BIOGRAPHICAL SKETCH

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NAME: Kevin Tong

eRA COMMONS USER NAME (credential, e.g., agency login): TONGKEV

POSITION TITLE: Postdoctoral Fellow

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Rutgers, The State University of New Jersey	B.S.	05/08	Biotechnology
Lehigh University	Ph.D.	07/15	Cell and Molecular Biology
Rutgers, The State University of New Jersey	(Postdoc)	present	Cancer Genetics

A. Personal Statement

The SMAD4/ TGFβ /BMP signaling pathway is found to be mutated in over half of all colorectal cancers, yet the role of SMAD4 is still not well understood. My work discerns the molecular mechanisms of an under-appreciated tumor suppression pathway and provides molecular details for what is currently a large gap in the colon cancer field (what SMAD4/TGFβ signaling does in the colon nucleus). I have several projects that revolve around a novel mouse model that aggressively generates serrated tumors in mice that emulates human serrated cancers and reveal that SMAD4 is a critical tumor suppressor for serrated cancer initiation (Tong et al. 2017, Tong et al. 2021). I also have collaborations with multiple members of CINJ, including Drs. Nan Gao, Michael Gatza, and Shridar Ganesan, expanding the breath of my research interests into GI diseases, cancer drug resistances, and breast cancer fields. My projects are poised to fill a niche in understanding the role of SMAD4 in colon tumors, particularly in serrated cancers, a colon tumor subtype (~20-30% of colon tumors) that carries the worse prognosis.

Ongoing and recently completed projects that I would like to highlight include:

Current Funding
5K99CA245123, NIH-NCI Role: PI
05/01/2020-present
Title: Elucidating the Role of SMAD4 in Colorectal Cancer
My research currently focuses on defining the molecular mechanisms of SMAD4 as a transcription factor in colorectal cancers, and its direct interactions with other oncogenic pathways.

Completed Funding
DFHS16PPC036, NJCCR Role: PI
01/01/2016-12/30/2017
Title: Epigenomic-impact of signaling pathways regulating colon tumorigenesis
Here I sought to understand the impact of transcription factors on WNT-driven colon cancer progression.

1F32CA235829, NIH-NCI Role: PI
01/01/2019-4/30/2020
Title: SMAD4 in Serrated Tumorigenesis
This work is studied how SMAD4 regulates the BRAF-driven serrated tumor pathway. *Terminated early for Pathway to Independence Award (K99/R00).*

Citations:

Shiyan Yu, **Kevin Tong**, Yanlin Zhao, Iyshwarya Balasubramanian, George S. Yap, Ronaldo P. Ferraris, Edward M. Bonder, Michael Verzi, and Nan Gao. ***Cell Stem Cell.*** Radiated Paneth cells acquire multipotency upon Notch activation. 2018 Jul 5;23(1):46-59.e5.

Kevin Tong, Oscar Pellón-Cárdenas, Veerin R. Sirihorachai, Bailey N. Warder, Om A. Kothari, Ansu O. Perekatt, Emily E. Fokas, Robert L. Fullem, Anbo Zhou, Joshua K. Thackray, Hiep Tran, Lanjing Zhang, Jinchuan Xing, Michael P. Verzi. ***Cell Rep.*** Degree of Tissue Differentiation Dictates Susceptibility to BRAF-driven Colorectal Cancer. 2017 Dec 26;21(13):3833-3845.

Mehta GA, Angus SP, Khella CA, **Tong K**, Khanna P, Dixon SAH, Verzi MP, Johnson GL, Gatza ML. ***NPJ Breast Cancer.*** SOX4 and SMARCA4 cooperatively regulate PI3k signaling through transcriptional activation of TGFBR2. 2021 Apr 9;7(1):40.

Kevin Tong, Om A. Kothari, Katherine S. Haro, Anshuman Panda, Manisha M. Bandari, Jillian N. Carrick, Joseph J. Hur, Lanjing Zhang, Chang S. Chan, Jinchuan Xing, Michael L. Gatza, Shridar Ganesan, Michael P. Verzi. ***Oncogene.*** SMAD4 is Critical in Suppression of BRAF-V600E Serrated Tumorigenesis. (2021).

B. Positions and Honors

ACTIVITY/ OCCUPATION	START DATE (mm/yy)	END DATE (mm/yy)	FIELD	INSTITUTION/ COMPANY	SUPERVISOR/ EMPLOYER
Assistant Member	05/22	-	Cancer Biology	Hackensack Meridian Health - Center for Discovery and Innovation	Hackensack Meridian Health
Postdoctoral Fellow	09/15	present	Genetics	Rutgers, The State University of New Jersey	Michael Verzi, Ph.D.
Co-Adjunct, Lecturer	09/15	present	Genetic Analysis	Rutgers, The State University of New Jersey	Michael Verzi, Ph.D.
Teaching Assistant	08/08	05/14	Biology	Lehigh University	Lehigh University Department of Biological Sciences

Academic and Professional Honors

NIH Pathway to Independence Award (K99/R00) May 2020
American Cancer Society Postdoctoral Fellowship Award (Declined for NRSA)
Ruth L. Kirschstein National Research Service Award Individual Postdoctoral Fellowship January 2018

New Jersey Commission of Cancer Research Postdoctoral Fellowship Award January 2016
Marjorie Nemes Fellowship Award January 2015
Lehigh University College of Arts and Sciences Summer Fellowship Award April 2012
Lehigh University Graduate Student Senate Travel Grant Award December 2011

Professional Society Memberships

American Association for Cancer Research - Member since 2018
American Society of Cell Biology – Member since 2012

C. Contributions to Science

1. Challenged Prominent Models of Sister Chromatid Cohesion and Chromosome Condensation. My Ph.D. work addressed mechanistic questions of how the protein complex cohesins function to ensure sister chromatids retain their fidelity to ensure proper cell division and chromosome segregation. Using the protein Pds5, I directly tested the prominent "one-ring" model of sister chromatid cohesion and found it to be unsatisfactory in explaining the role of cohesins in regulating cohesion. Furthermore, I was among of the first to show that the pathways that regulate chromosome segregation and condensation, once believe to be irreparably linked, were indeed separable. Thus, in my two first-author publications, I posited alternative models of cohesion to address the limits of the "one-ring" model and also defined key cohesin regulators that had unique roles in chromosome segregation and condensation. *My Ph.D. work provided me the first "taste" of elucidating the role of a protein in biological pathways.* ***The proposed work will seek to understand and map the pathways of colon cancer development and progression, which will require a similar approach in how I tested the pathways in these publications.***

a) **Kevin Tong**, Robert V. Skibbens. ***PLoS One***. Cohesin without Cohesion: A Novel Role for Pds5 in *Saccharomyces cerevisiae.* 2014 Jun 25;9(6):e100470.

b) **Kevin Tong**, Robert V. Skibbens. ***PNAS.*** Pds5 Regulators Segregate Cohesion and Condensation Pathways in *Saccharomyces cerevisiae.* 2015 Jun 2; 112(22):7021-6.

2. Using Novel Mouse Models and Organoids to Study Serrated Colon Cancer. As a postdoc in the Verzi Lab, I have developed a novel mouse model that rapidly and aggressively generates BRAF-driven serrated tumors. We have found that the mutant allele BRAF-V600E is very poor at generating serrated tumors, yet the ablation of transcription factor SMAD4 in combination with the BRAF allele results in aggressive serrated tumorigenesis. We reveal that BRAF-V600E drives the regulation of intestinal homeostasis towards differentiation, whereas the loss of SMAD4 reverts this shift. Furthermore, we reveal that the combination of oncogenic BRAF, SMAD4, and WNT mutations are the critical drivers for serrated tumor initiation – revealing an underappreciated role of SMAD4 in early-stage colon cancer progression. Importantly, human patient data is also consistent with our findings in our mouse models. ***These studies are the basis of what I hope will be a long and successful career as a cancer researcher in understanding the molecular role of SMAD4 in colon cancer suppression.***

a) **Kevin Tong**, Oscar Pellón-Cárdenas, Veerin R. Sirihorachai, Bailey N. Warder, Om A. Kothari, Ansu O. Perekatt, Emily E. Fokas, Robert L. Fullem, Anbo Zhou, Joshua K. Thackray, Hiep Tran, Lanjing Zhang, Jinchuan Xing, Michael P. Verzi. ***Cell Rep.*** Degree of Tissue Differentiation Dictates Susceptibility to BRAF-driven Colorectal Cancer. 2017 Dec 26;21(13):3833-3845.

b) **Kevin Tong**, Om A. Kothari, Katherine S. Haro, Anshuman Panda, Manisha M. Bandari, Jillian N. Carrick, Joseph J. Hur, Lanjing Zhang, Chang S. Chan, Jinchuan Xing, Michael L. Gatza, Shridar Ganesan, Michael P. Verzi. ***Oncogene.*** SMAD4 is Critical in Suppression of BRAF-V600E Serrated Tumorigenesis. (2021). https://doi.org/10.1038/s41388-021-01997-x

3. Using Bioinformatics to Address Questions in Intestinal Homeostasis Regulatory Pathways. Under the tutelage of my Co-Mentor Dr. Ron Hart and the monthly Epigenomics Group meetings, I rapidly gained proficiency in several bioinformatics tools over the past year - including using TopHat2, Cufflinks, and HISAT2/StringTie/Ballgown on the Rutgers University High Performance Computing facilities for RNA-Seq

analysis. With my expertise, I was offered collaboration opportunities with Drs. Nan Gao and Michael Gatza's lab to address questions to determine the regulatory systems in the GI and breast cancer respectively. ***I am grateful for the opportunities that I have been offered by Dr. Nan Gao to collaborate while in Dr. Michael Verzi's lab and I hope to maintain this collaborative network as I continue to move forward in my research career.***

a) Shiyan Yu, **Kevin Tong**, Yanlin Zhao, Iyshwarya Balasubramanian, George S. Yap, Ronaldo P. Ferraris, Edward M. Bonder, Michael Verzi, and Nan Gao. ***Cell Stem Cell.*** Radiated Paneth cells acquire multipotency upon Notch activation. 2018 Jul 5;23(1):46-59.e5.

b) Yu S, Balasubramanian I, Laubitz D, **Tong K**, Bandyopadhyay S, Lin X, Flores J, Singh R, Liu Y, Macazana C, Zhao Y, Béguet-Crespel F, Patil K, Midura-Kiela MT, Wang D, Yap GS, Ferraris RP, Wei Z, Bonder EM, Häggblom MM, Zhang L, Douard V, Verzi MP, Cadwell K, Kiela PR, Gao N. ***Immunity.*** Paneth Cell-Derived Lysozyme Defines the Composition of Mucolytic Microbiota and the Inflammatory Tone of the Intestine. 2020 Aug 18;53(2):398-416.e8. doi: 10.1016/j.immuni.2020.07.010.

c) Zhang X, Bandyopadhyay S, Araujo LP, **Tong K**, Flores J, Laubitz D, Zhao Y, Yap G, Wang J, Zou Q, Ferraris R, Zhang L, Hu W, Bonder EM, Kiela PR, Coffey R, Verzi MP, Ivanov II, Gao N. ***JCI Insight.*** Elevating EGFR-MAPK program by a nonconventional Cdc42 enhances intestinal epithelial survival and regeneration.2020 Aug 20;5(16):e135923. doi: 10.1172/jci.insight.135923.

d) Mehta GA, Angus SP, Khella CA, **Tong K**, Khanna P, Dixon SAH, Verzi MP, Johnson GL, Gatza ML. ***NPJ Breast Cancer.*** SOX4 and SMARCA4 cooperatively regulate PI3k signaling through transcriptional activation of TGFBR2. 2021 Apr 9;7(1):40. doi: 10.1038/s41523-021-00248-2.

Complete List of Published Work in MyBibliography:
https://www.ncbi.nlm.nih.gov/sites/myncbi/kevin.tong.1/bibliography/public/