稿件編號：OF1	AI 囊胚判讀系統及使用者介面¬—應用於預測植入後之懷孕率 AI recognition system and user interface thereof for assisted prediction of pregnancy rate after blastocyst transfer
臨時稿件編號：0880	林映任 [1] 黃仁傑 [1] 鄭銘凱 [1] 谷化芬 [2] 陳雅芳 [2] 權詩婷 [2] 陳明哲 [2] 王榮華 [3] 國立臺灣海洋大學電機工程學系 [1] 台中榮民總醫院婦女醫學部 [2] 國立臺灣海洋大學人工智慧研究中心 [3]

論文發表方式：
口頭報告

論文歸類：
生殖內分泌

Due to economic pressure and infertility problems, Taiwan's birth rate has been declining year by year. At the same time, the youth dependency ratio is also rising annually. The combination of these factors has formed a national security crisis. Typical treatments of infertility involve vitro fertilization (IVF/ET), whereby an egg is removed from the woman's ovaries and fertilized with sperm in a laboratory. The fertilized eggs are cultivated for 5-7 days to become a blastocyst and then implanted back into the woman's womb to grow and develop. The quality of the blastocyst to be implanted plays a crucial role in the success rate of pregnancy. Traditionally, physicians and embryologists grade the quality of blastocysts with naked eyes and rank the blastocysts for implantation into the mother's body. However, such manual operations heavily rely on personal experiences and hence apt to be affected by subjective preferences.

We present the findings of a joint project between National Taiwan Ocean University (NTOU), Taichung Veterans General Hospital, and SOFIVA (Dianthus Medical Group). The main production is a modularized AI recognition system, which includes a blastocyst evaluation method and plural machine learning algorithms trained with feature data arranged as tablur structure. Feature data may include blood test reports and those retrieved from EMR (electronic medical record) as well as images of embryos growing into blastocysts taken in the time-lapse incubator (TLI). The prediction system is integrated with a visualization user interface (UI) to allow physician/embryologist making objective judgments on the quality of blastocyst. In particular, our system contains a generative model, which allows users to online modify parametric settings of tablur structure, thus enabling the system to accommodate the expertise of physicians in a flash without having to retrain the AI algorithms from scratch. Newly developed algorithms and feature data can be easily added and modified via the user-friendly UI and integrated into the modularized system.

稿件編號：OF2 臨時稿件編號：0713	腹腔鏡良性卵巢與內膜異位瘤手術中止血方式對於卵巢功能之影響 Impact of hemostatic methods on ovarian reserve after laparoscopic ovarian cystectomy of benign and endometriotic ovarian tumor: Systematic review and meta-analysis. 林瑜萱 [1] 劉勇良 [1] 李宗賢 [1,2] 夏立忻 [1] 黃允瑤 [1,2] 張浩榕 [1] 中山醫學大學附設醫院婦產部 [1] 中山醫學大學醫學院 [2]
論文發表方式： 口頭報告 論文歸類： 生殖內分泌	Benign ovarian tumors are common gynecological problems which occur in approximately 7 % of woman during procreative age. Ovarian reserve may be affected during surgery, either by mechanical injury or thermal damage. Hemostasis achieved with electrical energy increase the risk of damage to the surrounding normal ovarian tissue. The treatment of benign ovarian tumors had become an issue for fertility desire patients. Previous studies had reported reduced ovarian reserve after laparoscopic cystectomy. We performed a systematic review and meta-analysis to analyze the impact of ovarian reserve during laparoscopic cystectomy by comparing nonthermal hemostatic methods with bipolar coagulation. We analyzed 13 RCTs and compared the postoperative AMH of patients between 2 groups and found that non-thermal hemostasis method in laparoscopic surgery of ovarian tumor is more advance in preservation of ovarian reserve than bipolar hemostasis, especially in patients with endometrioma.
稿件編號：OF2 臨時稿件編號：0713	

稿件編號：OF3	經電腦程式模擬分析以完善小鼠囊胚玻璃化冷凍保存及解凍之基因和微核醣核酸表達軌跡之影響
臨時稿件編號：0795	Comprehensive in-silico analysis complements the effect of mouse blastocyst vitrification and warming on the gene and microRNA expression profiles
	李季穎 [1,2] 蔡漢霓 [1] 鄭恩惠 [1,3] 李宗賢 [1,4,5] 林秉瑤 [1,3] 李俊逸 [1,4,5] 李茂盛 [1,4,5] 茂盛醫院 [1] 清華大學生物資訊與結構生物研究所 [2] 中興大學學士後醫學系 [3] 中山醫學大學醫學研究所 [4] 中山醫學大學附設醫院婦產部 [5]
論文發表方式：口頭報告 論文歸類：生殖內分泌	Objective: In vitro fertilization (IVF) and embryo transfer are crucial in assisted reproduction. Blastocyst vitrification has increased the flexibility of IVF by efficiently preserving embryos before being transferred in subsequent menstrual cycles. However, previous studies have shown that blastocyst vitrification may lead to higher live birth rates and heavier newborn weights. In addition, it is still unclear how vitrification and warming affect embryo implantation. Therefore, this study aimed to investigate the effects of vitrification on blastocyst gene expression profiles in a mouse model using next-generation sequencing and in silico analysis. Materials and Methods: Our study collected vitrified and thawed mouse embryos for NGS sequencing to obtain a comprehensive mRNA expression profile. The study then conducted functional evaluations based on mRNA expression characteristics to understand the effect of vitrification and thawing on embryonic development. Previous studies suggested that mice use miRNA to communicate with the maternal uterus to facilitate successful implantation. This study used blastocyst mRNA expression characteristics to predict the potential impact of vitrification and thawing on miRNA expression and speculate how vitrification and thawing affect blastocyst implantation. Additionally, the study used rt-qPCR to verify the critical gene and miRNA candidates identified through functional evaluations. Results: The results revealed that vitrification modified the in vivo-derived mouse blastocysts transcriptome, leading to minor gene expression modifications, which can influence subsequent blastocyst development. In particular, vitrification affects mRNA involved in cell development, proliferation, projection, movement, calcium regulation, and signaling pathways. The study also revealed that vitrification changes blastocyst miRNA expression. Conclusions: Blastocysts may communicate with and regulate the endometrium by using miRNA. By holding specific pathways, miRNA supports the implantation and survival of embryos. The in-silico analysis helped to construct the mRNA mechanism of vitrified blastocysts and predict miRNA that can regulate gene expression in blastocysts. The study provides insight into how blastocyst vitrification affects gene expression and its potential impact on embryo implantation and development.

稿件編號：OF4 臨時稿件編號： 0861	褪黑激素之抗發炎作用可改善雙酚 A 對顆粒細胞造成的毒性 Anti-inflammatory effects of melatonin ameliorate bisphenol A-induced toxicity on human granulosa cells 王凱弘 [1] 蔡青浣 [1] 林大欽 [1,2] 郭宗正 [1,2] 郭綜合醫院生殖醫學中心 [1] 婦產部 [2]
論文發表方式： 口頭報告 論文歸類： 生殖內分泌	**Introduction** Melatonin is an important endogenous hormone with anti-inflammatory and antioxidant effects, and can participate in the regulation of reproductive processes. The oocyte is protected and nurtured from its surrounding somatic cells, including cumulus cells and granulosa cells (GCs). Numerous studies have demonstrated that normal folliculogenesis and oocyte maturation, ovulation, and luteal growth/regression relies on bidirectional interaction between the GCs and the oocyte. Bisphenol A (BPA), an exogenous estrogen known as an endocrine-disrupting chemical, might cause ovarian toxicity by increasing apoptosis of GCs, alter oocyte maturation by prematurely closing gap junctions in the GCs-oocyte complex, and decrease progesterone synthesis by disrupting cholesterol homeostasis in GCs. This study aims to assess the protective effect of melatonin on BPA-induced toxicity in GCs. **Materials and methods** Human GCs were collected from patients undergoing IVF surgery following controlled ovarian stimulation. To explore the effect of melatonin on BPA-induced GCs, we used different methods to evaluate their biological effects, gene expression and protein expression. **Results** In our previous studies, we demonstrated that melatonin restores the expression of Cx43 in BPA-treated GCs by reducing the expression of COX-2. In this study, we found that BPA adversely affected the viability and growth of GCs and increased their apoptosis rate, while melatonin administration ameliorated these toxic effects. We further revealed that BPA exposure increases the expression of inflammatory cytokines, including tumor necrosis factor-α (TNF-α), interleukin-1β (IL-1β), and prostaglandin E2 (PGE2). Next, we analyzed the effect of melatonin on BPA-induced inflammatory cytokine expression in GCs. The results showed that the melatonin significantly reduced IL-1β and PGE2 production in BPA-induced GCs in a dose-dependent manner, but only slightly affected TNF-α in BPA-induced GCs. **Conclusion** Our recent data provide important insights into melatonin protecting GCs from the adverse effects of BPA by ameliorating inflammation.

稿件編號：OF5	以全基因表現分析技術探討 IL-33 對子宮內膜異位基質細胞之影響
	Genome-wide expression analysis of IL33-stimulated human endometriotic stromal cells
臨時稿件編號：0862	
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論文發表方式：
口頭報告

論文歸類：
生殖內分泌

Introduction
Endometriosis is a common chronic gynecological disorder characterized by the presence and growth of endometrial-like tissue outside of the uterus. Its clinical manifestations include chronic pelvic pain, dysmenorrhea, and infertility. Although the exact etiology of endometriosis pathogenesis remains unclear, dysfunction of immune and inflammatory mediators such as interleukin (IL) is thought to contribute to the pathogenesis of endometriosis. IL-33 is a danger signal and a key regulator of chronic inflammation. It is predominantly expressed by the nuclei of various cell types, including endometrial stromal cells.
Recent literature reports have shown that IL-33 concentration was increased in the serum and peritoneal fluid in patients with deeply infiltrating endometriosis. IL-33 is speculated to be a crucial factor contributing to inflammation and endometriosis progression. The aim of this study was to investigate the pathways involved in the development of endometriosis by IL-33 using genome-wide expression analysis.

Materials and methods
The study used human endometriotic stromal cells derived from ovarian endometrioma (hOVEN-SCs) as its experimental cells. Gene expression was analyzed using the Illumina Whole Genome Expression Arrays and reverse transcription-polymerase chain reaction (RT-PCR).

Results
Our previous study showed that IL-33 enhanced the invasion ability of hOVEN-SCs as mediated by MMP-9 through the ST2 (an IL-33-specific receptor)/MAPK signaling pathway. In this study, we applied Illumina Whole Genome Expression Arrays to investigate the effect of IL-33 on hOVEN-SC. The results showed that the expression of 72 genes changed more than 10-fold following IL-33-treated hOVEN-SCs compared with hOVEN-SCs. Among these genes, 47 were up-regulated and 25 were down-regulated in IL-33-treated hOVEN-SCs as compared with hOVEN-SCs. The top 5 up-regulated genes are VCAM-1, VIPR1, NPTX2, IL-1, and IL1RL1. To verify these results, we performed experiments to quantify the transcript expression by semi-quantitative RT-PCR. The results showed that expressions were statistically significantly higher in IL-33-treated hOVEN-SCs than in hOVEN-SCs (18.9-, 12.6-, 9.3-, 6.6- and 3.4-fold increase, respectively, for VCAM-1, VIPR1, NPTX2, IL-1, and IL1RL1). According to relevant research and literature reports, VCAM-1 is highly expressed in endometriosis. We detected the expression of VCAM-1 by flow cytometry. Analysis revealed that the expressions of VCAM-1 in IL-33-treated hOVEN-SCs was 3.6-fold higher than in untreated hOVEN-SCs.

Conclusion
Collectively, our study should provide useful information for the effects of IL-33 in endometriosis, and for finding candidate genes for the diagnosis or treatment of endometriosis.

稿件編號：OF6 臨時稿件編號：0752	使用促性腺釋放激素促效劑進行激素替代治療病人於冷凍胚胎週期的黃體支持期，額外給予單一劑量 GnRH 促進劑能否增加活產率: 回顧型研究 Additional single dose GnRH agonist during luteal phase support may improve live birth rate in GnRHa-HRT frozen–thawed embryo transfer cycle: a retrospective cohort study 劉相宜 [1] 林立德 [1] 張瑋珊 [2] 林佩萱 [1] 李佳榮 [1] 陳其葳 [1] 陳昱蓁 [1] 崔冠濠 [3] 高雄榮總婦女醫學部 [1] 國軍高雄總醫院 [2] [3]
論文發表方式： 口頭報告 論文歸類： 生殖內分泌	GnRH agonist (GnRHa) has been reported to have direct effects and functional roles in the endometrium and embryos. Several meta-analyses have shown that GnRHa administration in the luteal phase improved the live birth rate or pregnancy rate in both fresh and frozen embryo transfer(FET) cycles. The aim of this study was to investigate whether luteal GnRHa administration could also improve in vitro fertilization (IVF) outcomes in patients undergoing hormone replacement therapy (HRT) cycles with GnRHa suppression.

稿件編號：OF7	癌症病患生殖保存-高醫經驗分享
	Cryopreservation in oncofertility-KMUH experience
臨時稿件編號：0718	
	徐以樂 [1] 莊蕙瑜 [1] 蔡英美 [1] 高醫婦產部 [1]

論文發表方式：口頭報告	Since improvement in cancer treatment, the issue of becoming parenthood raised among children, adolescents and young adult cancer patients. Not only disease itself, but also the treatment may be gonadotoxic, which may impair fecundity in the future. Cryopreservation of sperm, oocyte, and embryo are standard methods of fertility preservation among cancer patients currently. Regardless of limited time for ART before cancer treatment, whether pregnancy is safe for the patient challenges the clinical practice as well. Lower rate of return for embryo transfer, lower likelihood of clinical pregnancy and live birth among cancer patients were observed in the previous publications. We share the experience of fertility preservation among cancer patients in KMUH.
論文歸類：生殖內分泌	

Among 112 male cancer patients since 2004, hematologic cancer account for more than half (56%) of the sperm cryopreservation patients. Whereas testicular cancer stands for 18%. Mean sperm count was lowest among testicular cancer patients. Significantly lower sperm motility was observed among testicular patients with tumor size larger than 8 cm. Three returned for thawing, and 2 of them had live birth delivery.
Among 28 female cancer patients since 2013, breast cancer stands for 75%. Patients seeking for oocyte cryopreservation were less than 8 every year. Mean number of oocytes retrieved was 15.17, mean number of frozen oocytes was 14.77, and matured oocyte was between 70.73% to 78.72%. Two of them experienced OHSS after oocyte retrieval. Only one breast cancer patient returned for thawing oocyte and pending embryo transfer.
Though cancer treatment and ART have improved for decades, returning for embryo transfer remains low among cancer patient. Future pregnancy outcome still relies on initial quality of banked sperm/oocyte.

稿件編號：OF8 臨時稿件編號：0933	試管嬰兒療程濾泡液中 CEGF-A, Eotaxin 和 CXCL-6 濃度與卵子成熟度有強烈相關性 VEGF-A, Eotaxin and CXCL-6 concentration in follicular fluid strongly correlate with oocyte maturity in IVF

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論文發表方式：
口頭報告

論文歸類：
生殖內分泌

Background: Angiogenesis in folliculogenesis contributes to oocyte developmental competence in natural and in vitro fertilization (IVF) cycles. Therefore, the identification of key angiogenic factors in follicular fluid (FF) during folliculogenesis is clinically significant and important for in vitro fertilization. This study aims to identify the key angiogenic factors in FF for predicting oocyte maturity during in vitro fertilization.

Materials and Methods: Forty participants who received ovarian stimulation using a GnRH antagonist protocol in their first in vitro fertilization treatment were recruited. From each patient, two follicular samples (one preovulatory follicle, > 18 mm; one mid-antral follicle, < 14 mm) were collected without flushing during oocyte retrieval. In total, 80 FF samples were collected from 40 patients. The expression profiles of angiogenesis-related proteins in FF were analyzed via Luminex high-performance assays. Recorded patient data included antral follicle count, anti-müllerian hormone, age, and BMI. Serum samples were collected on menstrual cycle day 2, the trigger day, and the day of oocyte retrieval. Hormone concentrations including day 2 FSH/LH/E2/P4, trigger day E2/LH/P4, and retrieval day E2/LH/P4 were measured by chemiluminescence assay.

Results: Ten angiogenic factors were highly expressed in FF: eotaxin, Gro-α, IL-8, IP-10, MCP-1, MIG, PAI-1 (Serpin), VEGF-A, CXCL-6, and HGF. The concentration of eotaxin, IL-8, MCP1, PAI-1, VEGF-A, and CXCL-6 differed significantly between preovulatory and mid-antral follicles ($p < 0.05$). Logistic regression and receiver operating characteristic (ROC) analysis revealed that VEGF-A, eotaxin, and CXCL-6 were the three strongest predictors of oocyte maturity. The combination of VEGF-A and CXCL-6 predicted oocyte maturity with a higher sensitivity (91.7%) and specificity (72.7) than other combinations.

Conclusions: Our findings suggest that VEGF-A, eotaxin, and CXCL-6 concentrations in FF strongly correlate with oocyte maturity from the mid-antral to preovulatory stage. The combination of VEGF-A and CXCL-6 exhibits a relatively good prediction rate of oocyte maturity during in vitro fertilization.

稿件編號：OF9 臨時稿件編號：0775	催產素受器拮抗劑或可改善反覆植入失敗、子宮肌腺症及子宮肌瘤病患之胚胎植入預後 Administration of oxytocin receptor antagonist during frozen embryo transfer might improve live birth rates in women with recurrent implantation failure, adenomyosis and myoma 林柏文 [1] 林佩萱 [1] 陳其葳 [1] 李佳榮 [1] 蔡曉文 [1] 陳昱蓁 [1] 崔冠濠 [1] 林立德 [1] 高雄榮民總醫院 [1]
論文發表方式： 口頭報告 論文歸類： 生殖內分泌	Background Embryo transfer is the final critical step of in vitro fertilization (IVF). Studies showed that uterine contractility reached a nearly quiescent status at the time of embryo implantation. Increased uterine contractility during embryo implantation would significantly reduce implantation rate. Studies revealed that administration of oxytocin receptor antagonist during embryo transfer improves implantation rates, especially in the recurrent implantation failure (RIF) group. However, in specific subgroups, for example, women with uterine myomas or adenomyosis, few studies assess the effect. Therefore, this study aims to investigate the effect of oxytocin receptor antagonist used during embryo transfer on IVF outcomes and further analyze the effect of oxytocin receptor antagonist on subgroups. Methods This retrospective cohort study contained 431 patients who underwent first IVF frozen embryo transfer (FET) cycle in our reproductive center from Jan. 2021 to Dec. 2021. The study group included 162 patients receiving oxytocin receptor antagonist during embryo transfer. A total of 227 patients in the control group underwent embryo transfer without administrating oxytocin receptor antagonist. Baseline characteristics, infertility histories, ovarian reserve tests and IVF outcomes were compared between the two groups. Subgroup analyses were also performed. Result Baseline characteristics and FET cycle characteristics were similar between the two groups. In all population, no significant difference regarding live birth rates was observed between the study group and the control group. However, in the subgroups, compared to the control group, live birth rates in the study group were significantly higher (RIF, 43.9% versus 26.2%, P = 0.016; adenomyosis, 37.7% versus 22.1%, P = 0.039; myoma, 46.3% versus 20.4%, P = 0.004). The multivariate analysis revealed that use of oxytocin receptor antagonist was positively associated with live birth rates in women with RIF (adjusted OR 2.17, 95% CI 1.08–4.35, P = 0.030), adenomyosis (adjusted OR 3.44, 95% CI 1.43–8.28, P = 0.006) and myoma (adjusted OR 3.11, 95% CI 1.23–7.85, P = 0.016). Conclusion Oxytocin receptor antagonist administration during frozen embryo transfer might improve live birth rate in women with recurrent implantation failure, adenomyosis and myoma.