

黃志超



RONALD WANG



09 REPRODUCTION AND DEVELOPMENT

Research Progress Summary

Ronald Wang and his team from the Department of Obstetrics & Gynaecology focus on the field of Reproduction and Development. The team covered a wide spectrum of clinical, basic and genetic studies of female and male reproduction, and embryo and fetal development in human and mice. The team has many intradepartmental (TY Leung in fetal medicine and prenatal diagnosis; Liona Poon and WH Tam in maternal medicine; TC Li in assisted reproductive technology), interdepartmental (Simon Lam in neonatology; WS Poon in neurosciences; Ronald Ma in diabetes; Huating Wang, Kathy Chan and Tong Leung, Anna Tsang in stem cells, Alisa Shum in developmental biology), intrauniversity (KM Kwan in developmental biology), interuniversity (HKU, Ernest Ng and Raymond Li in O&G; Thomas Leung and Bill Chan in drug development), many other regional, national and international research collaboration in the field.

Ronald is the Licensee of Assisted Reproductive Technology Unit for IVF treatment and PGT;

the Director of The Chinese University of Hong Kong-Sichuan University Joint Laboratory in Reproductive Medicine and the Deputy Director of Prenatal Genetic Diagnosis Centre. His team members are the cord members of World Endometriosis Society Research Working Group and also International Core Outcome Measure for Infertility Trials Initiative. The team has published 3 reviews, 22 papers and 3 book chapters and obtained 6 new research grants (4 as PI or Co-PI including Collaborative Research Fund, General Research Fund, Health and Medical Research Fund, and the Ministry of Science and Technology; and 2 as Co-I including Health and Medical Research Fund and the Ministry of Science and Technology). The team members also received 1 international conference, 1 exchange and 1 outstanding student awards and they have 2 new PhD students awarded with Hong Kong PhD Fellowship Scheme (HKPFS) with or without Hong Kong Special Administrative Region Scholarship.





Principal Investigator

Ronald Wang



Team members

Judy Zhang, Maran Leung, Linda Wu, Nina Chu, Yi Song, Kennes Hung, Zinnat Hasina, Meng Li, Rui Zhe Zhang, Ruo Fan Qi, Wei Li, Alan Chan, Alice Lin, Scott Lin, Easo Wong, Ying Ying Zhang, Wen Jing Ding, Ken Tam, Sophia Tan, Kenean Getaneh Tlaye, Yiran Li, Olena Getsko, Xu Zheng, Gashaw Garede Woldeamanuel, Yang Ding, Xiao Yi Bai

Research Awards and Recognitions

Member's Name	Details	
	Award	Organisation
Ronald Wang	江西省引進培養創新創業高層次人才, 雙千計劃——第二批引進類創新領軍人才	中國江西省
Sophia Tan	Eurasia-Pacific Uninet Mach Grant	Uninet Ernst Mach
Rui Zhe Zhang	Outstanding Oral Presentation Award	Asia Pacific Initiative on Reproduction 2021
Kennes Hung	Outstanding Students Awards 2021	The Chinese University of Hong Kong

Fellowships

Member's Name	Details	
	Fellowship	Organisation
Ronald Wang	Directorship	The Chinese University of Hong Kong - Sichuan University Joint Laboratory for Reproductive Medicine
Woldeamanuel Gashaw Garede	Hong Kong PhD Fellowship Scheme	Research Grants Council
Olena Getsko	Hong Kong PhD Fellowship Scheme	Research Grants Council
	Hong Kong Special Administrative Region Scholarship	Hong Kong Special Administrative Region Government

Research and Scholarship

Academic Editorship

Member's Name	Details	
	Role	Journal
Ronald Wang	Guest Editor	Evidence-Based Complementary and Alternative Medicine

Reviewer of Journal / Conference

Member's Name	Details	
	Role	Journal / Conference
Ronald Wang	Reviewer	Poland Grants OPUS National Science Centre
		RCOG World Congress 2021
		Journal of Ethnopharmacology
		Human Reproduction (Open)
		PLoS ONE
		Molecular Biology Reports
		Human Reproduction
		American Journal of Reproductive Immunology
		Gynecologic Oncology
		Human Immunology
		Journal of Assisted Reproduction and Genetics
		Frontiers in Pharmacology
		Gene
		JAMA Internal Medicine
		Molecular Pharmacology
Frontiers Cell and Developmental Biology		
Fertility and Sterility		

Grants and Consultancy

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)	
Ronald Wang	早發型子癇前期發病機制及整體化防控策略的研究;開發適宜藥物靶向投遞系統,探索老藥新用的防治前景	Ministry of Education, Ministry of Science and Technology	01/12/2021	30/11/2025	RMB 27,777,000	
	利用多組學和系統生物學技術,篩選疾病生物標誌與潛在靶標	Ministry of Education, Ministry of Science and Technology	01/12/2021	30/11/2025	RMB 6,500,000	
	Epithelium Caveolin and its Calcium Signaling Pathway in Endometrium of Recurrent Miscarriage	Research Grants Council – General Research Fund	01/09/2021	31/08/2023	775,732	
	Receptor Tyrosine Kinase Inhibitor Sunitinib as Novel Immunotherapy to Inhibit Myeloid-derived Suppressor Cells for Treatment of Endometriosis	Food and Health Bureau – Health and Medical Research Fund	01/09/2021	29/2/2023	1,360,000	
	A Super-Resolution Fluorescence Microscopy Platform for Live-cell and Animal-tissue Imaging	Research Grants Council – Collaborative Research Fund	30/06/2021	29/06/2024	7,154,250	
	Transdermal Peptide Delivery of siRNA for the Treatment of Cervical Cancer and Melanin-related Diseases	Innovation and Technology Commission – Partnership Research Programme	01/08/2020	31/07/2022	975,826.5	
	Transdermal Peptide Delivery of siRNA for the Treatment of Cervical Cancer and Melanin-related Diseases	Innovation and Technology Commission – Re-industrialisation Funding Scheme	01/08/2020	31/07/2022	1,000,000	
	Transdermal Peptide Delivery of siRNA for the Treatment of Cervical Cancer and Melanin-related Diseases	Innovation and Technology Commission – Research Talent Hub	01/08/2020	31/07/2022	2,570,153.53	
	Transdermal Peptide Delivery of siRNA for the Treatment of Cervical Cancer and Melanin-related Diseases	Donation	01/08/2020	31/07/2022	47,600	
	Transdermal Peptide Delivery of siRNA for the Treatment of Cervical Cancer and Melanin-related Diseases	Research Grants Council - Research Matching Grant Scheme	01/08/2020	31/07/2022	23,800	

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Ronald Wang	The Effect of In Utero Hyperglycaemia, Maternal Overnutrition and Interaction with Postnatal Lifestyle on Cardiometabolic Risk at Young Adulthood – Extension of HAPO Follow Up Study.	Research Grants Council – General Research Fund	01/01/2020	31/12/2022	1,158,019
	A Metabolomic Approach to Redefine Diagnostic Criteria and Classification of Polycystic Ovary Syndrome	Food and Health Bureau – Health and Medical Research Fund	01/04/2019	31/03/2021	1,499,999
	Umbilical Cord Blood Mononuclear Cell Bank in Hong Kong and Treatment of Neonatal Cerebral Ischemia and Anaemia	Innovation and Technology Commission – Innovation and Technology Fund	01/10/2017	31/03/2021	2,864,999
	Umbilical Cord Blood Mononuclear Cell Bank in Hong Kong and Treatment of Neonatal Cerebral Ischemia and Anaemia	Innovation and Technology Commission – Re-industrialisation Funding Scheme	01/10/2017	31/03/2021	3,000,001
	Umbilical Cord Blood Mononuclear Cell Bank in Hong Kong and Treatment of Neonatal Cerebral Ischemia and Anaemia	Internships and Postdoctoral Fellowships	01/10/2017	31/03/2021	3,051,431
	A Pilot Study on Developing A One-step Thawing Method on Human Blastocysts with Transcriptomic and Methylomic Comparison to Conventional Vitrified-thawing Method	Food and Health Bureau – Health and Medical Research Fund	01/10/2021	30/09/2023	929,940
	Netrin-1促進子宮內膜異位症發生發展及其介導疼痛敏化的作用機制研究	National Natural Science Foundation of China	01/01/2020	31/12/2023	RMB 530,000
	Dysregulation of Retinoic Acid Homeostasis and Signaling in Fetal Islet Development under Maternal Diabetic or High Glucose Conditions	Research Grants Council – General Research Fund	01/01/2020	30/06/2022	770,053
	宮腔液外泌體MicroRNA介導子宮內膜炎反應的機制初探	National Natural Science Foundation of China	01/10/2019	30/09/2022	RMB 100,000

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Ronald Wang	Evaluation of Aspirin Non-responsiveness in Preeclampsia Prevention: A Pharmacometabolomics Approach	Food and Health Bureau – Health and Medical Research Fund	01/08/2019	31/01/2021	989,600
	Do Endometrial Leucocytes and Angiogenesis in the Peri-implantation Period Predict Hypertensive Disorders in the Subsequent Pregnancy?	Food and Health Bureau – Health and Medical Research Fund	01/08/2019	31/01/2021	477,196
	A Double Blinded, Randomized Placebo Controlled Trial on Effect of Traditional Chinese Medicine Formula Wuzi Yanzong Pill on Improving Semen Qualities in Men with Sub-optimal Parameters	Food and Health Bureau – Health and Medical Research Fund	01/05/2019	30/04/2022	1,114,156
	Cervicovaginal Fluid Biomarker for the Identification of Spontaneous Preterm Birth	Innovation and Technology Commission – Innovation and Technology Fund	01/04/2018	30/06/2021	1,870,200
	Cervicovaginal Fluid Biomarker for the Identification of Spontaneous Preterm Birth	Innovation and Technology Commission – Re-industrialisation Funding Scheme	01/04/2018	30/06/2021	1,911,000

Publications

A. Journal Papers

- Chen X, Man GCW, Hung SW, Zhang T, Fung LWY, Cheung CW, Chung JPW, Li TC, Wang CC. Therapeutic effects of green tea on endometriosis. *Critical Reviews in Food Science and Nutrition*. Published online 2021. doi:10.1080/10408398.2021.1986465. (Review, Epub ahead of print)
- Hung SW, Zhang R, Tan Z, Chung JPW, Zhang T, Wang CC. Pharmaceuticals targeting signaling pathways of endometriosis as potential new medical treatment: A review. *Medicinal Research Reviews*. 2021;41(4):2489-2564. doi:10.1002/med.21802. (Review)
- Tam C, Rao S, Waye MMY, Ng TB, Wang CC. Autophagy signals orchestrate chemoresistance of gynecological cancers. *Biochimica et Biophysica Acta - Reviews on Cancer*. 2021;1875(2). doi:10.1016/j.bbcan.2021.188525. (Review)
- Li J, Wu Q, Ng EHY, Mol BWJ, Wu XK*, Wang CC. Effects of medicines and supplements on spontaneous pregnancy and semen parameters in male infertility: A systematic review update and network meta-analysis. *Engineering*. 2021 (Accepted) doi: 10.1016/j.eng.2021.07.009. (Review, In press)

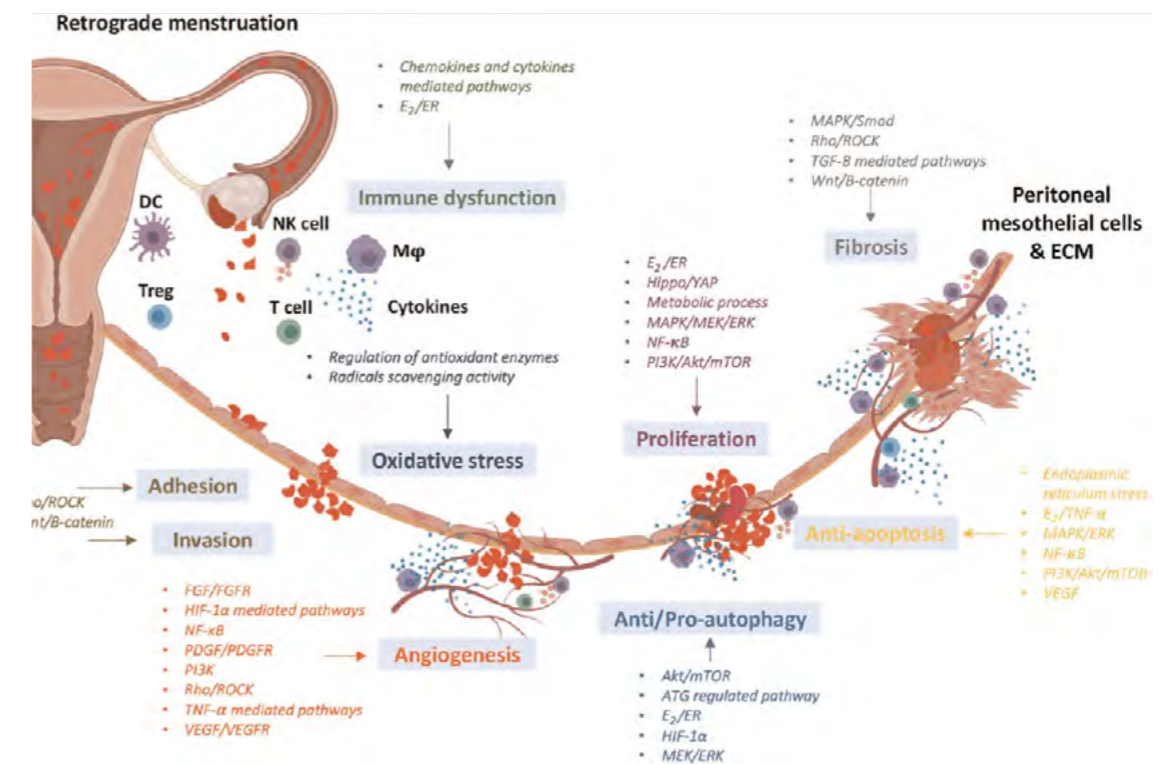
- Hung SW, Liang B, Gao Y, Zhang R, Tan Z, Zhang T, Chung PWJ, Chan TH, Wang CC. An In-Silico, In-Vitro and In-Vivo combined approach to identify NMNATs as potential protein targets of ProEGCG for treatment of endometriosis. *Frontiers in Pharmacology*. 2021;12. doi:10.3389/fphar.2021.714790.
- Li X, Milosavljevic A, Elsea SH, Wang CC, Scaglia F, Syngelaki A, Nicolaidis KH, Poon LC. Effective aspirin treatment of women at risk for preeclampsia delays the metabolic clock of gestation. *Hypertension*. Published online 2021:1398-1410. doi:10.1161/hypertensionaha.121.17448. (Epub ahead of print)
- Zhao Y, Man GCW, Wang J, Liu Y, Kwong J, Zhang T, Chung JPW, Wang CC, Chen X, Li TC. The identification of endometrial immune cell densities and clustering analysis in the mid-luteal phase as predictor for pregnancy outcomes after IVF-ET treatment. *Journal of Reproductive Immunology*. 2021;148. doi:10.1016/j.jri.2021.103431.
- Zhao Y, Man GCW, Chan LKY, Guo X, Liu Y, Zhang T, Kwong J, Wang CC, Chen X, Li TC. Multiplexed fluorescent immunohistochemical staining of four endometrial immune cell types in recurrent miscarriage. *Jove-journal of Visualized Experiments*. 2021;(174). doi:10.3791/62931.
- He Y, Hung SW, Liang B, Zhang R, Gao Y, Chu CY, Zhang T, Xu H, Chung JPW, Wang CC. Receptor tyrosine kinase inhibitor sunitinib as novel immunotherapy to inhibit myeloid-derived suppressor cells for treatment of endometriosis. *Frontiers in Immunology*. 2021;12. doi: 10.3389/fimmu.2021.641206.
- Wu Q, Li J, Ng EHY, Liu JP, Mol BWJ, Wu XK, Wang CC, Kuang HY, Ma HL, Gao JS, Hou LH, Hu ZX, Shao XG, Ge J, Zhang JF, Xue HY, Xu XF, Liang RN, Ma HX, Yang HW, Huang DM, Sun Y, Hao CF, Du SM, Ding CF, Gao YQ, Wu TX, Stener-Victorin E, Zhang H, Legro RS. Do baseline AMH levels in women with polycystic ovary syndrome predict ovulation rate and time to ovulation: A secondary analysis of PCOSAct trial? *BJOG-An International Journal of Obstetrics and Gynaecology*. 2021;128(9):1477-1486. doi:10.1111/1471-0528.16742.
- Mao D, Cao H, Shi M, Wang CC, Kwong J, Li JJX, Hou Y, Ming X, Lee HM, Tian XY, Wong CK, Chow E, Kong APS, Lui VWY, Chan PKS, Chan JCN. Increased co-expression of PSMA2 and GLP-1 receptor in cervical cancer models in type 2 diabetes attenuated by exendin-4: A translational case-control study. *EBioMedicine*. 2021;65. doi:10.1016/j.ebiom.2021.103242.
- Wu L, Song Y, Zhang Y, Liang B, Deng Y, Tang T, Ye YC, Hou HY, Wang CC. Novel genetic variants of PPAR gamma 2 promoter in gestational diabetes mellitus and its molecular regulation in adipogenesis. *Frontiers in Endocrinology*. 2021;11. doi: 10.3389/fendo.2020.499788.

B. Book / Book Chapter

- He Y, Hung KSW, Xu H, Wang CC. Chapter 18: Immunosuppression and immunotherapy in endometriosis: Review of pathophysiology, recent development and future perspectives. In: Mor G and Koga K, ed. *Immunology of Endometriosis: Pathogenesis and Management Volume 2*. Elsevier; 2021: 271-296.
- Zhang T, Li TC, Chung JPW, Wang CC. Chapter 6: Auto-immunity factors: Evidence, mechanism and therapeutic potential. In: *Immunology of Endometriosis: Etiology and Management*. Koga K and Mor G, ed. Elsevier; 2021: 85-104.

C. Patents

- Inventors: 黃志超、張睿喆、耿科、李業菁、李百靈、高峻
Title: 基於 OCT 的子宮內膜檢測分析方法、裝置、設備及存儲介質
SIPO 202110760679.4
Publication No.: CN113520317A
Publication Date: 22 October 2021
- Umbilical cord blood mononuclear cells and red cell fraction improve neurogenesis and behavioral recovery after hypoxia-ischemic brain damage. US patent US 63/211,946.
- Inventors: 黃志超、張睿喆、耿科、李業菁、李百靈、高峻
Title: 無創 OCT 直接應用於子宮內膜的檢測方法、設備及系統
SIPO 202110567731.4
Publication No.: CN113273968A
Publication Date: 20 August 2021



Pathophysiology of endometriosis. The schematic diagram was created using BioRender.com. Akt, protein kinase B; ATG, autophagy-related genes; DC, dendritic cells; E2, estrogen; ECM, extracellular matrix; ER, estrogen receptor; ERK, extracellular signal-regulated kinase; FGF, fibroblast growth factor; FGFR, fibroblast growth factor receptors; HIF, hypoxia-inducible factors; Mφ, macrophages; MAPK, mitogen-activated protein kinase; MEK, ERK kinase; mTOR, mammalian target of rapamycin; NF-κB, nuclear factor κB; NK, natural killer; PDGF, platelet-derived growth factor; PDGFR, platelet-derived growth factor receptor; PI3K, phosphoinositide 3-kinases; Rho, Ras homolog family; ROCK, Rho-associated coiled-coil kinase; VEGF, vascular endothelial growth factor; TGF, transforming growth factor; TNF, tumor necrosis factor; Treg, regulatory T cells; Wnt, wingless-type mouse mammary tumor virus integration site family; YAP, Yes-associated protein.

Source: Hung SW, Zhang R, Tan Z, Chung JPW, Zhang T, Wang CC. *Pharmaceuticals targeting signaling pathways of endometriosis as potential new medical treatment: A review. Medicinal Research Reviews*. 2021;41(4):2489-2564. doi:10.1002/med.21802.