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拮抗剂方案扳机方式对体外受精结局影响的研究进展

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【摘要】 在体外受精-胚胎移植中, 获取有效卵母细胞依赖于超促排卵方案。随着临床超促排卵经验的不断累积, 拮抗剂方案被越来越广泛地应用。拮抗剂方案治疗周期短, 且可以使用促性腺激素释放激素激动剂 (GnRH-a) 替代人绒毛膜促性腺激素 (hCG) 诱发排卵, 能有效降低卵巢过度刺激综合征的风险。本文就拮抗剂方案使用 GnRH-a 扳机和 hCG 扳机对体外受精结局影响的相关研究进行综述。

【关键词】 受精, 体外; 促性腺激素释放激素拮抗剂方案; 人绒毛膜促性腺激素; 促性腺激素释放激素激动剂

Research progress of effect of different trigger methods on the *in vitro* fertilization outcomes of gonadotropin-releasing hormone antagonist cycles

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【 Abstract 】 In *in vitro* fertilization (IVF) cycles, controlled ovarian hyperstimulation is the access to get available oocytes. Nowadays, gonadotropin-releasing hormone antagonist (GnRH-A) protocols are being used more widely in assisted reproductive technology for the benefits of shorter gonadotropin (Gn) stimulation duration and being able to use GnRH agonist (GnRH-a) instead of human chorionic gonadotropin (hCG) for triggering, which would decrease the risk of ovarian hyperstimulation syndrome. This paper reviews

the effects of GnRH-a trigger and hCG trigger on IVF outcomes in antagonist regimen.

【 Key words 】 Fertilization *in vitro*; Gonadotropin-releasing hormone antagonist protocols; Human chorionic gonadotropin; Gonadotropin-releasing hormone agonist

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促性腺激素释放激素拮抗剂对子宫内膜容受性的影响

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【摘要】 促性腺激素释放激素拮抗剂 (gonadotropin-releasing hormone antagonist, GnRH-A) 方案在辅助生殖技术领域中的应用愈加广泛, 相比较经典的促性腺激素释放激素激动剂 (gonadotropin-releasing hormone agonist, GnRH-a) 方案, 其存在如抑制早发黄体生成素 (luteinizing hormone, LH) 峰起效快、停药后垂体恢复迅速、减少促性腺激素的使用及降低卵巢过度刺激综合征 (ovarian hyperstimulation syndrome, OHSS) 的发生等诸多优势。但早期随机对照试验表明, GnRH-A 方案妊娠率低于传统的 GnRH-a 方案。另有文献报道, 虽然 GnRH-A 方案新鲜周期的种植率降低, 但随后的冻融胚胎移植的种植率和临床妊娠率并未受到影响。研究表明 GnRH-A 可能改变了子宫内膜的容受性, 但并不影响卵子质量与胚胎发育, 对于这一结论尚存在争议。故本文从子宫内膜超声影像学 and 形态学水平、蛋白水平、基因水平及妊娠结局等方面就 GnRH-A 对子宫内膜容受性的影响进行综述。

【关键词】 促性腺激素释放激素拮抗剂; 子宫内膜容受性; 妊娠结局
基金项目 : 国家重点研发计划 (2018YFC1002104)

Effects of gonadotropin-releasing hormone antagonist on endometrial receptivity

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【 Abstract 】 The gonadotropin-releasing hormone antagonist (GnRH-A) protocol has been widely used in the field of assisted reproductive technology. Compared with the classical GnRH-agonist (GnRH-a) protocol, it has many advantages: 1) a rapid reduction of gonadotropin use after inhibiting the early onset of luteinizing hormone (LH) peak effect; 2) the rapid cessation of the drug; 3) the reduction of the occurrence of ovarian hyperstimulation syndrome (OHSS). However, early randomized and controlled trials showed that the pregnancy rate of antagonist protocol-users were lower than that of traditional agonist protocol-users. Other medical research reports concluded that although the implantation rate of a fresh cycle of antagonist protocol decreased, the implantation rate and the clinical pregnancy rate of a subsequent frozen-thawed embryo transfer were not affected. It was concluded that the GnRH-A might change the receptivity of endometrium, but it didn't have an effect on the quality of oocyte and embryo development. This conclusion is debatable. Therefore, this paper reviews the effects of GnRH-A on endometrial receptivity from the aspects of endometrial ultrasound imaging, morphological levels, protein levels, gene levels and pregnancy outcomes.

【 Key words 】 Gonadotropin-releasing hormone antagonist; Endometrial receptivity; Pregnancy outcome

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宫腔灌注对反复种植失败患者妊娠结局的研究 进展

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【摘要】 虽然辅助生殖技术 (assisted reproductive technology, ART) 的发展使不孕不育夫妇的临床妊娠率获得显著提升，但反复种植失败 (repeated implantation failure, RIF) 患者的妊娠成功率依然很低。RIF 造成了胚胎资源的浪费、增加了患者的经济负担、加重患者的身心创伤，如何提高 RIF 患者的内膜容受性以期改善妊娠结局已成为目前辅助生殖领域亟待解决的临床难点和科研热点问题。宫腔灌注作为一种改善子宫内膜容受性的临床治疗方法在 RIF 患者中的使用已较为普及，粒细胞集落刺激因子 (granulocyte-colony stimulating factor, G-CSF)、人绒毛膜促性腺激素 (human chorionic gonadotropin, hCG)、外周血单核细胞 (peripheral blood mononuclear cells, PBMCs) 是目前用于宫腔灌注的主要药物，宫腔灌注及这些药物对子宫内膜及子宫微环境发挥其特定的作用，改善 RIF 患者的妊娠结局。本文回顾了宫腔灌注 G-CSF、hCG、PBMCs 及其它药物对 RIF 患者妊娠结局及其相关机制的研究，旨在对宫腔灌注对 RIF 患者的影响作一综述。

【关键词】 宫腔灌注；反复种植失败；不孕症；生殖技术，辅助

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Research progress of intrauterine perfusion on pregnancy outcome in the patients with repeated implantation failure

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【Abstract】 Although the development of assisted reproductive technology (ART) has significantly increased the clinical pregnancy rate of infertile couples, the success rate of pregnancy in patients with repeated implantation failure (RIF) is still very low. RIF causes the waste of embryonic resources, increases the financial burden of patients, and aggravates the physical and mental trauma of patients. How to improve the endometrial receptivity and pregnancy outcomes of the patients with RIF has become an urgent clinical and scientific research focus in the field of assisted reproduction. Intrauterine perfusion as a clinical treatment to improve

endometrial receptivity has become more popular in the patients with RIF, granulocyte-colony stimulating factor (G-CSF), human chorionic gonadotropin (hCG), peripheral blood mononuclear cells (PBMCs) are the main drugs used for intrauterine perfusion at present. Intrauterine perfusion and these drugs play a specific role in endometrium and uterine micro-environment to improve pregnancy outcomes of the patients with RIF. In this paper, we retrospectively analyzed the effects of intrauterine infusion of G-CSF, hCG, PBMCs and other drugs on pregnancy outcomes and related mechanisms, and the effects of intrauterine infusion on patients with RIF.

【 Key words 】 Intrauterine perfusion; Repeated implantation failure; Infertility; Reproductive technology, assisted

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卵胞质移植技术在辅助生殖中的应用

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【摘要】 对于卵子质量差的患者治疗是当今辅助生殖领域面临的巨大挑战之一。卵胞质移植 (ooplasmic transfer, OT) 的应用旨在为卵子质量差导致反复移植失败的患者提高胚胎发育潜能。该技术通过移植少量的有益供体卵胞质, 纠正受体卵母细胞的缺陷, 帮助其恢复正常的发育能力。本文对 OT 过程中, 重构胚的线粒体功能、线粒体 DNA 异质性、细胞凋亡的调节、细胞分裂、表观遗传修饰、卵胞质内容物、mRNA 等因素产生变化的机制进行综述, 并对 OT 技术在辅助生育应用中的优势及弊端进行总结。

【关键词】 卵胞质移植； 线粒体； 卵胞质内容物； 凋亡； 表观遗传修饰； 辅助生殖

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Application of ooplasmic transfer in assisted reproduction

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【Abstract】 One of the great challenges in assisted reproduction today is the management of cases with poor-quality oocytes. Ooplasmic transfer (OT) has been used with the aim of augmenting embryo viability in patients with multiple implantation failures, usually associated with developmentally compromised oocytes. The justification for the technique was that the ooplasm from the donor contained beneficial components lacking in the recipient's oocytes, and that the transfer of these components to the recipient's oocytes would result in normal growth and viability. This review focuses on concerns regarding its use in assisted reproduction, like mitochondrial functioning, mitochondrial DNA heteroplasmy, regulation of apoptosis, cleavage division, epigenetic modifications, oocyte contents and mRNA which are the factors affecting oocytes due to mixing of two entities. The applications, efficacy and adverse effects of OT techniques in human are summarized.

【 Key words 】 Ooplasmic transfer; Mitochondria; Oocyte contents; Apoptosis; Epigenetic modifications; Assisted reproduction

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卵泡液蛋白质组学与体外受精不良妊娠结局相关性研究进展

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【摘要】 体外受精 (IVF) 是不孕不育疾病的常规治疗方法, 但存在着妊娠成功率低以及相应不良妊娠结局问题。在后基因时代, 基于蛋白质组学的人类卵泡液研究可提供有关 IVF 过程各个步骤的实质性信息, 并有助于预测或改善 IVF 妊娠结局。通过检索 PubMed、Scopus、Web of Science 数据库, 本文回顾了基于人类卵泡液蛋白质组学的 IVF 妊娠结局相关研究的最新进展, 旨在总结可用于优化 IVF 结局的潜在标志物的同时提供 IVF 失败机制见解, 以促进生殖医学的基础研究, 进而加速临床转化。

【关键词】 受精, 体外; 卵泡液; 蛋白质组学; 不良妊娠结局
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Research advances in the correlation between follicular fluid proteomics and *in vitro* fertilization adverse pregnancy outcomes

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【Abstract】 *In vitro* fertilization (IVF) is a routine treatment for infertility diseases, but there are low pregnancy success rates and corresponding adverse pregnancy outcomes. In the post-gene era, human follicular fluid studies based on proteomics can provide substantial information about the various steps of the IVF process and contribute to predict or improve IVF pregnancy outcomes. By searching the PubMed, Scopus, and Web of Science databases, this paper reviews recent advances in studies related to IVF pregnancy outcomes based on human follicular fluid proteomics. The aim is to summarize the potential markers that can be used to optimize IVF outcomes while providing insights into IVF failure mechanisms, which can facilitate basic research in reproductive medicine, thereby accelerating clinical transformation.

【Key words】 Fertilization *in vitro*; Follicular fluid; Proteomics; Adverse pregnancy outcomes

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子宫内膜容受性阵列对子宫内膜种植窗精准判断的研究进展

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【摘要】 当前辅助生殖技术已取得了很大的发展,但是胚胎反复植入失败仍是有待解决的难题,提高植入率的关键在于子宫内膜与胚胎发育的同步以及对胚胎具有最大容受性。由于种植窗时间存在个体性差异,故精准地判断胚胎植入的最佳时机是目前辅助生殖领域的难点及热点。以往的研究多通过经阴道超声、血清雌孕激素水平、子宫内膜活检等方法来判断子宫内膜种植窗的时间,但均存在一定的误差。近年来,现代分子基因诊断及微阵列技术取得了重大进展,有学者也将其应用于子宫内膜容受性及种植窗的判断,并发现其具有较好的临床指导价值。现就子宫内膜容受性阵列(ERA)的基本情况、临床应用、应用前景等方面作一综述,为不孕症患者的个体化胚胎移植(pET)提供参考。

【关键词】 子宫内膜容受性阵列; 种植窗; 子宫内膜容受性; 个体化胚胎移植

基金项目:广东省中医药局科研项目(20191013)

Advances in research on endometrial receptive array and accurate judgment of window of implantation

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【 Abstract 】 Although assisted reproductive technology has made great progress, the recurrent implantation failure of embryos remains a dilemma to be solved. The key to improve the implantation rate lies in the developmental synchronization of endometrium with embryo and the maximum receptivity to embryos. Due to individualized differences in window of implantation (WOI) time, it is difficult in the field of assisted reproduction to accurately judge the optimal time for embryo implantation. Previous researches mostly used transvaginal ultrasound, serum estrogen and progesterone levels, endometrial biopsy and other methods to judge the time of endometrial WOI. However, errors remain. Recent years, big achievement has been made in modern molecular genetic diagnosis and microarray technology. Some scholars have also applied it to judge the endometrial receptivity and WOI, and found that it has a good guiding value. This article reviews the basic situation, clinical application and application prospect of endometrial receptivity array in order to provide reference for personalized embryo transfer (pET) in infertility patients.

【 Key words 】 Endometrial receptivity array; Window of implantation; Receptivity of endometrial; Personalized embryo transfer

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多囊卵巢综合征患者卵巢局部胰岛素抵抗研究 进展

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【摘要】 多囊卵巢综合征 (PCOS) 是女性常见的一种生殖障碍与内分泌紊乱并存的疾病, 是无排卵性不孕的最主要病因。胰岛素抵抗 (IR) 作为 PCOS 的主要代谢特征被认为是 PCOS 发病的重要病理及生理基础。PCOS 患者卵巢胰岛素信号通路受损, 存在卵巢局部 IR。卵巢局部 IR 可能导致卵泡发育异常、排卵障碍与高雄激素血症从而造成 PCOS 患者生殖障碍。了解 PCOS 患者卵巢局部 IR 的分子机制有助于为 PCOS 患者提供更好的治疗。本文就 PCOS 患者中卵巢局部 IR 的相关研究进展进行综述。

【关键词】 多囊卵巢综合征; 胰岛素抵抗; 卵巢; 甾体激素

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Research progress of ovary insulin resistance in patients with polycystic ovary syndrome

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【 Abstract 】 Polycystic ovary syndrome (PCOS), a common endocrine disease among women and the most common reason of anovulation infertility, is characterized by insulin resistance (IR). IR is considered as an important pathogenesis of PCOS. There is impair insulin signaling pathway in the ovary of PCOS patients. Ovary insulin resistance will cause fertile disorder by having a side effect on folliculogenesis, causing anovulation and hyperandrogenia. Further understanding the mechanism and effects of ovary IR will help to provide a better treatment for PCOS patients. In this paper, we summarized the research and the development of the ovary IR in PCOS patients.

【Key words】 Polycystic ovary syndrome; Insulin resistance; Ovary; Steroid hormone

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多囊卵巢综合征患者子宫内膜孕激素抵抗研究进展

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【摘要】 多囊卵巢综合征 (polycystic ovary syndrome , PCOS) 是导致育龄期女性不孕的常见内分泌代谢紊乱性疾病。PCOS 表现出的内分泌和代谢异常会造成子宫内膜容受性受损，从而导致低胚胎植入率和高流产率。孕激素是调节子宫内膜进入分泌期和良好胚胎容受状态的重要类固醇激素，孕激素效应的减弱会导致子宫功能失衡。PCOS 患者已被证实存在子宫内膜孕激素抵抗现象，而孕激素抵抗是导致子宫内膜容受性下降的重要因素之一，可显著增加子宫内膜不典型增生和癌症发生的风险。明确孕激素抵抗在 PCOS 发生发展中的作用机制，可以有效改善 PCOS 患者的妊娠结局，同时可以为子宫内膜癌防治提供重要的理论依据。本文对 PCOS 患者子宫内膜孕激素抵抗效应以及该现象发生发展的相关分子机制进行总结论述，以期改善 PCOS 患者子宫内膜容受性提供理论依据。

【关键词】 多囊卵巢综合征； 子宫内膜； 子宫内膜容受性； 孕激素抵抗； 子宫内膜癌

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Research progress on the mechanism of endometrial progesterone resistance in patients with polycystic ovary syndrome

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【Abstract】 Polycystic ovary syndrome (PCOS) is a common gynecologic endocrine disease caused infertility of women at the childbearing age. The endocrine and metabolic abnormalities displayed in women with PCOS promote complex effects on the endometrial receptivity, leading to a low rate of implantation and even infertility. Progesterone is an important steroid hormone that regulates the endometrium into the secretory for embryo implantation. Aberrant progesterone signaling can lead to an imbalance in the uterine function.

Endometrial progesterone resistance has been confirmed in patients with PCOS, which may be one of the causes of reduced endometrial receptivity. However, the molecular mechanism of progesterone resistance is still unclear. To clarify the mechanism of progesterone resistance can provide an important basis for improving pregnancy outcome and preventing endometrial cancer in PCOS patients. We summarize the effects of endometrial progesterone resistance in PCOS patients and the related molecular mechanisms of the occurrence and development of progesterone resistance, aiming to provide a theoretical basis for improving the endometrial receptivity of PCOS patients.

【 Key words 】 Polycystic ovary syndrome; Uterine endometrium; Endometrial receptivity; Progesterone resistance; Endometrial cancer

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·综述·

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地诺孕素在子宫内膜异位症治疗中的应用研究 进展

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【摘要】 地诺孕素(dienogest)作为一种新型的高效孕激素,也是第一个针对子宫内膜异位症的药物,在中国以外的市场已经应用了11年,积累了相应的疗效与安全性等方面的经验。本文将围绕地诺孕素在不同类型子宫内膜异位症治疗中的应用进行综述,并介绍其在亚洲人群的患者中的临床试验开展情况,有助于临床医生更全面地了解地诺孕素在子宫内膜异位症治疗中的应用价值。

【关键词】 地诺孕素; 子宫内膜异位症; 治疗

Application of dienogest in treatment of endometriosis

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【Abstract】 As a new high-potency progesterone and the first drug for endometriosis, dienogest has been used in overseas markets for 11 years, accumulating relevant experience in efficacy and safety. This article reviewed the application of dienogest in the treatment of different types of endometriosis, and the results of clinical trials in Asian patients. It would help the clinicians fully understand the application value of dienogest in the treatment of endometriosis.

【Key words】 Dienogest; Endometriosis; Treatment

· 综述 ·

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慢性子宫内膜炎在生殖领域中的研究进展

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【摘要】 慢性子宫内膜炎 (chronic endometritis, CE) 是由各种病原体引起的子宫内膜持续且隐匿的炎症。CE 患者大多缺乏明显的症状、体征或症状轻微, 临床上往往易被忽视。病理检查发现子宫内膜间质内浆细胞浸润是诊断 CE 的金标准。宫腔镜及病理组织学检测发现不少不孕症女性患有这种子宫内膜病变, 而这种病变应用超声和造影等检查均难以发现。越来越多的报道显示 CE 会造成不孕、复发性流产、行体外受精-胚胎移植 (IVF-ET) 者反复胚胎种植失败等。抗生素治疗后这类患者会获得较高的种植率和临床妊娠率。本文旨在对 CE 的病因、诊断、治疗及在生殖等相关领域的研究进展做一综述。

【关键词】 慢性子宫内膜炎; 不孕症; 反复胚胎种植失败

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Research progress of chronic endometritis in reproduction

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【Abstract】 Chronic endometritis (CE) is a disease of persistent and mild inflammation in endometrium caused by many kinds of pathogens. CE is often missed during the clinical practice for the hidden symptoms or even no symptom of the patients. Histological detection of plasma cells in the stromal area of the endometrium is still the gold standard test for diagnosis of CE. The application of hysteroscopy and histological test have revealed that CE was widespread in infertility women, which is hard to be detected by routine examination, such as ultrasound and hysterosalpingography (HSG). More and more evidences demonstrated that CE was associated with the infertility, repeated implantation failure and recurrent pregnancy loss. It has been proved that the clinical pregnancy rate and the implantation rate of IVF patients could be improved after treatment with antibiotic. The aim of this review is to address the etiology, diagnosis, treatment and current literature surrounding CE and highlight recent advances in reproduction.

【Key words】 Chronic endometritis; Infertility; Repeated implantation failure

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· 综述 ·

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女性高雄激素对妊娠和子代影响的研究进展

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【摘要】 雄激素对女性的生殖健康有重要作用。雄激素过多会影响糖脂蛋白质代谢及生殖系统的功能。妊娠期雄激素过多会影响母体的健康, 导致流产等不良

妊娠结局以及妊娠期高血压疾病、妊娠期糖尿病、早产等妊娠期并发症。过量的雄激素还会通过胎盘影响胎儿各系统的生长发育,对胎儿在宫内的发育及子代出生后的健康产生不良影响。本文从高雄激素对妊娠和子代的影响方面作一综述。

【关键词】 女性; 雄激素增多症; 妊娠期并发症; 胎儿发育

Effects of high level of androgens on pregnancy and offsprings in female

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【Abstract】 Androgen has an important impact on women's reproductive health. Hyperandrogenism can cause various metabolism disorders and damages reproductive system functions. Hyperandrogenism during pregnancy will not only affect the health of the mother, leading to adverse pregnancy outcomes such as abortion, as well as pregnancy complications such as hypertensive disorder complicating pregnancy, gestational diabetes, and premature delivery. Exposure of the fetus to excess androgen can also affect the development of fetal systems, and therefore adversely affect the health of the fetus and even the postnatal offsprings. This article reviews the effects of high level of androgens on pregnancy and offsprings.

【Key words】 Female; Hyperandrogenism; Pregnancy complications; Fetal development

· 综 述 ·

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围绝经期抑郁的研究新进展

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【摘要】 围绝经期抑郁的病因不明确，目前认为卵巢功能减退和激素波动是其主要原因。随着人口老龄化的加剧，围绝经期抑郁的发病率明显上升，严重危害女性的身心健康。加强对围绝经期女性的抑郁筛查，提高抑郁症状的识别率至关重要。2018年北美更年期协会（NAMS）和全国抑郁症中心网络妇女和情绪障碍工作组（NNDC）制定了围绝经期抑郁的评估和治疗指南，明确了围绝经期抑郁症的诊断标准。抗抑郁药是围绝经期抑郁症的主要治疗方法。有研究证实雌激素有抗抑郁作用，但激素治疗的应用还存有争议。本文结合该指南及最新文献，对围绝经期抑郁的筛查、诊断和治疗展开综述。

【关键词】 围绝经期；抑郁；雌激素

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Progress in research on perimenopausal depression

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【Abstract】 The cause of perimenopausal depression is not clear, decrease in ovarian function and increase in hormonal fluctuations are considered to be the main causes. With the aging of the population, the incidence of perimenopausal depression increased significantly, which seriously impacts the physical and mental health of women. Screening of depression in perimenopausal women should be conducted to recognize depression in the early stage. In 2018, the North American Menopause Society (NAMS) and the National Network of Depression Centers Women and Mood Disorders Task Group (NNDC) have developed the guideline for the assessment and treatment of perimenopausal depression, which defined the diagnostic criteria for perimenopausal depression. Antidepressants is considered as first-line treatment for perimenopausal depression. However, studies have confirmed that estrogen has antidepressant effects, but there are still different opinions on the application of hormone therapy. This article reviewed this guideline and the latest literatures of the screening, diagnosis and treatment of perimenopausal depression.

【Key words】 Perimenopause; Depression; Estrogen

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微小 RNA 在卵巢卵泡发育中的调控作用

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【摘要】 微小 RNA (microRNA, miRNA) 是一类长度在 22~25 核苷酸的非编码 RNA,主要通过与其靶基因 3'-非翻译区(3'-untranslated region,3'-UTR)以完全或不完全碱基互补配对的形式结合,进而导致靶基因 mRNA 的降解或翻译抑制。卵泡是卵巢的主要功能单位,在卵泡发育不同阶段可检测到多个 miRNAs 的表达,且 miRNAs 的表达具有时空特异性。研究表明,miRNAs 广泛参与原始卵泡募集、优势卵泡选择、颗粒细胞增殖分化、甾体类激素的合成与分泌、卵母细胞成熟、排卵以及黄体形成等卵泡发育的各个环节。此外,miRNAs 表达异常与卵巢早衰、多囊卵巢综合征等疾病的发生、发展密切相关。本文探讨 miRNAs 在卵泡发育中的调控作用,为进一步了解卵巢卵泡发育以及女性相关疾病的诊治提供思路。

【关键词】 微小 RNA; 卵泡发育; 颗粒细胞; 卵巢功能紊乱

Regulation of microRNA in ovarian follicular development

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【Abstract】 MicroRNA (miRNAs) is a class of non-coding RNA with a length of 22-25 nt. They can bind to the 3'-untranslated region (3'-UTR) of target mRNAs in the form of complete or incomplete base complementary pairing, causing the degradation or translation inhibition of target mRNAs. Follicles are the functional unit of the ovary. Multiple miRNAs can be detected in different stages of follicular development, and the expression of these microRNAs has a certain temporal and spatial specificity. Recent studies have shown that miRNAs are involved in various stages of follicular development, such as primordial follicle recruitment, dominant follicle selection, granulosa cell proliferation and differentiation, steroid hormone synthesis and secretion, oocyte maturation, ovulation and luteal formation. In addition, abnormal expression of miRNAs are closely related to the occurrence and development of diseases such as premature ovarian failure and polycystic ovarian syndrome. To further explore the regulatory role of miRNAs in follicular development will provide ideas for further understanding of ovarian follicular development and the diagnosis and treatment of female-related diseases.

【Key words】 MicroRNA; Follicular development; Granulosa cells; Ovarian dysfunction

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非编码 RNA 与妊娠期糖尿病关系的研究进展

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【摘要】 目前, 随着肥胖和 II 型糖尿病发病率的不断升高, 妊娠期糖尿病 (GDM) 的发病率持续上升。GDM 是常见影响围产期妇女妊娠结局的疾病之一, 可导致自然流产、巨大儿、早产儿和死胎等不良结局发生率增加。在调控 GDM 的发生和发展中, 非编码 RNA 起着重要的作用, 而且与 GDM 并发症的发生也有一定关系。非编码 RNA 是一类不编码蛋白质的 RNA, 包括长链非编码 RNA (LncRNA)、微小 RNA (miRNA) 和环状 RNA (circRNA) 等, 随着研究的深入, 发现非编码 RNA 含有丰富的信息。本文通过对 3 种非编码 RNA 与 GDM 的相关研究进展进行综述, 详细介绍了 3 种非编码 RNA 与 GDM 的关系, 以期为进一步对 GDM 的深入研究提供理论基础。

【关键词】 妊娠期糖尿病; 长链非编码 RNA; 微小 RNA; 环状 RNA

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Research progress of the relationship between non-coding RNA and gestational diabetes mellitus

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【Abstract】 With the increase of obesity and type 2 diabetes, gestational diabetes mellitus (GDM) is growing public health problem worldwide. GDM is one of the most ubiquitous diseases affecting pregnancy outcomes in perinatal women, which increases the incidence of adverse outcomes such as miscarriage, macrosomia, premature birth and stillbirth. Non-coding RNA (ncRNA) plays an

important role in regulating the occurrence and development of GDM, and it is also related to the occurrence of complications of GDM. ncRNA is a type of RNA that don't encode proteins, including long non-coding RNA (LncRNA), microRNA (miRNA) and circular RNA (circRNA). More and more studies show ncRNA contains abundant information. This review discusses the relationship between three kinds of ncRNA and GDM, in aim to provide theoretical basis for further research on gestational diabetes.

【 Key words 】 Gestational diabetes mellitus; Long non-coding RNA; MicroRNA; Circular RNA

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· 综 述 ·

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圆头精子症致病机制及临床妊娠结局相关研究 进展

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【摘要】 圆头精子症是一种罕见的畸形精子症, 在男性不育患者中约占0.1%, 是诉诸第二代试管婴儿[卵胞质内单精子显微注射(ICSI)] 的病症之一。圆头精子症的精子头部呈圆形、顶体缺陷, 其特征还包括颈部异常和尾部弯曲, 这源于精子发生过程出现了异常(顶体形成异常、线粒体及微管排列紊乱、核染色质浓缩延长异常等)。圆头精子症发病具有家族集中倾向。目前已证实 5 个人类基因和 17 个小鼠基因与圆头精子症的发生相关。相比传统 ICSI 技术, 结合人工卵子激活(AOA) 的 ICSI 技术对圆头精子症更有效。本文对圆头精子的发现、认识及定义、形态学特征及超微结构、相关基因及发病机制、辅助生殖结局的相关研究进展进行总结及讨论。

【关键词】 圆头精子症； 畸形精子症； 基因突变； 生殖技术， 辅助； 男性不育

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Pathogenic mechanism and reproductive outcomes in globozoospermia: an update

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【Abstract】 Globozoospermia is a rare (0.1%) but severe disorder in male infertility, with round-headed and acrosomeless sperm defects. The pathogenesis of globozoospermia most probably originates in spermiogenesis, more specifically in acrosome formation and sperm head elongation. It is confirmed with genetic origin. Five human genes and 17 mouse genes have been so far confirmed in presenting globozoospermia. Intracytoplasmic sperm injection (ICSI) combined with assisted oocyte activation (AOA) has been proved to be a very efficient fertilization technique when compared with conventional ICSI in globozoospermia. In this paper, the discovery, recognition and definition of round head sperm, morphological characteristics and ultrastructure, related genes and pathogenesis, and the outcome of assisted reproduction in globozoospermic patients were summarized and discussed.

【Key words】 Globozoospermia; Teratozoospermia; Genetic mutation; Reproductive techniques, assisted; Male infertility

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· 综述 ·

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男性不育相关代谢组学研究进展

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【摘要】 随着生活环境改变和社会压力增加, 男性精液质量逐步下降, 男性不育症发病率逐年上升, 愈来愈受到人们关注。精液分析是目前诊断男性不育症的首选检查, 但无法明确与男性不育症相关的精液代谢改变及其相关机制, 且临床上尚存在部分不育症患者表现出正常的精液分析结果。代谢组学的出现有望弥补精液分析的这些不足。代谢组学通过对样本中小分子代谢产物进行定性和定量分析, 寻找疾病发生发展的生物标志物, 为疾病诊疗提供新方法。近年来, 各国学者利用代谢组学对不育男性的血清、精浆等样本进行研究, 发现了多种可能与男性不育症相关的生物标志物, 涉及氧化应激、能量代谢、信号转导中的多种通路。本文就近年来代谢组学在无精子症、少精子症、弱精子症、畸形精子症及不明原因男性不育症中的研究进展作一综述, 以期为不育症的临床诊疗提供新思路。

【关键词】 男性不育症; 代谢组学; 代谢紊乱; 生物标志物; 潜在机制

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Research progress on the metabolomics of male infertility

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【Abstract】 With the change of living environment and the increase of social pressure, the quality of male semen is gradually declining, and the incidence of male infertility is increasing year by year, which attracts more and more attention. At present, semen analysis is the first choice for diagnosis of male infertility, but it is impossible to clarify the changes in semen metabolism associated with male infertility and its related mechanisms, and there are still some infertile patients who show normal semen parameters. The emergence of metabolomics is expected to compensate for these deficiencies in semen analysis. Metabolomics can provide biomarkers for diseases by qualitative and quantitative analysis of small molecular metabolites in different samples. In recent years, scholars in various countries have used metabolomics to study the serum, seminal plasma and other samples of infertile men. Many biomarkers related to male infertility have been found, involving multiple metabolic pathways in oxidative

stress, energy metabolism and signal transduction. In this paper, the research progress of metabonomics in azoospermia, oligozoospermia, asthenospermia, teratospermia and unexplained male infertility is reviewed, in order to provide new ideas for clinical diagnosis and treatment of infertility.

【 Key words 】 Male infertility; Metabolomics; Metabolic disorders; Biomarkers; Underlying mechanisms

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· 综 述 ·

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冷冻卵子的社会、伦理和法律问题

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【摘要】 近年来,快速发展的卵子冷冻技术为妇女生育力保存提供了新的手段,我国部分辅助生殖机构已经逐步开展了卵子冷冻技术的临床应用。但是,卵子冷冻就技术层面而言,远远落后于胚胎及精子冷冻,人类卵母细胞的低温保存目前只能作为女性生育力保存可选方案之一;完全放开卵子库的使用在我国存在管理困难及其它伦理学问题。但是,对诸如卵巢早衰、将要进行放化疗的女性患者,确实有冻存卵母细胞的实质需求。本文对卵子冷冻可能引发的社会、伦理和技术层面的问题和争议进行了概述,并对各国卵子冷冻技术相关的法律法规进行介绍,以抛砖引玉,引起业内同行的关注,以期进一步建立健全相关的法律法规,推动卵子冷冻技术健康良性发展,让妇女生育需求和意愿在合理范围内能有效得到满足。

【关键词】 卵子冷冻; 伦理分析; 法律

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Social, ethical and legal issues of ovum freezing

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【Abstract】 The rapid development of oocyte cryopreservation in recent years has provided a new means for the preservation of women's fertility. Some assisted reproductive institutions in China have gradually carried out the clinical application of oocyte cryopreservation. However, oocyte cryopreservation is far behind embryo and sperm freezing in terms of technology, and cryopreservation of human oocytes can only be used as one of the options for female fertility preservation. Moreover, allowing the egg bank completely has much management difficulties in our country, which can easily lead to ethical problems. However, there is a real need for oocyte cryopreservation in women with premature ovarian failure who are about to undergo radiotherapy and chemotherapy. This article summarizes the social, ethical and technical issues and controversies that may arise from egg freezing, and introduces the laws and regulations in various countries. We expect the healthy development of egg freezing technology and can satisfy the needs and wishes of women's reproduction effectively within a reasonable range.

【Key words】 Oocyte cryopreservation; Ethical analysis; Legislation

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