a

.

n

.



DIABETES AND OBESITY

糖尿病與肥胖症研究





Principal Investigator Juliana Chan

Team members

Ronald Ma, Alice Kong, Andrea Luk, Elaine Chow, Wing Yee So, Hongjiang Wu, Aimin Yang, Juliana Lui, Risa Ozaki, Kitty Cheung, Cadmon Lim, Stephanie Cheung, Phyllis Kwong, Eric Lau, Heung-Man Lee, Ming Wai Poon, Claudia Tam, Natural Chu, Baoqi Fan, Noel Ng, Mei Shi, Alex Ng, Emily Poon, Tony O, Ho Lam Hui, Hou Yong, Jamie Cheung, Sandra Choi, Yingnan Fan, Jia He, Wang Ke, James Ling, Tsz Fung Tsoi, Gechang Yu, Tianjiao Yuan, Rebecca Yue, Yingchai Zhang, Xinge Zhang, Andy Kuo, Chun Hei Tam, Huanyi Cao, Chuiguo Huang, Qiao Jin, Kit Ying Tsoi, Sylvia Qiu, Kwun Kiu Wong

RESEARCH PROGRESS SUMMARY

Using Data Science to Monitor Trends, Identify Unmet Needs and Ensure Safe and Cost-effective Use of Medicines

Sing the Hong Kong Diabetes Surveillance Database (HKDSD) curated from the Hospital Authority (HA) Electronic Medical Record (EMR) system, consisting of 4 million people who ever had blood glucose measurement (2000-2019), the research team identified 0.8 million people with diabetes. During these 2 decades, they have observed the declining trends of all-cause death and cardiovascular diseases, limb amputation and tuberculosis in people with diabetes. In a recent report including 21 million deaths during 0.5 billion person-years of follow-up among people with diagnosed diabetes from 16 high-income countries/ areas with national or territory-wide databases, Hong Kong had the largest decrement in death rate with 4% per year resulting in 70% drop in death rate from 3% per year in 2000 to 1.3% per year in 2016.

However, this improvement was not observed in patients with young-onset diabetes (YOD, diagnosed before the age of 40) who had a standardised mortality ratio of 5-8 compared to that of their peers without diabetes. The research team further quantified the amplifying effects of the early age of diagnosis on the risk of end-stage kidney disease (ESKD) which is one of the costliest diseases with extremely poor quality of life. With the territory-wide reform of diabetes care service in 2000 focusing on regular assessment and education together with the availability of new glucose-lowering drugs with low risk of hypoglycemia and weight gain, they observed overall improvement in glycemic control amongst their patients in 2000-2016. However, this improvement was less evident in patients with YOD. These worrying trends were accompanied by the rising trend of diabetes in people under the age of 40 despite the declining or stabilising trends in people of older age. In the HKDSD, 1 million people were found to have prediabetes based on laboratory values. Using modelling, they estimated that 90% of people with prediabetes might develop diabetes and cardiovascular disease during their lifetime especially young people with prediabetes.

Using the HKDSD and Hong Kong Diabetes Register (HKDR) established since 1995, the team had reported the benefits of metformin and renin-angiotensin system inhibitors (RASi) which are used extensively, albeit not universally, to treat diabetes and hypertension respectively. Using this real-world evidence (RWE), they also observed the reduced risk of pneumonia and cancer in patients treated with these two drugs. For the first time, they have comprehensively demonstrated the renoprotective effects of metformin and RASi in patients with advanced chronic kidney disease in whom the risk-benefit ratio of using these two drugs had been an ongoing debate. In the Joint Asia Diabetes Evaluation (JADE) Register with over 100,000 patients enrolled from 11 countries/areas in Asia established since 2007, they also reported the safety and effectiveness of sulphonylureas (SU) in patients with type 2 diabetes managed in a broad range of settings.

Although randomised clinical trials and metaanalysis have confirmed the cardiovascularrenal benefits of some new drugs, these data are applicable mainly in high-risk patients with diabetes and complications and/or multiple risk factors, with a paucity of similar data in the majority of patients without complications and notably young people. Against a backdrop of aging, a rising trend of YOD and improved survival from cardiovascular disease, critical illnesses such as cancer, ESKD and pneumonia will become the top causes of death. In this light, the research team also reported the risk associations of glycemic burden and variability with all-cancer events in patients with over 10 years of diabetes. Taken together, their data has reaffirmed the importance of using data to stratify risk and control all risk factors early to reduce cardiovascular-renal-cancer events and all-cause death. Given the large number of people affected by diabetes, the early introduction and persistent use of highly affordable old medications such as metformin, SU, RASi and statin with long safety record, will have huge potential to improve the

sustainability of their healthcare system.

Using Precision Medicine to Predict, Classify and Personalise Care in Young Onset Diabetes

In their ongoing PRISM Project (Precision Medicine to Redefine Insulin Secretion and Monogenic Diabetes in Chinese Patients with Young Onset Diabetes) commissioned by the Health and Medical Research Fund (HMRF), they have completed the recruitment of 884 patients with YOD. Of these, 442 were randomised to receive multidisciplinary care guided by clinical and biogenetic markers. In this project, they have discovered the multicausality of YOD including autoimmunity, common and rare genetic variants, life-course factors (e.g., low birth weight, childhood obesity), hormonal (e.g. Cushing's syndrome) and pancreatic diseases (e.g. pancreatitis) as well as other psychological-behavioural and familial factors (e.g. chronic hepatitis B infection or hemoglobinopathy). These factors interact in a complex manner resulting in different clinical presentations at different ages with diverse outcomes. This 3-year project will not only provide new insights into the complexity of YOD but also evaluate the costeffectiveness of team-based personalised care with improved precision of diagnosis aimed at empowering both patients and care providers to make shared decisions as compared with usual care. The results of this pragmatic project will have important implications for the future implementation of genomic medicine in this growing population of patients with YOD with many unmet needs.

Using the available biobanks of their prospective cohorts, the PRISM project has enabled them to use biomarkers to reclassify diabetes based on their indexes of insulin resistance and deficiency (HOMA) for predicting the onset of diabetes and progression to insulin requirement. By applying whole genome sequencing and whole exome sequencing to their case-control and affected-sib-pair cohorts, they shall provide novel insights into the molecular basis of YOD in the Chinese population. Notwithstanding the importance of gathering biomedical evidence, they are also conducting epidemiological analysis to evaluate patient-reported outcomes (e.g. quality of life, depression, distress, etc.) and cognitive-psychological-behavioural factors (e.g. diet, exercise, sleep) which are important determinants of outcome. This is accompanied by the conduct of randomised clinical trials where they used a multicomponent

and multidisciplinary approach to improve the outcomes and quality of life of people with or at risk of having diabetes and its complications.

From Treatment to Prevention

Globally, nearly 500 million people have diabetes and 300 million have prediabetes which are the root causes of many critical illnesses. While public health measures are needed to improve our ecosystem, promote a healthy lifestyle, improve health literacy, and reduce social disparity, there is a need to identify the 20-30% of people who are at extremely high risk of developing diabetes or its complications due to genetic or life course factors. Using the JADE Register, the research team reported for the first time the interactions between positive family history and healthy lifestyle and selfmanagement in delaying the onset of diabetes and improving risk factor control. Using their extensive biobanks and databases, they have developed genetic risk scores to identify people at high risk of progression to diabetes and similarly, those at high risk of developing complications who can benefit from early intervention to change the trajectory of their clinical course. In collaboration with the HA Data Collaboration Laboratory, the data scientists of the team have been using machine learning and data-mining strategies to develop algorithms for identifying high-risk patients attending HA clinics/ hospitals who are at risk of developing diabetes and/or adverse drug reactions (e.g.hypoglycemia and fall). Using a data-driven strategy implemented through the EMR, they aim to translate these findings by alerting physicians to take early actions to prevent diabetes and review medications to maximise benefits and minimise harm.

From Genomic Medicine to Mechanism and Drug Discovery

In their ongoing multi-omic project, they continue to use their biobanks and databases to apply for research grants and develop their students and fellows with academic output aimed at elucidating the genetic regulation of diabetic complications (see Ronald Ma's report in Lab 602). In brief, they have now gained considerable experience and developed pipelines to decode the genomes including sequences and single nucleotide polymorphisms (SNPs) of 30,000 individuals at different stages of the development of diabetes and its complications continuously followed up since 1995. By integrating these multi-omic data with clinical variables including laboratory, drug and hospitalisation data, they have discovered novel biomarkers and molecular signatures in both coding and non-coding regions associated with diabetes and its complication for risk stratification and early intervention.

In their collaborative project with Astra Zeneca, they are making good progress in using long-read and short-read whole genome sequencing data as well as publicly available resources to discover novel pathways implicated in diabetic kidney disease (DKD). By using multiple methods including but not limited to bioinformatics and network analysis, computational biology and Mendelian Randomisation, they have discovered a list of druggable targets for functional studies using different cell models, notably islets and kidneys. In collaboration with other basic scientists within and outside CUHK, they continue to use experimental models to elucidate the role of specific pathway (e.g. SIRT3) in the development of diabetes and fatty liver. Currently, they are using singlecell sequencing to enrich the data granularity for new discoveries. These projects have high translational values and provided huge opportunities to develop their students and fellows which will contribute to the development of their knowledge workers.

Technologies and Therapeutics

In collaboration with the CUHK Phase 1 Clinical Trial Centre, the team has established the insulin/glucose clamp techniques, a gold standard, to evaluate the insulin secretory function and its action in people with or without diabetes in controlled settings. They have developed a strategic partnership with Hua Medicine, a leading pharmaceutical company in China which has developed the first glucokinase activator (GKA), a novel class of glucoselowering drug approved by the regulatory agency in China in 2022 for lowering blood glucose. Using clamp studies, they have been evaluating the glucose-lowering effects of this GKA in patients with monogenic diabetes due to GK mutation, supported by functional studies. The results of this proof-of-concept study have opened a new page for using molecular genetics and targeted treatment as an example of precision medicine in monogenic diabetes. In a phase 3 study, they are evaluating the efficacy and safety of a novel aldose reductase inhibitor in patients with type 2 diabetes and heart failure with preserved ejection fraction (HFpEF). In collaboration with their cardiologist, they are setting up *state-of-the-art* facilities including echocardiogram, cardiopulmonary exercise testing and metabolomic platform

for comprehensive analysis. Given the genetic associations of aldose reductase with diabetic complications, experience with this molecule may offer new opportunities for implementing precision medicine in patients with genetic predisposition.

The launching of the continuous glucose monitoring (CGM) system lasting for 7-14 days has transformed diabetes care by providing immediate biofeedback to patients with diabetes for corrective actions. Supported by a local biotechnological company, the team has the opportunity to evaluate a novel CGM system lasting for 28 days, supported by the Innovation and Technology Commission (ITC). Through this project, they have developed expertise in evaluating CGM systems and since then has been supported by several grants to evaluate other CGM systems in patients including those with patients with type 1 diabetes, DKD and people with prediabetes for improving clinical outcome.

Their previous animal-based mechanistic studies have revealed the multi-omic effects of 2 multicomponent Chinese Medicine (CM) formulae with improved beta cell function and insulin resistance. Supported by a CUHK strategic grant, they were able to confirm the glucoselowering effect of a novel CM formulation (Jinmai, JM[®]) with possible remission in people with prediabetes. Taking this project forward, they have been funded by the ITC to use Western methodologies to evaluate the clinical and multi-omic effects of JM[®]) in people with early type 2 diabetes. This study will be supplemented by a pharmacokinetic (PK) and pharmacodynamic (PD) study in volunteers for evaluating possible drug-herb interactions. By using standard methodologies employed in Western medicine, they aim to develop JM[®] into an evidence-based therapy for prevention, treatment and possible remission of type 2 diabetes. In the same vein, given the importance of nutrition in health and disease, they are applying this experimental principle to evaluate the multi-omic effects of functional foods and drug-food interactions including changes in microbiota and their impacts on internal milieu and energy metabolism.

Knowledge Transfer, International Profile and People Development

As an International Diabetes Federation (IDF) Centre of Excellence in Diabetes Care, the research team continue to build professional capacity through their bi-annual Master, Diploma and Certificate Courses in Endocrinology, Diabetes and Metabolism and their annual Hong Kong Diabetes and Cardiovascular Risk Factor – East Meets West Symposium organised by the Hong Kong Institute of Diabetes and Obesity to promulgate the latest advances, share best practices and foster collaborations. Supported by multiple parties including the Hong Kong Jockey Club, they have been organising activities including online lectures by professionals and patient stories to educate and empower lay people and patients to protect their health and prevent disease through selfmanagement and informed decision-making (http://hkido.cuhk.edu.hk/).

By combining research, practice, and education, the CUHK had been ranked the first in Asia for diabetes and endocrinology for 3 consecutive years by US News. In the last 12 months, the achievements of the team continue to be recognised locally, regionally, and internationally through their major grants, teaching and research awards, named lectureships, prestigious research fellowships and research assistant professorships, while several of their research associates have also been awarded the CU postdoctoral fellowships through competitive bidding.

All principal investigators (PIs) are serving on editorial boards of leading diabetes journals and committees of international organisations in the field of diabetes, obesity, and related disease. Besides, all PIs play leadership roles in conducting regional and international surveys, cardiovascular-renal outcome trials, or formulating practice guidelines and recommendations with publications in leading journals. Some examples include 1) Diabetes Atlas by IDF (Juliana Chan, Ronald Ma, Andrea Luk); 2) Practice guidelines by Kidney Disease Improving Global Outcome (KDIGO) Workgroup (Juliana Chan); 3) Precision medicine for diabetes and diabetic complications by American Diabetes Association (Ronald Ma); 4) International evidence-based guideline for the assessment and management of polycystic ovary syndrome (Ronald Ma); 5) International consensus on standardisation of continuous glucose monitoring in clinical trials (Elaine Chow); 6) Asia-Pacific consensus recommendations for application of continuous glucose monitoring in diabetes management (Alice Kong) and 7) Asia-Pacific evidence-based clinical practice guideline for the use of basal insulin in the management of non-pregnant adults with type 2 diabetes (Alice Kong).

Apart from serving on Health Bureau and HA committees to advise on matters related to diabetes, noncommunicable disease, drug utilisation and development, most PIs are members of grant review committees of ITC, Research Grant Committee (RGC) and HMRF, contributing to the scholastic development in Hong Kong. Given the importance of industry in translating research findings to clinical use, some members also serve on steering committees of global outcome clinical trials and/or provide consultancy to global and regional advisory boards of multinational companies including Amgen, Astra Zeneca, Bayer, Boehringer Ingelheim, Celltrion, Merck, MSD, Novo Nordisk, Sanofi, Pfizer and Viatris.

Their passion is to prevent the preventable and preserve the quality of life of people with or at risk of having diabetes by empowering them to make informed and evidence-based decisions. Thus, in 2022, they have published several press releases to share their latest research findings with the public.

https://www.med.cuhk.edu.hk/pressreleases?tag=diabetes-care

https://www.cpr.cuhk.edu.hk/en/press/cuhk-firstdiscovers-obese-patients-with-diabetes-and-

RESEARCH AND SCHOLARSHIP

Research Awards and Recognitions

Nomo	Details			
Name	Award	Organisation		
CUHK Endocrine and Diabetes Team	Number 1 in Asia for Endocrinology and Metabolism	U.S. News Best Global Universities Rankings		
Alice Kong	Faculty Education Award	Faculty of Medicine, The Chinese University of Hong Kong		
Andrea Luk	The Xiaoren Pan Distinguished Research Award for Epidemiology of Diabetes in Asia			
Elaine Chow	2022 Women's Interprofessional Network of the American Diabetes Association Abstract Award	American Diabetes Association		
Jamie Cheung	Travel Grant Award	58 th European Association for Study of Diabetes Annual Meeting		
Noel Ng	Azziz-Baumgartner Family Early Career Investigator Travel Award	Androgen Excess-PCOS Society 20 th Annual Meeting		
Kit Ying Tsoi	Soi Winner for Young Investigator Poster Presentation Award 22 nd Diabetes and Cardiov Risk Factors East Meets V symposium			
Natural Chu	Runner up for Young Investigator Oral Presentation Award	ral 22 nd Diabetes and Cardiovascular Risk Factors East Meets West symposium		

fluctuating-blood-glucose-control-had-a-highcancer-risk-while-patients-with-diabetes-treated-with-a-common-class-of-blood-pressurelowering-drug/

https://www.med.cuhk.edu.hk/press-releases/ cuhk-study-supports-continuation-of-reninangiotensin-system-inhibitors-rasi-in-patientswith-type-2-diabetes-and-advanced-chronickidney-disease-to-reduce-major-cardiorenalcomplications

On an implementation front, they continue to promote the JADE platform through the Asia Diabetes Foundation (https://www.adf.org. hk/), governed by the CUHK Foundation and implement the JADE-assisted data-driven diabetes prevention and care program at the CUHK Yao Chung Kit Diabetes Assessment Centre under the Hong Kong Institute of Diabetes and Obesity in partnership with the CU Medical Centre.

https://www.cuhkmc.hk/programmes/otherprogrammes/diabetes-risk-assessmentprogramme

http://www.hkido.cuhk.edu.hk/Centres/CUHK-Yao-Chung-Kit-Diabetes-Assessment-Centre



Fellowships

Nama	Details			
Name	Fellowship	Organisation		
Eric Lau	Faculty Postdoctoral Fellowship	Faculty of Medicine, The Chinese University of Hong Kong		
Mei Shi	Faculty Postdoctoral Fellowship	Faculty of Medicine, The Chinese University of Hong Kong		
Baoqi Fan	Faculty Postdoctoral Fellowship	Faculty of Medicine, The Chinese University of Hong Kong		
Kit Ying Tsoi	Faculty Postdoctoral Fellowship	Faculty of Medicine, The Chinese University of Hong Kong		
Ronald Ma	Croucher Senior Medical Research Fellowship	Croucher Foundation		

Academic Editorships

Nome	Details			
Name	Role	Journal		
	International Advisor	The Lancet Diabetes and Endocrinology		
Juliana Chan	Editorial Board Member	Diabetes Metabolism Research Review		
		Journal of Diabetes		
	Expert Editor	Journal of Diabetes Investigation		
Donald Ma	Associate Editor	Diabetologia		
Rundiu Ma	Editorial Doord Mombor	PLOS Medicine		
	Eulonai Board Member	Obesity Reviews		
Alian Kang	Editor-in-chief	Primary Care Diabetes		
Alice Kong	Editorial Board Member	Diabetes Technology & Therapeutics		
Andrea Luk	Associate Editor	Diabetic Medicine		
Elaine Chow	Associate Editor	Primary Care Diabetes		

Grants and Consultancies

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
Juliana Chan	Clinical Safety, Efficacy and Multiomic Evaluation of A Novel Chinese Medicine (cm) Formula in Type 2 Diabetes (T2D): Effects on Beta- Cell Function and Insulin Resistance	Innovation and Technology Commission – Midstream Research Programme for Universities	01/06/2022	30/05/2025	4,966,735
Juliana Chan Ronald Ma	Using Whole Genome Sequencing, Computational Biology and Functional Analysis to Discover Biological Pathways Implicated in Diabetic Kidney Disease	Astra Zeneca Investigator Initiated Study	30/10/2019	30/09/2023	8,918,060

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amo (Hk
Juliana Chan Andrea Luk	Precision Medicine to Redefine Insulin Secretion and Monogenic Diabetes (PRISM) in Chinese Patients with Young Onset Diabetes	Health Bureau – Health and Medical Research Fund	01/09/2019	31/08/2024	8,45
Juliana Chan	Self-managing Healthy Eating & Active Lifestyle For impeding 3-Highs (high blood glucose, high blood pressure and high cholesterol) mobile application (SHEALF3 APP) (renamed as Citybite APP and Chatbot)	Innovation and Technology Fund for Better Living via Asia Diabetes Foundation	01/10/2018	30/09/2022	4,24
	Real World Evidence of Sulphonlyureas Usage in Asian Patients with Type 2 Diabetes - The Joint Asia Diabetes Evaluation (JADE) Register	Servier via Asia Diabetes Foundation	01/03/2021	31/12/2022	1,20
	Using Modern and Traditional Technologies to Redefine and Prevent Young Onset Diabetes	The Chinese University of Hong Kong – Strategic Grant	01/09/2019	30/06/2023	50
	Using Modern and Traditional Technologies to Redefine and Prevent Young Onset Diabetes	The Chinese University of Hong Kong – Funding for Research Sustainability of Major RGC Funding Schemes	01/09/2019	30/06/2023	50
Juliana Chan Elaine Chow	Effects of Dorzagliatin on 1 st Phase Insulin and Beta- Cell Glucose Sensitivity in Individuals eith Impaired and Normal Glucose Tolerance	Hua Medicine Investigator Initiated Study	03/03/2022	03/2023	1,22
Juliana Chan	Aldose Reductase Inhibition for Stabilization of Exercise capacity in Heart Failure (ARISE- HF): A Multicenter, Randomized, Placebo- Controlled Study to Evaluate the Safety and Efficacy of AT-001 in Patients with Diabetic Cardiomyopathy / Stage B Heart Failure at High Risk of Progression to Overt Heart Failure (Stage C Heart Failure)	Applied Therapeutics	01/11/2020	31/12/2025	1,50
Ronald Ma	Unraveling the Link between Maternal Hyperglycaemia and Childhood Obesity: Genome-Wide Methylation Analysis in a Prospective Cohort of Untreated Gestational Disbetos	Research Grants Council – General Research Fund	01/01/2019	30/06/2022	97

✓_____≯

.

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
-	Translating Multi-Omic Discoveries to Transform Diabetes Care and Reduce Diabetic Complications	Research Committee Funding for Research Sustainability of Major Research Grants Council Funding Schemes	01/05/2019	30/04/2024	500,000
	Translating Multi-Omic Discoveries to Transform Diabetes Care and Reduce Diabetic Complications	Research Grants Council – Research Impact Fund	01/05/2019	30/04/2024	8,400,000
	A Nanotechnology Platform for Profiling Diabetes-related MiRNA for Precision Medicine	Innovation and Technology Commission – Midstream Research Programme for Universities	01/06/2021	30/11/2023	4,201,853
Ma	Genomic Medicine in Diabetic Kidney Disease - RMG01	University Grants Committee – Research Matching Grant Scheme	01/06/2020	31/08/2024	3,499,675
	Croucher Senior Medical Research Fellowship	Croucher Foundation	01/05/2021	30/04/2022	2,272,948
	Croucher Senior Medical Research Fellowships, Research Project	Croucher Foundation	01/05/2021	30/04/2023	2,000,000
-	Precision Medicine in Diabetes	The Croucher Foundation – Croucher Senior Medical Research Fellowships, 2020– 2021 – Research Project	01/05/2021	30/04/2023	2,000,000
Andrea Luk	Delineating the Metabolic Architecture and Response to Anti-Hyperglycaemic Drug Treatment in Lean Type 2 Diabetes in Chinese	Research Grants Council – General Research Fund	01/01/2021	31/12/2023	1,178,778
Alice Kong	The Impact of Cognitive Behavioral Therapy (CBT-i) on Glycemic Control in Older Type 2 Diabetes (T2D) Comorbid with Insomnia	Health Bureau – Health and Medical Research Fund	01/09/2021	31/08/2023	1,484,694
Elaine Chow	Subphenotypes of Prediabetes in Chinese and Association with Diet and Gut Microbiota Profiles	Hong Kong College of Physicians – Young Investigator Research Grant	01/10/2021	31/12/2022	49,600
	Continuous Glucose Monitoring as An Adjunct to Lifestyle Modification in Individuals with Impaired Glucose Tolerance: A Randomised Controlled Trial	Health Bureau – Health and Medical Research Fund	01/10/2020	30/09/2023	1,344,796

				>	
Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK\$)
	Effectiveness and Safety Study of the Continuous Glucose Monitoring System (Fibersense) for Home Use (Including In-Clinic Sessions) in Patients with Diabetes	Innovation and Technology Commission – Guangdong- Hong Kong Technology Cooperation Funding Scheme	17/08/2020	16/11/2024	5,674,000
	A Phase 1b/2a Ascending Dose Study of the Safety, Tolerability and Preliminary Efficacy of Sublingual Liraglutide in Patients with Type 2 Diabetes	Innovation and Technology Commission – Partnership Research Programme	01/09/2020	31/05/2023	3,680,203
	Effect of Glucagon-like Peptide 1 Receptor Agonist in Combination with Insulin on Glycaemic Variability and Time-In-Range in Diabetic Kidney Disease: A Randomised Controlled Trial	Health Bureau – Health and Medical Research Fund	03/01/2022	02/01/2025	1,361,740
Elaine Chow	Effects of Dorzagliatin on 1 st Phase Insulin and Beta- Cell Glucose Sensitivity in Individuals with Recent- Onset Type 2 Diabetes and Monogenic Diabetes	The Chinese University of Hong Kong Research Committee – Direct Grant	30/06/2021	30/06/2022	149,600
	Evaluation of Accuracy of Guardian Sensor 3 in Diabetes Patient on Peritoneal Dialysis	Medtronic – External Research Program	01/01/2021	31/3/2022	334,397
	A Multi-center, Randomized, Double- Blinded, Parallel, Vildagliptin and Placebo- Controlled Phase III Clinical Study to Evaluate the Efficacy and Safety of PB-201 in Treatment- naïve Patients with Type 2 Diabetes Mellitus	PegBio Co. Ltd.	12/06/2022	12/06/2024	864,152
	The Impact of High or Low FODMAP diets on Postprandial glucose response and Gut Microbiota in Individuals with Prediabetes treated with Metformin: A Randomized Crossover Controlled-Feeding Trial	Merck Investigator Initiated Clinical Trial	01/11/2022	01/01/2024	669,575
Noel Ng	Long-term Health Impact of Polycystic Ovary Syndrome	Research Grants Council – Postdoctoral Research Fellowship Scheme	02/07/2020	01/07/2023	1,225,800
Noel Ng (Ronald Ma as supervisor)	Evaluation of the Long- Term Healthcare Impact of Polycystic Ovary Syndrome	Health Bureau – Health and Medical Research Fund	01/10/2021	30/09/2023	1,304,136

Publication

A. Journal Papers

- 1. Sun H, Saeedi P, Karuranga S, Pinkepank M, Ogurtsova K, Duncan BB, Stein C, Basit A, Chan JCN, Mbanya JC, Pavkov ME, Ramachandaran A, Wild SH, James S, Herman WH, Zhang P, Bommer C, Kuo S, Boyko EJ, Magliano DJ. IDF diabetes atlas: Global, regional and country-level diabetes prevalence estimates for 2021 and projections for 2045. Diabetes Research and Clinical Practice. 2021;183(109119):109119. doi:10.1016/j.diabres.2021.109119.
- 2. Rossing P, Caramori ML, Chan JCN, Heerspink HJL, Hurst C, Khunti K, Liew A, Michos ED, Navaneethan SD, Olowu WA, Sadusky T, Tandon N, Tuttle KR, Wanner C, Wilkens KG, Zoungas S, de Boer IH. KDIGO 2022 clinical practice guideline for diabetes management in chronic kidney disease. Kidney International. 2022;102(5):S1-S127. doi:10.1016/j.kint.2022.06.008. (Review)
- 3. Rossing P, Filippatos G, Agarwal R, Anker SD, Pitt B, Ruilope LM, Chan JCN, Kooy A, McCafferty K, Schernthaner G, Wanner C, Joseph A, Scheerer MF, Scott C, Bakris GL. Finerenone in predominantly advanced CKD and type 2 diabetes with or without sodium-glucose cotransporter-2 inhibitor therapy. Kidney International Reports. 2022;7(1):36-45. doi:10.1016/j.ekir.2021.10.008.
- 4. Ke C, Narayan KMV, Chan JCN, Jha P, Shah BR. Pathophysiology, Phenotypes and management of type 2 diabetes mellitus in Indian and Chinese populations. Nature Reviews Endocrinology. 2022;18(7):413-432. doi:10.1038/s41574-022-00669-4. (Review)
- 5. Rossing P, Caramori ML, Chan JCN, Heerspink HJL, Hurst C, Khunti K, Liew A, Michos ED, Navaneethan SD, Olowu WA, Sadusky T, Tandon N, Tuttle KR, Wanner C, Wilkens KG, Zoungas S, Craig JC, Tunnicliffe DJ, Tonelli MA, Cheung M. Executive summary of the KDIGO 2022 clinical practice guideline for diabetes management in chronic kidney disease: An update based on rapidly emerging new evidence. Kidney International. 2022;102(5):990-999. doi:10.1016/j.kint.2022.06.013. (Review)
- 6. Jiang G, Luk AO, Tam CHT, Ozaki R, Lim CKP, Chow EYK, Lau ES, Kong APS, Fan B, Hong Kong Diabetes Register TRS Study Group, Lee KF, Siu SC, Hiu G, Tsang CC, Lau KP, Leung JY, Tsang MW, Kam G, Lau IT, Li JK, Yeung VT, Lau E, Lo S, Fung S, Cheng YL, Chow CC, Hong Kong Diabetes Biobank Study Group, Tang NLS, Huang Y, Lan HY, Oram RA, Szeto CC, So WY, Chan JCN, Ma RCW. Clinical predictors and long-term impact of acute kidney injury on progression of diabetic kidney disease in Chinese patients with type 2 diabetes. Diabetes. 2022;71(3):520-529. doi:10.2337/db21-0694.
- 7. Chow E, Chan JCN. The Emerging role of incretins and twincretins. *Nature Reviews Endocrinology*. 2021;18(2):73-74. doi:10.1038/s41574-021-00607-w. (Editorial)
- 8. Cheng F, Luk AO, Shi M, Huang C, Jiang G, Yang A, Wu H, Lim CKP, Tam CHT, Fan B, Lau ESH, Ng ACW, Wong KK, Carroll L, Lee HM, Kong AP, Keech AC, Chow E, Joglekar MV, Tsui SKW, So WY, So HC, Hardikar AA, Jenkins AJ, Chan JCN, Ma RCW, Shortened leukocyte telomere length is associated with glycemic progression in type 2 diabetes: A prospective and mendelian randomization analysis. Diabetes Care. 2022;45(3):701-709. doi:10.2337/dc21-1609.
- 9. Chan JCN, Thewjitcharoen Y, Nguyen TK, Tan A, Chia YC, Hwu CM, Jian D, Himathongkam T, Wong KL, Choi YM, Mirasol R, Mohamed M, Kong APS, Ma RCW, Chow EYK, Ozaki R, Lau V, Fu AWC, Hong EG, Yoon KH. Effect of a web-based management guide on risk factors in patients with type 2 diabetes and diabetic kidney disease. JAMA Network Open. 2022;5(3):e223862. doi:10.1001/ jamanetworkopen.2022.3862.
- 10.Khunti K, Aroda VR, Aschner P, Chan JCN, Del Prato S, Hambling CE, Harris S, Lamptey R, McKee M, Tandon N, Valabhji J, Seidu S. The impact of the COVID-19 pandemic on diabetes services: Planning for a global recovery. The Lancet Diabetes & Endocrinology. 2022;10(12):890-900. doi:10.1016/s2213-8587(22)00278-9. (Editorial)
- 11. Chu N, Chan JCN, Chow E. A diet high in FODMAPs as a novel dietary strategy in diabetes? Clinical Nutrition. 2022;41(10):2103-2112. doi:10.1016/j.clnu.2022.07.036. (Review)
- 12.Wu H, Lau ESH, Yang A, Zhang X, Ma RCW, Kong APS, Chow E, So WY, Chan JCN, Luk AOY. Data resource profile: The Hong Kong diabetes surveillance database (HKDSD). International Journal of Epidemiology. 2021;51(2):e9-e17. doi:10.1093/ije/dyab252

- 13.Lim LL, Chow E, Chan JCN. Cardiorenal diseases in type 2 diabetes mellitus: Clinical trials and reals41574-022-00776-2. (Review, Epub ahead of print)
- fendo.2022.857090. (Review)
- j.diabres.2022.110030.
- (Commentary)
- 17. Shi M, Yang A, Chow E, Lau ESH, Tam CHT, Kong APS, Luk AOY, Ma RCW, Cheung CMT, Chan ahead of print)
- 18. Cao H, Chung ACK, Ming X, Mao D, Lee HM, Cao X, Rutter GA, Chan JCN, Tian XY, Kong APS. Molecular Metabolism. 2022;60:101493. doi:10.1016/j.molmet.2022.101493.
- 919. doi:10.1093/abm/kaab114.
- 21.Ling J, Ng JKCC, Lau ESH, Ma RCW, Kong APS, Luk AOY, Kwok JSS, Szeto CC, Chan JCN, j.ekir.2022.03.029. (Review)
- Diseases. 2022;80(2):196-206.e1. doi:10.1053/j.ajkd.2021.11.011.
- 23. Wang K, Shi M, Huang C, Fan B, Luk AOY, Kong APS, Ma RCW, Chan JCN, Chow E. Evaluating analysis. Cardiovascular Diabetology. 2022;21(1):192. doi:10.1186/s12933-022-01613-6.
- 24. Fan B, Wu H, Shi M, Yang A, Lau ESH, Tam CHT, Mao D, Lim CKP, Kong APS, Ma RCW, Chow E, and Reviews. 2022;38(5):e3525. doi:10.1002/dmrr.3525.
- modeling study. PLoS Medicine. 2022;19(7):e1004045. doi:10.1371/journal.pmed.1004045.
- 26.He Q, Bennett AN, Fan B, Han X, Liu J, Wu KCH, Huang R, Chan JCN, Chan KHK. Assessment of

world practice. Nature Reviews Endocrinology. Published online November 29, 2022. doi:10.1038/

14.Chu N, Chan JCN, Chow E. Pharmacomicrobiomics in Western medicine and traditional Chinese medicine in type 2 diabetes. Frontiers in Endocrinology. 2022;13:857090. doi:10.3389/

15.Fan Y, S.H Lau E, Wu H, Yang A, Chow E, So WY, P.S Kong A, C.W Ma R, C.N Chan J, O.Y Luk A. Incidence of long-term diabetes complications and mortality in youth-onset type 2 diabetes: A systematic review. Diabetes Research and Clinical Practice. 2022;191:110030. doi:10.1016/

16. Wang K, Shi M, Yang A, Tomlinson B, Chan JCN, Chow E. Comment on Dawed et al. Genomewide meta-analysis identifies genetic variants associated with glycemic response to sulfonylureas. Diabetes Care. 2021;44:2673-2682. Diabetes Care. 2022;45(4):e80-e81. doi:10.2337/dc21-2428.

JCN, Chan AWS. Genetic susceptibility of dipeptidyl Peptidase-4 inhibitor associated bullous pemphigoid in Chinese patients with type 2 diabetes. Journal of the European Academy of Dermatology and Venereology. Published online November 25, 2022. doi:10.1111/jdv.18762. (Epub

Autotaxin signaling facilitates β Cell dedifferentiation and dysfunction induced by sirtuin 3 deficiency.

19. Ayala GX, Chan JCN, Cherrington AL, Elder J, Fisher EB, Heisler M, Howard AG, Ibarra L, Parada H, Safford M, Simmons D, Tang TS. Predictors and effects of participation in peer support: A prospective structural equation modeling analysis. Annals of Behavioral Medicine. 2022;56(9):909-

20. Prigge R, McKnight JA, Wild SH, Haynes A, Jones TW, Davis EA, Rami-Merhar B, Fritsch M, Prchla C, Lavens A, Doggen K, Chao S, Aronson R, Brown R, Ibfelt EH, Svensson J, Young R, Warner JT. Robinson H. Laatikainen T. International comparison of glycaemic control in people with type 1 diabetes: An update and extension. Diabetic Medicine. 2021;39(5):e14766. doi:10.1111/dme.14766.

Chow E. Continuous glucose monitoring metrics in the assessment of glycemia in moderate-toadvanced CKD in diabetes. Kidney International Reports. 2022;7(6):1354-1363. doi:10.1016/

22. Jin O, Luk AO, Lau ESH, Tam CHT, Ozaki R, Lim CKP, Wu H, Jiang G, Chow EYK, Ng JK, Kong APS, Fan B, Lee KF, Siu SC, Hui G, Tsang CC, Lau KP, Leung JY, Tsang M, Kam G. Nonalbuminuric diabetic kidney disease and risk of all-cause mortality and cardiovascular and kidney outcomes in type 2 diabetes: Findings from the Hong Kong Diabetes Biobank. American Journal of Kidney

the impact of glucokinase activation on risk of cardiovascular disease: A Mendelian randomisation

Luk AOY, Chan JCN. Associations of the HOMA2-%B and HOMA2-IR with progression to diabetes and glycaemic deterioration in young and middle-aged Chinese. Diabetes/Metabolism Research

25. Zhang X, Wu H, Fan B, Shi M, Lau ESH, Yang A, Chow E, Kong APS, Chan JCN, Ma RCW, Luk AOY. Lifetime risk of developing diabetes in Chinese people with normoglycemia or prediabetes: A

bidirectional relationships between leisure sedentary behaviors and neuropsychiatric disorders: A two-sample Mendelian randomization study. Genes. 2022;13(6):962. doi:10.3390/genes13060962.

- 27. Yang A, Wu H, Lau ESH, Shi M, Fan B, Kong APS, Ma RCW, Luk AOY, Chan JCN, Chow E. Effects of RAS inhibitors on all-site cancers and mortality in the Hong Kong Diabetes Surveillance Database (2002-2019). eBioMedicine. 2022;83:104219. doi:10.1016/j.ebiom.2022.104219.
- 28. Yang A, Lau ESH, Wu H, Ma RCW, Kong APS, So WY, Luk AOY, Fu AWC, Chan JCN, Chow E. Attenuated risk association of end-stage kidney disease with metformin in type diabetes with eGFR categories 1-4. Pharmaceuticals. 2022;15(9):1140. doi:10.3390/ph15091140.
- 29. Wang K, Yang A, Shi M, Tam CCH, Lau ESH, Fan B, Lim CKP, Lee HM, Kong APS, Luk AOY, Tomlinson B, Ma RCW, Chan JCN, Chow E. CYP2C19 loss-of-function polymorphisms are associated with reduced risk of sulfonylurea treatment failure in Chinese patients with type 2 diabetes. Clinical Pharmacology and Therapeutics. 2022;111(2):461-469. doi:10.1002/cpt.2446.
- 30. Mao D, Lau ESH, Wu H, Yang A, Fan B, Shi M, Tam CHT, Chow E, Kong APS, Ma RCW, Luk A, Chan JCN. Risk associations of glycemic burden and obesity with liver cancer - A 10-year analysis of 15,280 patients with type 2 diabetes. Hepatology Communications. 2022;6(6):1350-1360. doi:10.1002/hep4.1891.
- 31. Magliano DJ, Chen L, Carstensen B, Gregg EW, Pavkov ME, Salim A, Andes LJ, Balicer R, Baviera M, Chan JCN, Cheng YJ, Gardiner H, Gulseth HL, Gurevicius R, Ha KH, Jermendy G, Kim DJ, Kiss Z, Leventer-Roberts M, Lin CY, Luk AOY, Ma S, Mata-Cases M, Mauricio D, Nichols GA, Pildava S, Porath A, Read SH, Robitaille C, Roncaglioni MC, Lopez-Doriga Ruiz P, Wang KL, Wild SH, Yekutiel N, Shaw JE. Trends in all-cause mortality among people with diagnosed diabetes in highincome settings: A multicountry analysis of aggregate data. The Lancet Diabetes & Endocrinology. 2022;10(2):112-119. doi:10.1016/s2213-8587(21)00327-2.
- 32. Jin Q, Lau ESH, Luk AOY, Ozaki R, Chow EYK, So T, Yeung T, Loo K, Lim CKP, Kong APS, So WY, Jenkins AJ, Chan JCN, Ma RCW. Skin autofluorescence is associated with progression of kidney disease in type 2 diabetes: A prospective cohort study from the Hong Kong Diabetes Biobank. Nutrition, Metabolism and Cardiovascular Diseases. 2022;32(2):436-446. doi:10.1016/ j.numecd.2021.10.007.
- 33.Lim L, Lau ESH, Cheung JTK, Chan SP, Ji L, Lim S, Sirinvaravong S, Unnikrishnan AG, Luk AOY, Cortese V, Durocher A, Chan JCN. Real-world usage of sulphonylureas in Asian patients with type 2 diabetes using the joint Asia diabetes evaluation (JADE) register, Diabetes, Obesity and Metabolism. 2023;25(1):208-221. doi:10.1111/dom.14865. (Epub ahead of print)
- 34. Thewjitcharoen Y, Nakasatien S, Tsoi TF, Lim CKP, Himathongkam T, Chan JCN. Hypertriglyceridemia as a main feature associated with 17g12 deletion syndrome-related hepatocyte nuclear factor 1β-maturity-onset diabetes of the young. Endocrinology, Diabetes & Metabolism Case Reports. 2022;2022:22-0297. doi:10.1530/edm-22-0297. (Epub ahead of print)
- 35. Cheng F, Luk AO, Wu H, Tam CHT, Lim CKP, Fan B, Jiang G, Carroll L, Yang A, Lau ESH, Ng ACW, Lee HM, Chow E, Kong APS, Keech AC, Joglekar MV, So WY, Hardikar AA, Chan JCN, Jenkins AJ, Ma RCW. Relative leucocyte telomere length is associated with incident end-stage kidney disease and rapid decline of kidney function in type 2 diabetes: Analysis from the Hong Kong Diabetes Register. Diabetologia. 2022;65(2):375-386. doi:10.1007/s00125-021-05613-1.
- 36.Cheung JTK, Lau E, Tsui CCT, Siu ELN, Tse NKW, Hui NYL, Ma RCW, Kong APS, Fu A, Lau V, Jia W. Sheu WHH. Sobrepena L. Yoon KH. Tan ATB. Chia YC. Sosale A. Saboo BD. Kesavadev J. Goh SY. Combined associations of family history and self-management with age at diagnosis and cardiometabolic risk in 86,931 patients with type 2 diabetes: Joint Asia Diabetes Evaluation (JADE) Register from 11 countries. BMC Medicine. 2022;20(1):249. doi:10.1186/s12916-022-02424-y.
- 37. Chow E, Wang K, Lim CK, Tsoi ST, Fan B, Poon E, Luk AO, Ma RC, Ferrannini E, Mari A, Chen L, Chan JC. Dorzagliatin, a dual-acting glucokinase activator, increases insulin secretion and glucose sensitivity in glucokinase-maturity-onset diabetes of the young (GCK-MODY) and recent-onset type 2 diabetes. Diabetes. Published online October 28, 2022:db220708. doi:10.2337/db22-0708. (Epub ahead of print)
- 38.Lim LL, Lau ESH, Ozaki R, So TTY, Wong RYM, Chow EYK, Ma RCW, Luk AOY, Chan JCN, Kong APS. Team-based multicomponent care improved and sustained glycaemic control in obese people with type 2 diabetes (T2D) in a diabetes centre setting: A guality improvement program with guasiexperimental design. Diabetes Research and Clinical Practice. 2022;194:110138. doi:10.1016/ j.diabres.2022.110138.

- Research and Clinical Practice. 2022;193:110118. doi:10.1016/j.diabres.2022.110118.
- 2022;185:109233. doi:10.1016/j.diabres.2022.109233.
- 41. Huang C, Shi M, Wu H, Luk AOY, Chan JCN, Ma RCW. Human serum metabolites as potential Mendelian randomization study. Metabolites. 2022;12(7):598. doi:10.3390/metabo12070598.
- j.diabres.2022.110203. (Epub ahead of print)
- 43. Zhang X, Wu H, Fan B, Shi M, Lau ESH, Yang A, Chow E, Kong APS, Chan JCN, Ma RCW, Luk (Epub ahead of print)
- Pacific. 2022;26. doi:10.1016/j.lanwpc.2022.100509.
- eClinicalMedicine. 2023;55:101751. doi:10.1016/j.eclinm.2022.101751. (Epub ahead of print)
- 46.Mao D, Lau ESH, Wu H, Yang A, Shi M, Fan B, Tam CHT, Chow E, Kong APS, Ma RCW, Luk A, Regional Health - Western Pacific. 2022;18:100315. doi:10.1016/j.lanwpc.2021.100315.
- 2022;189:109969. doi:10.1016/j.diabres.2022.109969.
- 48. Tomic D, Morton JI, Chen L, Salim A, Gregg EW, Pavkov ME, Arffman M, Balicer R, Baviera M, ahead of print)
- 49. Mahajan A, Spracklen CN, Zhang W, Ng MCY, Petty LE, Kitajima H, Yu GZ, Rüeger S, Speidel 2022;54(5):560-572. doi:10.1038/s41588-022-01058-3.
- 0016. (Biographical)
- better? Science Bulletin. 2022;67(23):2392-2394. doi:10.1016/j.scib.2022.11.025. (Commentary)

39. Wang K, Shi M, Yang A, Fan B, Tam CHT, Lau E, Luk AOY, Kong APS, Ma RCW, Chan JCN, Chow E. GCKR and GCK polymorphisms are associated with increased risk of end-stage kidney disease in Chinese patients with type 2 diabetes: The Hong Kong Diabetes Register (1995–2019). Diabetes

40. Yang A, Shi M, Wu H, Lau ES, Fan B, Kong AP, Ma RC, Luk AO, Chan JC, Chow E. Time-varying risk associations of renin angiotensin system inhibitors with pneumonia and related deaths in a cohort of 252,616 patients with diabetes (2002-2019). Diabetes Research and Clinical Practice.

mediators from type 2 diabetes and obesity to COVID-19 severity and susceptibility: Evidence from

42. Cheung JTK, Yang A, Wu H, Lau ESH, Shi M, Kong APS, Ma RCW, Luk AOY, Chan JCN, Chow E. Initiation of sodium-glucose cotransporter-2 inhibitors at lower HbA1c threshold attenuates eGFR Decline in type 2 diabetes patients with and without cardiorenal disease: A propensitymatched cohort study. Diabetes Research and Clinical Practice. 2023;195:110203. doi:10.1016/

AOY. The role of age on the risk relationship between prediabetes and major morbidities and mortality: Analysis of the Hong Kong diabetes surveillance database of 2 million Chinese adults. The Lancet Regional Health - Western Pacific. 2023;30:100599. doi:10.1016/j.lanwpc.2022.100599.

44. Yang A, Wu H, Lau ESH, Zhang X, Shi M, Fan B, Ma RCW, Kong APS, Luk AOY, Chan JCN, Chow E. Glucose-lowering drug use, glycemic outcomes, and severe hypoglycemia: 18-year trends in 0.9 million adults with diabetes in Hong Kong (2002–2019). The Lancet Regional Health - Western

45. Yang A, Shi M, Lau ESH, Wu H, Zhang X, Fan B, Kong APS, Luk AOY, Ma RCW, Chan JCN, Chow E. Clinical outcomes following discontinuation of renin-angiotensin-system inhibitors in patients with type 2 diabetes and advanced chronic kidney disease: A prospective cohort study.

Chan JCN. Risk associations of long-term HbA1c variability and obesity on cancer events and cancer-specific death in 15,286 patients with diabetes - A prospective cohort study. The Lancet

47.Ma RCW, Xie F, Lim CKP, Lau ESH, Luk AOY, Ozaki R, Cheung GPY, Lee HM, Ng ACW, Li HW, Wong CKM, Wong SYS, So WY, Chan JCN. A randomized clinical trial of genetic testing and personalized risk counselling in patients with type 2 diabetes receiving integrated care -The genetic testing and patient empowerment (GEM) trial. Diabetes Research and Clinical Practice.

Boersma-van Dam E, Brinks R, Carstensen B, Chan JCN, Cheng YJ, Fosse-Edorh S, Fuentes S, Gardiner H. Gulseth HL. Gurevicius R. Ha KH. Lifetime risk, life expectancy, and years of life lost to type 2 diabetes in 23 high-income jurisdictions: A multinational, population-based study. The Lancet Diabetes & Endocrinology. 2022;10(11):795-803. doi:10.1016/s2213-8587(22)00252-2. (Epub

L, Kim YJ, Horikoshi M, Mercader JM, Taliun D, Moon S, Kwak SH, Robertson NR, Rayner NW, Loh M, Kim BJ, Chiou J, Morris AP, et al. Multi-ancestry genetic study of type 2 diabetes highlights the power of diverse populations for discovery and translation. Nature Genetics. 2022 54:5.

50.Ma RCW, So WY, Luk AOY. Professor Juliana Chung Ngor Chan: Tireless trailblazer for diabetes research, care, and education in Asia. Diabetes Care. 2022;45(10):2207-2216. doi:10.2337/dci22-

51. Chow E, Chan JCN. Targeting postprandial glucose control using ultra-rapid insulins: Is faster

52.Wong KK, Cheng F, Mao D, Lim CKP, Tam CHT, Wang CC, Yuen LY, Chan MHM, Ho CS, Joglekar M V., Hardikar AA, Jenkins AJ, Metzger BE, Lowe WL, Tam WH, Ma RCW. Vitamin D levels during pregnancy are associated with offspring telomere length: A longitudinal mother-child study. *The Journal of Clinical Endocrinology & Metabolism*. 2022;107(9):e3901-e3909. doi:10.1210/clinem/ dgac320.

B. Book / Book Chapters

- 1. Ma RCW, Chan JCN. Implementation of precision genetic approaches for type 1 and 2 diabetes. In: *Precision Medicine in Diabetes*. Springer International Publishing; 2022:111-129.
- 2. Luk AOY, Lim LL. Precision genetics for monogenic diabetes. In: *Precision Medicine in Diabetes*. Springer International Publishing; 2022:131-147.
- 3. Mazze RS, Kong APS, Petrovski G, Basu R. Diabetes technology for precision therapy in children, adults, and pregnancy. In: *Precision Medicine in Diabetes*. Springer International Publishing; 2022:289-304.



Insulin deficiency (ID) and resistance (IR) contribute to progression from normal glucose tolerance to diabetes to insulin requirement. The research team led by Juliana Chan estimated ID and IR using the Homeostasis Model Assessment (HOMA2) using fasting plasma glucose and C-peptide in Chinese

aged 20-50 years without diabetes in community-based setting (1998-2013) and those with diabetes in the Hong Kong Diabetes Register cohort (1995-2014).

The team defined ID as HOMA2-%B below median and IR as HOMA2-IR above median. During 10year follow-up, 62 (17.9%) of 347 community-dwelling participants progressed to T2D. After 8.6 years, 291 (48.1%) of 609 patients with T2D had glycaemic deterioration. The non-ID/IR group and the ID/ IR group had an adjusted odds ratio of 2.47 (95% CI: 1.28, 4.94) and 5.36 (2.26, 12.79), respectively, for incident T2D versus the ID/non-IR group. In patients with T2D, 50% of the ID/IR group required insulin at 6.7 years versus 11 years in the non-ID/IR or ID/non-IR, and more than 15 years in the non-ID/non-IR group. Compared with the latter group, the adjusted hazard ratios were 2.74 (1.80, 4.16) in the ID/non-IR, 2.73 (1.78, 4.19) in the non-ID/IR and 4.46 (2.87, 6.91) in the ID/IR group (p-interaction = 0.049). In young Chinese adults, IR and ID contributed to progression to T2D and glycaemic deterioration.

Source: Journal cover page image

Fan B, Wu H, Shi M, Yang A, Lau ESH, Tam CHT, Mao D, Lim CKP, Kong APS, Ma RCW, Chow E, Luk AOY, Chan JCN. Associations of the HOMA2-%B and HOMA2-IR with progression to diabetes and glycaemic deterioration in young and middle-aged Chinese. Diabetes/Metabolism Research and Reviews. 2022;38(5):e3525. doi:10.1002/dmrr.3525.

