

# Curriculum Vitae

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## ACADEMIC APPOINTMENT

**PROFESSOR** 2015 Aug~present

Department of Biomedical Sciences/Graduate Institute of Biomedical Sciences,  
College of Medicine, Chang Gung University (長庚大學生物醫學系)

**ASSOCIATE PROFESSOR** 2011 Aug~2015 Jul

Department of Biomedical Sciences/Graduate Institute of Biomedical Sciences,  
College of Medicine, Chang Gung University (長庚大學生物醫學系)

**ASSISTANT PROFESSOR** 2007 Mar~2011 Jul

Department of Biomedical Sciences/Graduate Institute of Biomedical Sciences,  
College of Medicine, Chang Gung University

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## EDUCATION

**DOCTOR OF PHILOSOPHY** 2003

Institute of Molecular Medicine, National Taiwan University, Taipei, Taiwan

**BACHELOR OF ARTS** 1995

University of California at Berkeley, Berkeley, California

Major: Molecular and Cell Biology (Emphasis in Biochemistry/Molecular Biology)

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## PROFESSIONAL EXPERIENCE

**Postdoctoral Research Fellow**

2004/1~2007/2

Institute of Molecular Medicine, National Taiwan University

(Distinguished Postdoctoral Fellowship of National Health Research Institute, Taiwan)

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## AWARDS AND HONORS

1. 2015 Academia Sinica Research Award for Young Research Investigators (104 年度中研院年輕學者著作獎)
2. Chang Gung University Research Excellence Award – 2013, 2015
3. 2015 MOST Wu Ta-You Research Award (104 年度科技部吳大猷紀念獎)

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## INVITED CONFERENCE TALKS

1. 1<sup>st</sup> Taipei Epigenetics and Chromatin Meeting, Academia Sinica. Oct. 2009
2. The 26<sup>th</sup> Biology Summer Camp (第 26 屆生物夏令營). July 21-22, 2010
3. 102 年度科技部「微免及檢驗醫學」暨「生化及藥理醫學」跨學門學術交流研討會. Nov. 2, 2013
4. The 13<sup>th</sup> Asian Conference on Transcription, Australia. Feb. 19-21, 2014
5. Frontiers of Genomic Research Symposium at National Cheng Kung University (國立成功大學). Dec. 1, 2014
6. School of Life Sciences Research Retreat, Xiamen University. Jul. 27-30, 2015
7. 2015 Annual Meeting of Taiwan Proteomics Society, Chang Gung University. Nov. 13-14, 2015
8. 2016 Biomedical Research Symposium of National Health Research Institutes. Aug. 15-16, 2016

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## PUBLICATIONS (selected since 2010)

(in chronological order; \*corresponding author)

1. Chung IH, Liu H, Lin YH, Chi HC, Huang YH, Yang CC, Yeh CT, Tan BC\*, Lin

- KH\*. ChIP-on-chip analysis of thyroid hormone-regulated genes and their physiological significance. **Oncotarget** (SCI), 2016 Mar 8; DOI: 10.18632/oncotarget.7988.
2. Zhong X, Peng J, Shen QS, Chen JY, Gao H, Luan X, Yan S, Huang X, Zhang SJ, Xu L, Zhang X, Tan BC, Li CY\*. RhesusBase PopGateway: Genome-wide Population Genetics Atlas in Rhesus Macaque. **Mol Biol Evol.** (SCI), 2016 Feb 16; pii: msw025.
  3. Yi YH, Ma TH, Lee LW, Chiou PT, Chen PH, Lee CM, Chu YD, Yu H, Hsiung KC, Tsai YT, Lee CC, Chang YS, Chan SP\*, Tan BC\*, Lo SJ\*. A genetic cascade of *let-7-ncl-1-fib-1* modulates nucleolar size and rRNA pool in *Caenorhabditis elegans*. **PLoS Genet.** (SCI), 2015 Oct 22;11(10):e1005580.
  4. Yang XZ, Chen JY, Liu CJ, Peng J, Wee YR, Han X, Wang C, Zhong X, Shen QS, Liu H, Cao H, Chen XW, Tan BC\*, Li CY\*. Selectively Constrained RNA Editing Regulation Crosstalks with piRNA Biogenesis in Primates. **Mol Biol Evol.** (SCI), 2015 Dec;32(12):3143-57.
  5. Chen JY, Shen QS, Zhou WZ, Peng J, He BZ, Li Y, Liu CJ, Luan X, Ding W, Li S, Chen C, Tan BC, Zhang YE, He A\*, Li CY\*. Emergence, Retention and Selection: A Trilogy of Origination for Functional De Novo Proteins from Ancestral LncRNAs in Primates. **PLoS Genet.** (SCI), 2015 Jul 15;11(7):e10005391.
  6. Chen WY, Shih HT, Liu KY, Shih ZS, Chen LK, Tsai TH, Chen MJ, Liu H, Tan BC, Chen CY, Lee HH, Loppin B, Ait-Ahmed O, Wu JT. Intellectual disability-associated dBRWD3 regulates gene expression through inhibition of HIRA/YEM-mediated chromatin deposition of histone H3.3. **EMBO Rep.** (SCI), 2015 Apr;16(4):528-38.
  7. Huang PJ, Lee CC, Tan BC, Yeh YM, Huang KY, Gan RC, Chen TW, Lee CY, Yang ST, Liao CS, Liu H, Tang P. Vanno: A Visualization-aided Variant Annotation Tool. **Hum Mutat.** (SCI), 2015 Feb;36(2):167-74.
  8. Huang PJ, Lee CC, Tan BC, Yeh YM, Chu LJ, Chen TW, Chang KP, Lee CY, Gan RC, Liu H, Tang P. CMPD: cancer mutant proteome database. **Nucleic Acids Res.** (SCI), 2015 Jan 28;43(Database issue):D849-55.
  9. Liu H, Ma CP, Chen YT, Schuyler SC, Chang KP, Tan BC\*. Functional impact of RNA editing and ADARs on regulation of gene expression: perspectives from deep sequencing studies. **Cell & Bioscience** (SCI), 2014 Aug 19;4:44.
  10. Hsu HC, Liu YS, Tseng KC, Tan BC\*, Chen SJ\*, Chen HC\*. LGR5 regulates survival through mitochondria-mediated apoptosis and by targeting the Wnt/ $\beta$ -catenin signaling pathway in colorectal cancer cells. **Cell Signal.** (SCI), 2014 Jul 12;26(11):2333-2342.
  11. Lee CW, Yang FC, Chang HY, Chou H, Tan BC, Lee SC\*. Interaction between Salt-inducible kinase 2 and protein phosphatase 2A regulates the activity of calcium/calmodulin-dependent protein kinase I and protein phosphatase methylesterase-1. **J Biol Chem.** (SCI), 2014 Jul 25;289(30):21108-19.

12. Zhang SJ, Liu CJ, Yu P, Zhong X, Chen JY, Yang X, Peng J, Yan S, Wang C, Zhu X, Xiong J, Zhang YE, Tan BC, Li CY\*. Evolutionary interrogation of human biology in well-annotated genomic framework of rhesus macaque. **Mol Biol Evol.** (SCI), 2014 May;31(5):1309-24.
13. Chen JY, Peng Z, Zhang R, Yang XZ, Tan BC, Fang H, Liu CJ, Shi M, Ye ZQ, Zhang YE, Deng M, Zhang X\*, Li CY\*. RNA editome in rhesus macaque shaped by purifying selection. **PLoS Genet.** (SCI), 2014 Apr 10;10(4):e1004274.
14. Hsieh CL, Liu H, Huang Y, Kang L, Chen HW, Chen YT, Wee YR, Chen SJ, and Tan BC\*. ADAR1 deaminase contributes to scheduled skeletal myogenesis progression via stage-specific functions. **Cell Death Differ.** (SCI), 2014 May; 21(5):707-719.
15. Chen HW, Yang CC, Hsieh CL, Liu H, Lee SC, and Tan BC\*. A functional genomic approach reveals the transcriptional role of EDD in the expression and function of angiogenesis regulator ACVRL1. **Biochim Biophys Acta.** (SCI), 2013 Dec; 1829(12): 1309-1319.
16. Yang FC, Lin YH, Chen WH, Huang JY, Chang HY, Su SH, Wang HT, Chiang CY, Hsu PH, Tsai MD, Tan BC, Lee SC\*. Interaction between salt-inducible kinase 2 (SIK2) and p97/VCP regulates ER-associated protein degradation in mammalian cells. **J Biol Chem.** (SCI), 2013 Nov; 288(47):33861-72.
17. Yang FC, Tan BC (co-first author), Chen WH, Lin YH, Huang JY, Chang HY, Sun HY, Hsu PH, Liou GG, Shen J, Chang CJ, Han CC, Tsai MD, and Lee SC\*. Reversible acetylation regulates salt-inducible kinase (SIK2) and its function in autophagy. **J Biol Chem.** (SCI), 2013 Mar; 288(9):6227-37.
18. Tan BC, Yang CC, Hsieh CL, Chou YH, Zhong CZ, Yung BYM\*, Liu H\*. Epigenetic silencing of ribosomal RNA genes by Mybbp1a. **J Biomed Sci.** (SCI), 2012 May; 19:57.
19. Yang CC, Liu H, Chen SL, Wang TH, Hsieh CL, Huang Y, Chen SJ, Chen HC, Yung BYM\*, Tan BC\*. Epigenetic silencing of myogenic gene program by Myb-binding protein 1a suppresses myogenesis. **EMBO J.** (SCI), 2012 Apr; 31(7):1739-1751.
20. Peng Z, Cheng Y, Tan BC (co-first author), Kang L, Tian Z, Zhu Y, Zhang W, Liang Y, Hu X, Tan X, Guo J, Dong Z, Liang Y, Bao L, and Wang J\*. Comprehensive analysis of RNA-Seq data reveals extensive RNA editing in a human transcriptome. **Nat. Biotechnol.** (SCI), 2012 Mar; 30(3):253-260.
21. Hsieh CL, Lin CL, Liu H, Chang YJ, Shih CJ, Zhong CZ, Lee SC\*, and Tan BC\*. WDHD1 modulates the post-transcriptional step of the centromeric silencing pathway. **Nucleic Acids Res.** 2011 May; 39(10):4048-4062.
22. Lin CY, Tan BC\* (co-first author), Liu H, Shih CJ, Chien KY, Lin CL, and Yung BYM\*. Dephosphorylation of nucleophosmin by PP1 $\beta$  facilitates pRB binding and consequent E2F1-dependent DNA repair. **Mol Bio Cell.** 2010 Dec 15; 21(24):4409-4417.

**23.** Tan BC\*, Liu H, Lin CL, Lee SC\*. Functional cooperation between FACT and MCM is coordinated with cell cycle and differential complex formation. **J Biomed Sci.** 2010 Feb 16; 17(1):11.

**24.** Chen YJ, Tan BC, Cheng YY, Chen JS, and Lee SC\*. Differential regulation of CHOP translation by phosphorylated eIF4E under stress condition. **Nucleic Acids Res.** 2010 Jan; 38(3):764-77.

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## **A-to-I RNA editing as a fitness factor in cell survival and differentiation**

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### **ABSTRACT**

Among mechanisms that demarcate metazoan transcriptomes, adenosine-to-inosine (A-to-I) RNA editing introduces single nucleotide variations in the nascent transcripts, and is catalyzed by the adenosine deaminase acting on RNA (ADAR) family enzymes. Despite the seemingly message-disrupting nature of this base change, RNA editing critically underpins organism survival and development. However, evidence for its functional output remains largely elusive. Studies on the implications of RNA editing in cell growth and differentiation are presented and discussed: First, our work has unveiled novel tissue-specific but divergent roles of ADAR1 and ADAR2 in skeletal myogenesis. Expression of these two editors displayed programmed alteration that is oppositely coordinated with differentiation cues. Furthermore, we found that the contrasting roles of these two enzymes in myogenic differentiation are exerted via targeting distinct sets of targets. Second, gene ontology analysis of the known RNA editing targets further unveiled a preponderance of genes related to apoptosis regulation, among which proto-oncogenes *XIAP* and *MDM2* encode two the most abundantly edited transcripts. The main RNA editor ADAR1 directly targets this 3' UTR editing of *XIAP* and *MDM2*, and further negatively regulates the expression of their protein products by modulating spatial distribution and translation efficiency of the target transcripts. Finally, ADAR1 militates against the XIAP-dependent suppression of apoptotic response. Together, our results strengthened the significance of ADAR1 and RNA editing in the functional output of transcriptome, and also provided mechanistic explanation for ADAR1's roles in development and tumorigenesis.