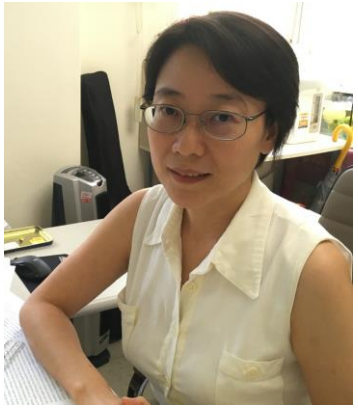
Distinguished Professor

Office: 生物醫學大樓 (R306)
e-mail: pcchang@nycu.edu.tw
Phone: 886-2-2826-7111



Education/學歷:

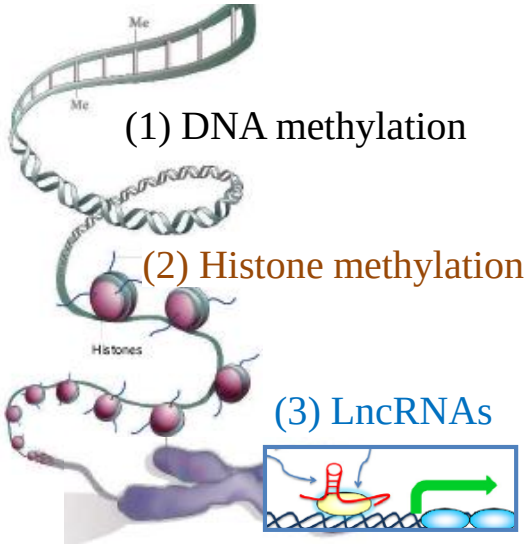
國立陽明大學	藥理學研究所	碩士
國立陽明大學	生化暨分子生物研究所	博士
University of Kentucky		Postdoctoral fellow
UC Davis	Cancer Center	postdoctoral fellow

Position/經歷:

2021~present	特聘教授, 國立陽明交通大學 微生物及免疫學研究所
	Visiting Scholar, Lerner Research Institute, Cleveland Clinic
2020~present	教授, 國立陽明大學 微生物及免疫學研究所
2016 - 2020	副教授, 國立陽明大學 微生物及免疫學研究所
2016 - 2019	副研究員, 高雄醫學大學 傳染病與癌症研究中心
2015 - 2016	Visiting Scholar, School of Pharmacy University of South California (USC)
2011 - 2016	助理教授, 國立陽明大學 微生物及免疫學研究所

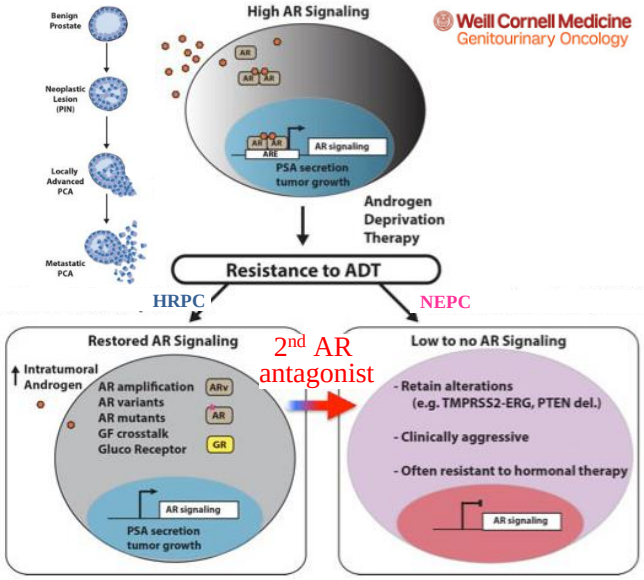
Research:

(I) Virus-Host interaction: Epigenetic regulation and Cancer



Epigenetic regulation includes: (1) DNA methylation; (2) Histone methylation and (3) Long non-coding RNAs (LncRNAs). By using oncogenic herpesvirus KSHV as a model, we studied the tumorigenic role of JMJD2A, the first identified histone trimethyl demethylase, and its own modification in epigenetic regulation. We found that JMJD2A is important for maintain low levels of H3K9me3, a favorable chromatin environment to execute rapid transcriptional reprograming. JMJD2A was targeted and sumoylated by KSHV K-bZIP, a viral SUMO E3 ligase. Sumoylation is essential for chromatin binding and in vivo dementylation function of JMJD2A. Our study also showed the role of JMJD2A in regulating IFN response and how virus against human immune system through targeting JMJD2A. Nowadays, we use KSHV as a model to identify novel KSHV reactivation associated long non-coding RNAs (lncRNAs), a newly emerged epigenetic regulator, and elucidate their tumorigenic role.

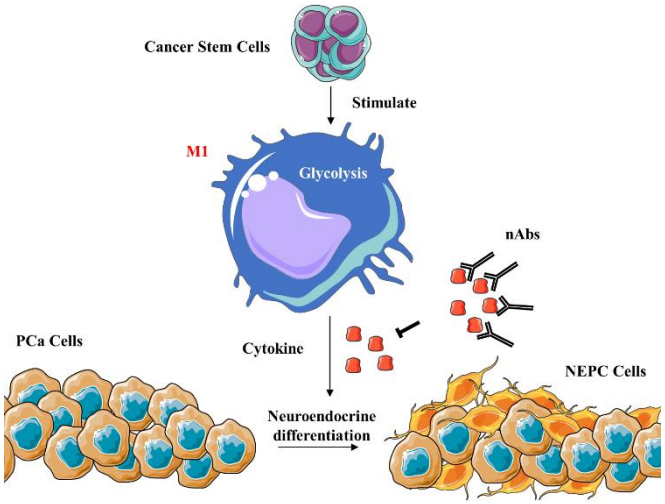
(II) Epigenetic regulation of Prostate Cancer



https://weillcornellgucancer.org/2016/04/18/aggressive-prostate-cancers-whats-new-in-research-and-treatment/

I further extend our epigenetic study to prostate cancer (PCa) research. PCa is a leading cancer affecting male population. Thought it can be successful treated by androgen deprivation therapy (ADT), unfortunately, hormone refractory prostate cancer (HRPC) eventually relapsed within few years after successful treatment. Thought 2nd generation of AR antagonist was developed and used for treating HRPC, it induced neuroendocrine differentiation (NED) of PCa cells. This emerging type of PCa, so-called NEPC, is highly metastatic and chemoresistant. We identified repressor element-1 (RE-1) silencing transcription factor (REST) as a key regulator for. Following this observation, we also demonstrated that long-term REST knockdown not only induce NED but also enhanced cell stemness through epigenetic regulation of Twist1 and CD44. In addition, we identified MAOA, a decision maker of apoptosis (inhibition) and autophagy (activation), as a novel REST target gene. It involves in mediating mitophagy activation during NED of PCa cells. Nowadays, we use NED as a model and identified many novel NED regulatory lncRNAs, including HOTAIR.

(III) Cancer Immunology



Emerging evidence showed that microenvironment shaped by pro- and anti-inflammatory types of macrophages contribute to not only host defense, but also cancer progression. We found that cancer stem cells (CSCs), without affect macrophage phenotype, induce M1 macrophages producing NED-related cytokines. Integrating transcriptome profiling in combine with mass spectrometry metabolites analysis reveals the contribution of glycolysis pathway in NED-related cytokines production. Importantly, CSC-educated M1 macrophages induced NED of cancer cells, thereby shifting carcinoma reprograming toward a neuroendocrine (NE) fate. In tumor tissues, NE marker CgA expression is associated with M1, but not M2, marker. These findings offer therapeutic opportunities of using immunotherapy to prevent the induction of a more malignant cancer phenotype.

Publications:

1. W.S. Yang, W.W. Yeh, M. Campbell, L. Chang, **P.C. Chang*** "Long non-coding RNA KIKAT/LINC01061 as a novel epigenetic regulator that relocates KDM4A on chromatin and modulates viral reactivation" PLoS Pathogens (Jun 2021)
2. M. Campbell, W.S. Yang, W.W. Yeh, C.H. Kao, **P.C. Chang*** "Epigenetic Regulation of Kaposi's sarcoma-associated herpesvirus Latency" Frontiers in Microbiology (2020 Apr; Accepted)
3. Y.W. Liang, M.L. Wang, C.H. Chien, Y.P. Yang, A.A. Yarmishyn, W.Y. Lai, Y.H. Luo, Y.T. Lin, **P.C. Chang***, S.H. Chiou* "Highlight of Immune Pathogenic Response and Hematopathologic Effect in SARS-CoV, MERS-CoV, and SARS-Cov-2 Infection" Frontiers in Immunology (May 2020)
4. W.C. Tsai, W.H. Chiang, C.H. Wu, Y.C. Li, M. Campbell, P.H. Huang, M.W. Lin, C.H. Lin, S.M. Cheng, **P.C. Chang***, C.C. Cheng "miR-548aq-3p is a novel target of Far infrared radiation which predicts coronary artery disease endothelial colony forming cell responsiveness" Scientific Reports (Apr 2020)
5. C.P. Yang, W.S. Yang, Y.H. Wong, K.H. Wang, Y.C. Teng, M.H. Chang, K.H. Liao, F.S. Nian, C.C. Chao, JW Tsai, W.L. Hwang, M.W. Lin, T.Y. Tzeng, P.N. Wang, M. Campbell, L.K. Chen, T.F. Tsai, **P.C. Chang***, H.J. Kung "Muscle atrophy-related myotube-derived exosomal microRNA in neuronal dysfunction: Targeting both coding and long noncoding RNAs" Aging Cell (Mar 2020)
6. W.S. Yang, T.Y. Lin, L. Chang, W.W. Yeh, S.C. Huang, T.Y. Chen, Y.T. Hsieh, S.T. Chen, W.C. Li, C.C. Pan, M. Campbell, C.H. Yen, Y.A. Chen, **P.C. Chang*** "HIV-1 Tat Interacts with a Kaposi's Sarcoma-Associated Herpesvirus Reactivation-Upregulated Antiangiogenic Long Noncoding RNA, LINC00313, and Antagonizes Its Function" J. Virol. (Nov 2019)
7. C.J. Lin, L. Chang, H.W. Chu, H.J. Lin, P.C. Chang, R.Y.L. Wang, B. Unnikrishnan, J.Y. Mao, S.Y. Chen, C.C. Huang "High Amplification of the Antiviral Activity of Curcumin through Transformation into Carbon Quantum Dots" Small (Oct 2019)
8. R. Kant, C.H. Yen, J.H. Hung, C.K. Lu, C.Y. Tung, P.C. Chang, Y.H. Chen, Y.C. Tyan, Y.A. Chen "Induction of GNMT by 1,2,3,4,6-penta-O-galloyl-beta-D-glucopyranoside through proteasome-independent MYC downregulation in hepatocellular carcinoma" Scientific Reports (Feb 2019)
9. Y.T. Chang, T.P. Lin, J.T. Tang, M. Campbell, Y.L. Luo, S.Y. Lu, C.P. Yang, T.Y. Cheng, C.H. Chang, T.T. Liu, C.H. Lin, H.J. Kung, C.C. Pan, **P.C. Chang*** "HOTAIR is a REST-regulated LncRNA that Promotes Neuroendocrine Differentiation in Castration Resistant Prostate Cancer" Cancer Letters (Oct 2018)
10. W.S. Yang, M. Campbell, H.J. Kung, **P.C. Chang*** "In vitro SUMOylation Assay to Study SUMO E3 Ligase Activity" JoVE (Jan 2018)
11. Y.C. Lin, Y.T. Chang, M. Campbell, H.C. Lee, J. C. Shih, **P.C. Chang*** "MAOA- a novel decision maker of apoptosis and autophagy in hormone refractory neuroendocrine prostate cancer cells" Scientific Reports (Apr 2017)

歷屆碩士畢業生:

2011/09 ~ 2013/06: 楊奕程 (論文發表: BMC Genomics. 2013 Nov 23; 14:824)
張怡婷 (論文發表: PLoS One. 2014 Feb 14; 9(2):e88556)

2013/09 ~ 2015/06: 李松遠 (論文發表: Oncotarget. 2016 May 3; 7(18):26137)
楊宛珊 (論文發表: PLoS Pathog. 2015 Jul 21; 11(7):e1005051.)

2015/09 ~ 2017/06: 羅勻里
黃詩晴 (論文與**林庭宇**一起發表於 J Virol)

2016/09 ~ 2018/06: 楊佳蓓 (論文發表: Aging cell. 2020 Mar 31:e13107.)
李悅誠

2017/09 ~ 2019/06 林庭宇 (論文發表: J Virol. 2020 Jan 17;94(3) pii: e01280-19.)
江玟慧 (論文發表: Sci Rep. 2020 Apr 22;10(1):6805)
施文仁
葉葳
鄭庭伃

2018/09 ~ 2020/06 高晨媗

2019/09 ~ Present 沈彩文

2020/09 ~ Present 陳柏安
胡則勻

2021/09 ~ Present 洪靖幃
鄭裕弘

歷屆博士畢業生:

2014/09 ~ 2018/09: 張怡婷 (1st author 發表: Scientific Reports 2017. Mar 3; 7:42795)
Scientific Reports 2017. Apr 12; 7:46338
Cancer Letters 2018. Oct 1; 433:43

2015/09 ~ Present: 楊宛珊 (1st author發表: PLoS Pathog. 2017 Feb 17;13(2):e1006216.
JoVE. 2018 Jan 29; (131)

2015/09 ~ Present: 張景欣

2016/09 ~ 2020/02: 張龍 (1st author發表: Small. 2019 Oct; 15(41): e1902641)

2020/09 ~ Present: 葉葳