鄧亮生

NELSON TANG

02 MOLECULAR DIAGNOSTICS

Genetics of Disease Susceptibility

Principal Investigator

Nelson Tang

Team members

Raphael Chan, Helen Chiu , Linda Lam , Ting Fan Leung , Suk Ling Ma , Xiaoqiang Yao

Research Progress Summary

Research directions:

1. Genetics of complex traits: to identify prevalent genetic variants causing common diseases in Han Chinese;
2. Statistical genetics and computational statistical analysis of big genetic and biological datasets; and
3. Analysis of variation of the transcriptome using latest technology of next generation sequencing.

Research into Genetics of Disease Susceptibility (GDS):

The mission of the GDS laboratory is to identify disease predisposition genes for common diseases, also known as complex traits. The research group involved in the development of various analysis methods and wet laboratory validation of the results generated from such analysis. The team also participates in international consortiums in studies of healthy aging (including bone and other phenotypes), breast cancer, and genetic susceptibility to adolescent idiopathic scoliosis and tuberculosis. With the advance in sequencing and other technology, the team acquires biological data in an unprecedented volume nowadays. The analysis and statistic method become limiting factors in handling such huge volume of data.

Research and Scholarship

Academic Editorship

Member's Name	Details	
	Role	Journal
Nelson Tang	Editorial Board Member	Frontiers in Pediatrics
		Journal of Pediatric Biochemistry (Official journal of World Society of Child Science)
		Genes — Open Access Journal of Genetics & Genomics
		Frontiers in Genetics

Reviewer of Journal / Conference

Member's Name	Details	
	Role	Journal / Conference
Nelson Tang	Reviewer	Hong Kong Medical Journal
		The 52nd Union World Conference on Lung Health
		Journal of International Medical Research
		Gene
		Journal of Medical Genetics
		Medical Review

Grants and Consultancy

Name	Project Title	Funding Source	Start Date (dd/mm/yyyy)	End Date (dd/mm/yyyy)	Amount (HK$)
Nelson Tang	Paediatric Biomonitoring Reference Values for Metals and Trace Elements in Urine: A Survey of Hong Kong Children	Food and Health Bureau	04/10/2021	03/10/2024	1,009,167
	Investigating the Key Factors Regulating Healthy Ageing in Chinese Longevity Family Cohort	Ministry of Science and Technology of China	01/01/2020	31/12/2022	RMB 876,000
Nelson Tang	Establishment Hong Kong Branch of CAS Center for Excellence in Animal Evolution and Genetics	The Chinese University of Hong Kong – Vice-Chancellor's One-off Discretionary Fund	01/06/2020	31/05/2023	12,000,000
	Pilot Study on the Changes of Transcriptome for Neuronavigated Repetitive Transcranial Magnetic Stimulation (rTMS) in the Management of Depression in Major Neurocognitive Disorders	The Chinese University of Hong Kong – Research Committee - Direct Grants	29/06/2020	28/06/2021	40,400
	Prediction of Clinical Outcomes by Determining the Kinetics of Serum Proadrenomedullin, Procalcitonin, and C-Reactive Protein in Adult Patients with Bloodstream Infections	The Chinese University of Hong Kong – Research Committee - Direct Grants	30/06/2019	29/06/2021	149,775

Publications

A. Journal Papers

1. Tam CHT, Lim CKP, Luk AOY, Ng ACW, Lee HM, Jiang G, Lau ESH, Fan B, Wan R, Kong APS, Tam WH, Ozaki R, Chow EYK, Lee KF, Siu SC, Hui G, Tsang CC, Lau KP, Leung JYY, Tsang MW, Kam G, Lau IT, Li JKY, Yeung VTF, Lau E, Lo S, Fung S, Cheng YL, Chow CC, Hu M, Yu W, Tsui SKW, Huang Y, Lan H, Szeto CC, Tang NLS, Ng MCY, So WY, Tomlinson B, Chan JCN, Ma RCW. Development of genome-wide polygenic risk scores for lipid traits and clinical applications for dyslipidemia, subclinical atherosclerosis, and diabetes cardiovascular complications among East Asians. *Genome Medicine*. 2021;13(1). doi:10.1186/s13073-021-00831-z.

2. Ji LD, Xu ZF, Tang NLS, Xu J. Natural selection of ATP2B1 underlies susceptibility to essential hypertension. *Frontiers in Genetics*. 2021;12. doi:10.3389/fgene.2021.628516. (Editorial)

3. Lee AWT, Ng JKW, Liao J, Luk AC, Suen AHC, Chan TTH, Cheung MY, Chu HT, Tang NLS, Zhao MP, Lian Q, Chan WY, Chan DYL, Leung TY, Chow KL, Wang W, Wang LH, Chen NCH, Yang WJ, Huang JY, Li TC, Lee TL. Single-cell RNA sequencing identifies molecular targets associated with poor in vitro maturation performance of oocytes collected from ovarian stimulation. *Human Reproduction (Oxford, England)*. 2021;36(7):1907-1921. doi:10.1093/humrep/deab100.

4. Huang D, Liu AYN, Leung KS, Tang NLS. Direct measurement of B lymphocyte gene expression biomarkers in peripheral blood transcriptomics enables early prediction of vaccine seroconversion. *Genes*. 2021;12(7). doi:10.3390/genes12070971.

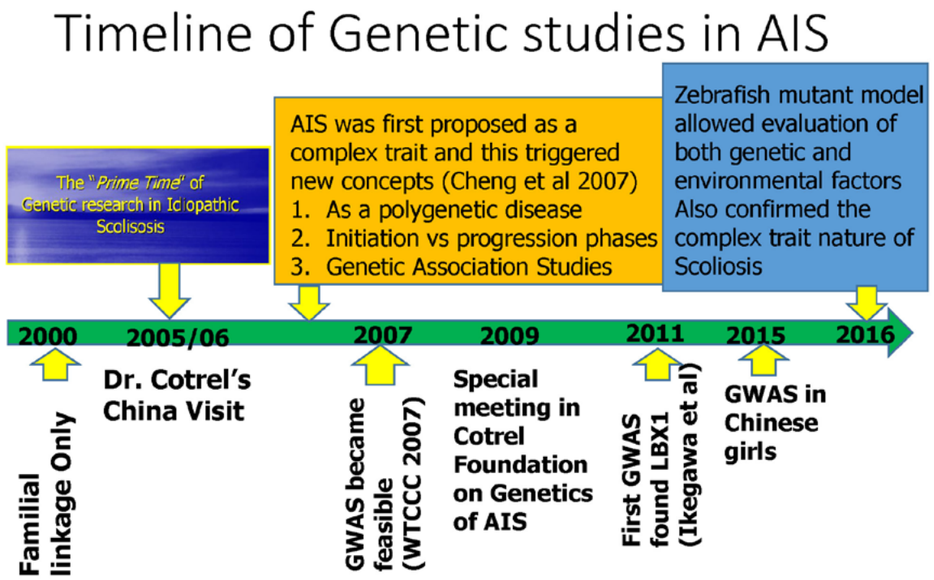
5. Tang NLS, Dobbs MB, Gurnett CA, Qiu Y, Lam TP, Cheng JCY, Hadley-Miller N. A decade in review after idiopathic scoliosis was first called a complex trait-A tribute to the late Dr. Yves cotrel for his support in studies of etiology of scoliosis. *Genes*. 2021;12(7). doi:10.3390/genes12071033. (Review)

6. Xu L, Feng Z, Dai Z, Lee WYW, Wu Z, Liu Z, Sun X, Tang N, Cheng JC-Y, Qiu Y, Zhu Z. A functional SNP in the promoter of LBX1 is associated with the development of adolescent idiopathic scoliosis through involvement in the myogenesis of paraspinal muscles. *Frontiers in Cell and Developmental Biology*. 2021;9. doi:10.3389/fcell.2021.777890.

7. van de Stadt SIW, Mooyer PAW, Dijkstra IME, Dekker CJM, Vats D, Vera M, Ruzhnikov MRZ, van Haren K, Tang N, Koop K, Willemsen MA, Hui J, Vaz FM, Ebberink MS, Engelen M, Kemp S, Ferdinandusse S. Biochemical studies in fibroblasts to interpret variants of unknown significance in the ABCD1 gene. *Genes*. 2021;12(12):1930. doi:10.3390/genes12121930.

A group photo of an annual reunion of the research group into etiology of scoliosis of the Cotrel Foundation in the Institut de France. The Late Dr. Yves Cotrel was in the first row on the right. (Courtesy of the Cotrel Foundation).

Source: Tang, N.L.S.; Dobbs, M.B.; Gurnett, C.A.; Qiu, Y.; Lam, T.P.; Cheng, J.C.Y.; Hadley-Miller, N. A Decade in Review after Idiopathic Scoliosis Was First Called a Complex Trait—A Tribute to the Late Dr. Yves Cotrel for His Support in Studies of Etiology of Scoliosis. Genes 2021, 12, 1033.



Timeline of research breakthrough in the genetics of AIS and the subsequent studies confirming the complex trait model of AIS which the team first proposed and published 15 years ago.

Source: Tang, N.L.S.; Dobbs, M.B.; Gurnett, C.A.; Qiu, Y.; Lam, T.P.; Cheng, J.C.Y.; Hadley-Miller, N. A Decade in Review after Idiopathic Scoliosis Was First Called a Complex Trait—A Tribute to the Late Dr. Yves Cotrel for His Support in Studies of Etiology of Scoliosis. Genes 2021, 12, 1033.