然科学基金项目(2015BS0802)

通讯作者: 陈秀娟; Tel: +86-13704781023;

E-mail: 90098687@sina.com

## Application progress of gene sequencing technology in reproductive areas

Jie ZHAO<sup>1</sup>, Xiu-juan CHEN<sup>1</sup>, Fang LIU<sup>1</sup>, Chen DU<sup>1</sup>, Jang-feng HE<sup>2</sup>

(1. Reproductive Center, Department of Obstetrics and Gynecology, the Affiliated Hospital of Inner Mongolia Medical University, Hohhot, 010050)

(2. Inner Mongolia agriculture & Animal Husbandry Sciences, Hohhot, 010031)

**【ABSTRACT】** Gene sequencing technology plays an important role in the research field of life science since it has been invented. Gene sequencing technology is effectively used to evaluate the safety of assisted reproductive technology (ART) by testing offspring through ART in gene level. Sequencing technologies can be used to test preimplantation embryos, it not only can increase the implantation rate of embryos by making aneuploidy screening to select high-quality embryos and transplantation, but also can avoid the hereditary disease passing in family. In addition, testing infertile patients in gene level by sequencing technology can discover some high-sensitive disease-causing genes, ultimately, it is useful to understand the mechanism of infertility disease and decide the treatment plan.

**Key words:** genetic sequencing; assisted reproductive technology (ART); preimplantation genetic diagnosis (PGD); sterility and infertility

---

本课题为内蒙古教育厅基金(NJZY16118); 内蒙古医科大学科技百万工程项目(YKD2014KJBW007); 内蒙古自然科学基金项目(2015BS0802)

通讯作者: 陈秀娟; Tel: +86-13704781023;

E-mail: 90098687@sina.com

• 临床报道 •

# 不同年龄卵巢储备功能下降患者体外受精 - 胚胎移植临床结局比较

庞丽娥<sup>1,2</sup> 乔宗惠<sup>1,2</sup> 吴丽敏<sup>1</sup> 刘瑞华<sup>1,2</sup> 童先宏<sup>1</sup> 刘雨生<sup>1</sup>

(1. 安徽医科大学附属省立医院生殖中心, 合肥, 230001)

(2. 安徽中医药大学研究生院, 合肥, 230038)

**【摘要】目的:** 探讨卵巢储备功能下降(DOR)患者体外受精-胚胎移植(*in vitro* fertilization and embryo transfer, IVF-ET)的临床妊娠率与年龄的关系。**方法:** 回顾性分析 DOR 患者行 IVF-ET 微刺激治疗方案的患者资料, 按照患者年龄分为3组: A组(<35岁,  $n=105$ ), B组(35~38岁,  $n=114$ ), C组(>38岁,  $n=173$ ), 比较分析不同年龄组患者一般情况及妊娠结局。**结果:** 各组患者的基础FSH、基础LH、基础E<sub>2</sub>、基础窦卵泡数(AFC)、平均每日促性腺激素(Gn)用量、平均Gn使用天数、平均Gn使用总量均无统计学差异( $P>0.05$ ), 促排卵后获卵数、正常受精数、可用胚胎数、优质胚胎数、扳机日LH水平、扳机日E<sub>2</sub>水平、未获可移植胚胎率、可移植周期平均移植次数均无统计学差异( $P>0.05$ ), 但生化妊娠率、临床妊娠率、种植率均随着年龄的增加呈下降趋势, A、B组的生化妊娠率、临床妊娠率、种植率与C组相比有着显著的统计学差异( $P<0.05$ ,  $P<0.01$ )。**结论:** DOR患者的生化妊娠率、临床妊娠率、种植率随年龄的增加而下降, 年轻的DOR不孕患者临床妊娠结局相对较好。

**关键词:** 卵巢储备功能下降(DOR); 女性年龄; 妊娠结局; 体外受精-胚胎移植(IVF-ET); 微刺激方案

中图分类号: R711.6

文献标识码: A

文章编号: 0253-357X(2016)11-0945-05

本课题为国家自然科学基金项目, 项目号: 81373671和81370757

通讯作者: 吴丽敏; Tel: +86-13605601977;

E-mail: wuliminmail@126.com

## Clinical outcome of *in vitro* fertilization-embryo transfer cycles in different age of women with diminished ovarian reserve

Li-e PANG<sup>1,2</sup>, Zong-hui QIAO<sup>1,2</sup>, Li-min WU<sup>1</sup>, Rui-hua LIU<sup>1,2</sup>,  
Xian-hong TONG<sup>1</sup>, Yu-sheng LIU<sup>1</sup>

(1. Center for Reproductive Medicine, Anhui Provincial Hospital Affiliated to Anhui Medical University, Hefei, 230001)

(2. Anhui University of Chinese Medicine, Hefei, 230038)

**【ABSTRACT】 Objective:** To investigate the clinical outcome of *in vitro* fertilization-embryo transfer (IVF-ET) cycles in different age of women with diminished ovarian reserve (DOR). **Methods:** A retrospective study of 392 patients was performed in infertile women with DOR who undergoing IVF-ET using the standard mild ovarian stimulation for the controlled ovarian hyperstimulation (COH). They were divided into three groups according to age: group A (<35 years,  $n=105$ ), group B (35–38 years,  $n=114$ ) and group C (>38 years,  $n=173$ ). The clinical characteristics and the clinical outcome of three groups were compared and analyzed. **Results:** There was no statistical difference in the level of basic FSH, LH and E<sub>2</sub>, the number of antral follicles, the average dosage of gonadotropin (Gn) daily used, the average duration of Gn used, and the mean total dosage of Gn used. There were no differences in the number of oocytes retrieved, normal fertilization, available embryos, high-quality embryos, and the serum E<sub>2</sub> level, the serum LH level, the rate of not getting a transplanted embryo, and average number of transplantation times. However, there were statistical differences in the biochemical pregnancy rate, the clinical pregnancy rate and the implantation rate of groups A and B compared with group C, which presented a decreasing trend along with the age. **Conclusion:** The clinical outcome is better in young infertile women with DOR as compared with elder women.

**Key words:** diminished ovarian reserve (DOR); women's age; pregnancy outcome; *in vitro* fertilization and embryo transfer (IVF-ET); mild ovarian stimulation

本课题为国家自然科学基金项目, 项目号: 81373671和81370757

通讯作者: 吴丽敏; Tel: +86-13605601977;

E-mail: wuliminmail@126.com

# 脱氢表雄酮(DHEA)改善卵巢反应不良患者 辅助生殖周期妊娠结局的自身对照研究

王慧丹<sup>1,2,3,4</sup> 孙梅<sup>1,2,3,4,5</sup> 盛燕<sup>1,2,3,4</sup> 马增香<sup>1,2,3,4</sup> 郭情情<sup>1,2,3,4</sup>

- (1. 山东大学生殖医学研究中心, 济南, 250021)  
(2. 国家辅助生殖与优生工程技术研究中心, 济南, 250021)  
(3. 生殖内分泌教育部重点实验室, 济南, 250021)  
(4. 山东省生殖医学重点实验室, 济南, 250021)  
(5. 山东省立医院, 济南, 250021)

**【摘要】**目的: 探讨脱氢表雄酮(dehydroepiandrosterone, DHEA)对卵巢反应不良(poor ovarian response, POR)患者在辅助生殖技术(assisted reproductive technique, ART)周期中的卵巢反应性及妊娠结局的影响。方法: 选取152例接受体外受精/卵胞质内单精子注射-胚胎移植(*in vitro* fertilizative/intracytoplasmic sperm injection and embryo transfer, IVF/ICSI-ET)的POR患者, 给予DHEA 25 mg, po, bid × 2~4个月, 服药前、后周期采用同一控制性超促排卵(COH)方案对患者ART周期中卵巢反应性相关指标和妊娠结局进行自身对照研究。结果: 152例患者服用DHEA后hCG注射日直径 $\geq 14$  mm的卵泡数、获卵数、双原核(2PN)胚胎数和优质胚胎数( $4.9 \pm 3.4$ 枚,  $5.4 \pm 4.1$ 枚,  $3.1 \pm 2.5$ 枚,  $1.6 \pm 1.9$ 枚)较服药前( $4.3 \pm 2.6$ 枚,  $4.8 \pm 3.2$ 枚,  $2.5 \pm 2.2$ 枚,  $1.1 \pm 1.7$ 枚)均有显著改善, 差异均有统计学意义( $P < 0.05$ )。治疗后临床妊娠率(32.7%)显著高于治疗前(7.2%)( $P < 0.01$ )。结论: DHEA预处理可以提高POR患者的卵巢反应性, 增加获卵数, 改善卵子及胚胎质量, 提高临床妊娠率。

**关键词:** 脱氢表雄酮(DHEA); 卵巢反应不良; 卵巢反应性; 妊娠结局

中图分类号: R711.6

文献标识码: A

文章编号: 0253-357X(2016)11-0950-05

本课题为山东省计生委科技计划基金项目, 项目号: 2013-03

通讯作者: 孙梅; Tel: +86-13708935869;

E-mail: sunmei0531@163.com

## Effects of dehydroepiandrosterone on ovarian reaction and pregnancy outcome in women with poor ovarian response

Hui-dan WANG<sup>1,2,3,4</sup>, Mei SUN<sup>1,2,3,4,5</sup>, Yan SHENG<sup>1,2,3,4</sup>,  
Zeng-xiang MA<sup>1,2,3,4</sup>, Qing-qing GUO<sup>1,2,3,4</sup>

(1. Center for Reproductive Medicine, Shandong University, Jinan, 250021)

(2. National Research Center for Assisted Reproductive Technology and Reproductive Genetics, Jinan, 250021)

(3. The Key laboratory for Reproductive Endocrinology of Ministry of Education, Jinan, 250021)

(4. Shandong Provincial Key Laboratory of Reproductive Medicine, Jinan, 250021)

(5. Shandong Provincial Hospital, Jinan, 250021)

**【ABSTRACT】 Objective:** To investigate the effects of dehydroepiandrosterone (DHEA) on ovarian reaction and pregnancy outcome in women with poor ovarian response (POR) undergoing *in vitro* fertilization or intracytoplasmic sperm injection and embryo transfer (IVF/ICSI-ET) cycles. **Methods:** A total of 152 women with POR were recruited. Patients who agreed to participate in the study began taking micronized DHEA by prescription, 25 mg orally, bid. If clinically possible, patients received approximately 2–4 months of DHEA treatment before any post-treatment IVF/ICSI-ET cycles. The patients experienced both their pre- and post-DHEA treatment IVF cycles. The characteristics and clinical outcomes of the 152 patients, before and after DHEA treatment, were compared by paired-samples *t*-tests and  $\chi^2$  tests. **Results:** Compared with pre-DHEA treatment, the number of antral follicles with diameter  $\geq 14$  mm on hCG injection day, oocytes retrieved, 2PN oocytes and day 3 high-quality embryos ( $4.9 \pm 3.4$ ,  $5.4 \pm 4.1$ ,  $3.1 \pm 2.5$ ,  $1.6 \pm 1.9$  vs  $4.3 \pm 2.6$ ,  $4.8 \pm 3.2$ ,  $2.5 \pm 2.2$ ,  $1.1 \pm 1.7$ ) were significantly increased ( $P < 0.05$ ), and the rate of clinical pregnancy was also significantly increased ( $32.7\%$  vs  $7.2\%$ ) ( $P < 0.01$ ) after DHEA treatment. **Conclusion:** DHEA treatment can improve ovarian reaction and the quality of oocytes and embryos. The DHEA therapy could increase the clinical pregnancy rate.

**Key words:** dehydroepiandrosterone (DHEA); poor ovarian response (POR); ovarian reaction; pregnancy outcome

本课题为山东省计生委科技计划基金项目, 项目号: 2013-03

通讯作者: 孙梅; Tel: +86-13708935869;

E-mail: sunmei0531@163.com