KUO-I LIN (林國儀)

POSITION/AFFILIATIONS

RESEARCH FELLOW AND PROFESSOR,
Genomics Research Center,
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CONTACT INFORMATION

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EDUCATION

INSTITUTION AND LOCATION	DEGREE	YEAR(S)	FIELD OF STUDY
National Taiwan University	B.S.	1991	Medical Technology
National Taiwan University	M.S.	1993	Medical Technology
The Johns Hopkins University	PH.D	1998	Molecular Microbiology and Immunology

POSITIONS AND EMPLOYMENT

2014 Dec.- Division Director of Medical Biology, Genomics Research Center, Academia Sinica, Taipei, Taiwan
2014 Sep.- Research Fellow, Genomics Research Center, Academia Sinica, Taipei, Taiwan
2009-2014 Associate Research Fellow (with tenure), Genomics Research Center, Academia Sinica, Taipei, Taiwan
2004-2009 Assistant Research Fellow, Genomics Research Center, Academia Sinica, Taipei, Taiwan
2016- Adjunct Professor, Graduate Institute of Immunology, National Taiwan University, Taipei, Taiwan
2010-2016 Adjunct Associate Professor, Graduate Institute of Immunology, National Taiwan University, Taipei, Taiwan

Honors

2019 Outstanding Research Achievement to National Health, Ming-Ning Wang Memorial Foundation
2018 Academia Sinica Investigator Award
2016 Outstanding Research Award, Ministry of Science and Technology (MOST), Taiwan
2015 Chair in Biotechnology, Taiwan Bio-Development Foundation
2014 Outstanding Research Award, The Chinese Society of Immunology, Taiwan
2014 Young Scientist Research Award, Tien-Te Lee Biomedical Foundation, Taiwan
2013 Outstanding Research Award, National Science Council (MOST), Taiwan

2010 Academia Sinica Career Development Award

2008 1st ASAIHL-Scopus Young Scientist Award (Winner of Life Sciences)

2005 Li Foundation Heritage Prize

1999-2002 The Leukemia and Lymphoma Society Fellowship

1999 Phi Beta Kappa, The Johns Hopkins University

1995 Betty Lee Hampil Honorary Fellowship, Dept. of Molecular Microbiology & Immunology. The Johns Hopkins University

A. PEER-REVIEWED PUBLICATIONS (in reverse chronological order)

1. Lo, L.-W., Chang, C.-W., Chiang, M.-F., Lin, I-Y., and **Lin, K.-I*** (2021) Marginal zone B cells assist with neutrophil accumulation to fight against systemic *Staphylococcus aureus* infection. *Frontiers in Immunology* (in press) ***corresponding author**

2. Lee, W., Wang, L.-T., Yen, M.-L., Hsu, P.-J., Lee, Y.-W., Liu, K.-J., **Lin, K.-I,** Su, Y.-W., Sytwu, H.-K., and Yen, B. L. (2021) Resident vs. nonresident multipotent mesenchymal stromal cell interactions with B lymphocytes result in disparate outcomes. *Stem Cells Transi Med.* 10(5):711-724

3. Liao, H.-Y., Wang, S.-C., Ko, Y.-A. **Lin, K.-I,** Ma, C., Cheng, R. T.-J., and Wong, C.-H. (2020) Chimeric hemagglutinin vaccine elicits broadly protective CD4 and CD8 T cell responses against multiple influenza strains and subtypes. *Proc Natl Acad Sci USA.* 117(30):17757-17763.

4. Chang, Y.-H., Weng, C.-L, and **Lin, K.-I*** (2020) *O*-GlcNAcylation and its role in the immune system. *J Biomed Sci.* 27(1):57. ***corresponding author**

5. Chen, H.-Y., Wu, Y.-F., Chou, F.-C., Wu, Y.-H., Yeh, L.-T., **Lin, K.-I**, Liu, F.-T., Sytwu, H.-K. (2020) Intracellular galectin-9 enhances proximal TCR signaling and potentiates autoimmune disease. *Journal of Immunology. 204(5):1158-1172.*

6. Liu, C.-H., Chou, C.-T., Chen, C.-H., Chen, C.-H., Yang, S.-Y., Ko, Y.-A., Wu, Y.-T., Wang, C.-C., Liu, F.-C., Yue, C.-T., Hung, S.-C., Tzeng, I-S., Tsai, W.-C. *, and **Lin, K.-I*** (2020) Aberrant distribution and function of plasmacytoid dendritic cells in patients with ankylosing spondylitis are associated with unfolded protein response. *Kaohsiung Journal of Medical Sciences.* DOI: 10.1002/kjm2.12184. ***corresponding author**

7. Liu, C.-H., Raj, S, Chen, C.-H., Hung, K.-H., Chou, C.-T., Chen, I.-Ho., Chien, J.-T., Lin, I-Y., Yang, S.-Y., Angata, T., Tsai, W.-C., Wei. J. C.-C., Tzeng, I-S., Hung, S.-C.*, and **Lin, K.-I*** (2019) HLA-B27-mediated activation of TNAP phosphatase promotes pathogenic syndesmophyte formation in ankylosing spondylitis. *Journal of Clinical Investigation*. 129 (12): 5357-5373. *(Highlighted by Nature Reviews Rheumatology)* ***corresponding author**

8. Tsai, D.-Y., Hung, K.-H., Chang, C.-W., and **Lin, K.-I*** (2019). Regulatory Mechanisms of B cell responses and the implication in B cell-related diseases. *J Biomed Sci.* 26(1): 64. ***corresponding author**

9. Wang, Y.-H., Tsai, D.-Y., Ko, Y.-A., Yang, T.-T., Lin, I-Y., Hung, K.-H., and **Lin, K.-I*** (2019) Blimp-1 contributes to the development and function of regulatory B cells. *Frontiers in Immunology* 10:1909. doi: 10.3389/fimmu.2019.01909. ***corresponding author**

10. Tseng, Y,-C., Wu, C.-Y., Liu, M.-L., Chen, T.-H., Chiang, W.-L., Yu, Y.-H., Jan, J.-T., **Lin, K.-I,** Wong, C.-H., and Ma, C. (2019) Egg-based influenza split virus vaccine with monoglycosylation induces cross-strain protection against influenza virus infections. *Proc Natl Acad Sci USA.* 116 (10): 4200-4205.

11. Ko, Y.-A., Chan, Y.-H., Liu, C.-H., Liang, J.-J., Chuang, T.-H., Hsueh, Y.-P., Lin, Y.-L., and **Lin, K.-I*** (2018) Blimp-1-mediated pathway promotes type I IFN production in plasmacytoid dendritic cells by targeting to interleukin-1 receptor-associated kinase M. *Frontiers in Immunology.* https://doi.org/10.3389/fimmu.2018.01828. ***corresponding author**

12. Tsai, M.-S., Chiang, M.-T., Tsai, D.-L., Yang, C.-W., Hou, H.-S., Li, Y.-R., Chang, P.-C., Lin, H. H., Chen, H.-Y., Hwang, I.-S., Wei, P.-K., Hsu, C.-P., **Lin, K.-I**, Liu, F.-T., Chau, L.-Y. (2018) Galectin-1 restricts vascular smooth muscle cell motility via modulating adhesion

force and focal adhesion dynamics. *Scientific Reports*. 8(1): 11497.

13. Hung, K.-H., Woo, Y. H., Lin, I-Y., Liu, C.-H., Wang, L.-C., Chen, H.-Y., Chiang, B.-L., and **Lin, K.-I*** (2018) The KDM4A/KDM4C/NF-κB and WDR5 epigenetic cascade regulates the activation of B cells. *Nucleic Acids Research*. 46(11): 5547-5560. ***corresponding author**

14. Wu, J.-L., Chiang, M.-F., Hsu, P.-H., Tsai, D.-Y., Hung, K.-H., Wang, Y.-H., Angata, T.* and **Lin, K.-I*** (2017) *O*-GlcNAcylation is required for B cell homeostasis and antibody responses. *Nature Communications*. 8(1): 1854. ***corresponding author**

15. Lai, C.-Y., Su, Y.-W., **Lin, K.-I,** Hsu, L.-C. and Chuang, T.-H. (2017) Natural modulators of endosomal Toll-like receptor-mediated psoriatic skin inflammation. *Journal of Immunology Research.*10.1155/2017/7807313.

16. Chen, T.-T., Tsai, M.-H., Kung, J.T., **Lin, K.-I**, Decker, T. and Lee, C.-K. (2016) STAT1 regulates marginal zone B cell differentiation in response to inflammation and infection with blood-borne bacteria. *Journal of Experimental Medicine*. 213: 3025-3039.

17. Wu, J.-L., Wu, H.-Y., Tsai, D.-Y., Chiang, M.-F., Chen, Y.-J., Gao, S., Lin, C.-C., Lin, C.-H., Khoo, K.-H., Chen, Y.-J.* and **Lin, K.-I*** (2016) Temporal regulation of Lsp1 *O*-GlcNAcylation and phosphorylation during apoptosis of activated B cells. *Nature Communications*. 7:12526. doi: 10.1038/ncomms12526. ***corresponding author**

18. Chien, C.-Y., Lee, H.-S. Lee, Cho, C.H.H., **Lin, K.-I**, Tosh, D., Wu, R.-R., Mao, W.-Y., Shen, C.-N. (2016) Maternal Vitamin A deficiency during pregnancy affects vascularized islet development. *Journal of Nutritional Biochemistry*. 36:51-59.

19. Yu, Y.-H., and **Lin, K.-I*** (2016) Factors that regulate the generation of antibody-secreting plasma cells. *Advances in Immunology.* 131:61-99. ***corresponding author**

20. Hung, K.-H., Su, S.-T., Chen, C.-Y., Hsu, P.-H., Huang, S.-Y., Wu, W.-J., Chen, M.M., Chen, H.-Y., Wu, P.-C., Lin, F.-R., Tsai, M.-D., and **Lin, K.-I*** (2016) Aiolos collaborates with Blimp-1 to regulate the survival of multiple myeloma cells. *Cell Death and Differentiation*. 23(7), 1175–1184. ***corresponding author**

21. Tsai, D.-Y., Hung, K.-H., Lin, I-Y., Su, S.-T., Wu, S.-Y., Chung, C.-H., Wang, T.-C., Li, W.-H., Shih, A. C.-C.*, and **Lin, K.-I*** (2015) Uncovering miRNA regulatory hubs that modulate plasma cell differentiation. *Scientific Reports.* 5: 17957. ***corresponding author**

22. Tsai, C.-M. and **Lin, K.-I*** (2015) Examination of the role of galectins in plasma cell differentiation. *Methods Mol Biol.* 1207:153-167. ***corresponding author**

23. Kretzschmar, K., Cottle, D.L., Donati, G, Chiang, M.-F., Quist, S.R., Gollnick, H.P., Natsuga, K., Aoyagi, S., **Lin, K.-I**, and Watt, F. M. (2014) BLIMP1 does not define a sebaceous gland progenitor population but is required for epidermal homeostasis. *Stem Cell Reports.* 3: 620-633. *(Cover story)*

24. Chiu, Y.-K., Lin, I-Y., Su, S.-T., Wang, K.-H., Yang, S.-Y., Tsai, D.-Y., Hsieh, Y.-T., and **Lin, K.-I***. (2014) Transcription factor ABF-1 suppresses plasma cell differentiation but facilitates memory B cell formation. *Journal of Immunology*. 193(5): 2207-2217. ***corresponding author**

25. Tsai, C.-M., Wu, H.-Y., Su, T.-H., Kuo, C.-W., Huang, H.-W., Chung, C.-H., Chen, C.-S., Khoo, K.-H., Chen, Y.-J.* and **Lin, K.-I*** (2014) Phosphoproteomic analyses reveal that galectin-1 augments the dynamics of B-cell receptor signaling. *Journal of Proteomics* 103: 241-253. ***corresponding author**

26. Huang, K.-Y., Wu, H.-Y., Chen, Y.-J., Lu, C.-T., Su, M.-G., Hsieh, Y.-C., Tsai, C.-M., **Lin, K.-I.**, Huang, H.-D., Lee, T.-Y. and Chen, Y.-J. (2014) RegPhos 2.0: an update resource to explore protein kinase-substrate phosphorylation networks in mammals. *Database: the journal of biological databases and curation (Oxford)* 25; 2014(0):bau034

27. Lin, I-Y., Chiu, F.-L., Yeang, C.-H., Chen, H.-F., Chuang, C.-Y., Yang, S.-Y., Hou, P.-S., Sintupisut, N., Ho, H.-N., Kuo, H.-C.*, and **Lin, K.-I*** (2014) Suppression of the *SOX2* neural effector gene by PRDM1 promotes human germ cell fate in embryonic stem cells. *Stem Cell Reports*. 2(2): 189-204. ***corresponding author**

28. Lin, M.-H., Yeh, L.-T., Chen, S.-J., Chiou, H.-Y., Chu, C.-C., Yen, L. B., **Lin, K.-I**, Chang, D.-M., and Sytwu, H.-K. (2014) T cell-specific BLIMP-1 deficiency exacerbates experimental autoimmune encephalomyelitis in nonobese diabetic mice by increasing Th1 and Th17 cells. *Clinical Immunology.* 151: 101-113.

29. Chen, J.-R., Yu, Y.-H., Tseng, Y.-C., Chiang, W.-L., Chiang, M.-F., Ko, Y.-A., Chiu, Y.-K., Ma, S.-H., Wu, C.-Y., Jan, J.-T., **Lin, K.-I***, Ma, C.*, and Wong, C.-H*. (2014) Vaccination of monoglycosylated hemagglutinin induces cross-strain protection against Influenza virus infections. *Proc Natl Acad Sci USA*. 111(7): 2476-2481. ***corresponding author** *(Highlighted by PNAS)*

30. Liao, S.-F, Liang, C.-H., Ho, M.-Y., Hsu, T.-L., Tsai, T.-I, Hsieh, Y. S.-Y., Tsai, C.-M., Li, S.-T., Cheng, Y.-Y., Tsao, S.-M., Lin, T.-Y., Lin, Z.-Y. , Yang, W.-B., Ren, C.-T., **Lin, K.-I**, Khoo, K.-H., Lin, C.-H., Hsu, H.-Y., Wu, C.-Y., and Wong, C.-H. (2013) Immunization of fucose-containing polysaccharides from Reishi mushroom induces antibodies to tumor-associated Globo H-series epitopes. *Proc Natl Acad Sci USA.* 110(34): 13809-13814. *(Highlighted by PNAS)*

31. Huang, H.-W., Chen, C.-H., Lin, C.-H., Wong, C.-H.*, and **Lin, K.-I***. (2013) B cell maturation antigen is modified by a single *N*-glycan chain that modulates ligand binding and surface retention. *Proc Natl Acad Sci USA* 110(27): 10928-10933. ***corresponding author**

32. Tu, Z., Hsieh, H.-W., Tsai, C.-M., Hsu, C.-W., Wang, S.-G., Wu, K.-J., **Lin, K.-I***, and Lin, C.-H*.(2013) Synthesis and characterization of sulfated Gal-β-1,3/4-GlcNAc disaccharides via consecutive Protection/glycosylation Steps. *Chemistry-An Asian Journal* 8 (7): 1536-1550. ***corresponding author**

33. Wang, S.-H., Tsai, C.-M., **Lin, K.-I*** and Khoo, K.-H.* (2013) Advanced mass spectrometry and chemical analyses reveal the presence of terminal disialyl motif on mouse B cells. *Glycobiology*. 23(6): 677-689. ***corresponding author**

34. Chiang, M.-F., Yang, S.-Y., Lin, I-Y., Hong, J.-B., Lin, S.-J., Ying, H.-Y., Chen, C.-M., Wu, S.-Y., Liu, F.-T., and **Lin, K.-I*** (2013) Inducible deletion of Blimp-1 gene in adult epidermis causes granulocyte-dominated chronic skin inflammation in mice. *Proc Natl Acad Sci USA* 110 (16): 6476-6481. ***corresponding author** *(Highlighted by Nature Reviews Immunology and Nature Immunology)*

35. Lin, M.-H., Chou, F.-F., Yeh, L.-T., Fu, S.-H., Chiou, H.-Y., **Lin, K.-I**, Chang, D.-M. and Sytwu H.-K. (2013) B lymphocyte-induced maturation protein 1 (BLIMP-1) attenuates autoimmune diabetes in NOD mice by suppressing Th1 and Th17 cells. *Diabetologia* 56: 136-146.

36. Lin, F.-R., Huang, S.-Y., Hung, K.-H., Su, S.-T., Chung, C.-H., Matsuzawa, A., Hsiao, M., Ichijo, H. and **Lin, K.-I*** (2012) ASK1 promotes apoptosis of normal and malignant plasma cells. *Blood* 120 (5): 1039-1047. ***corresponding author**

37. Ying, H.-Y., Su, S.-T., Hsu, P.-H., Chang, C.-C., Lin, I-Y., Tseng, Y.-H., Tsai, M.-D., Shih, H.-M. and **Lin, K.-I*** (2012) SUMOylation of Blimp-1 is critical for plasma cell differentiation. *EMBO Reports.* 13 (7): 631-637. ***corresponding author** *(Cover story and highlighted by A-IMBN)*

38. Chuang, C.-Y., **Lin, K.-I**, Hsiao, M., Stone, L., Chen, H.-F., Huang, Y.-H., Lin, S.-P., Ho, H.-N.,and Kuo, H.-C. (2012) Meiotic competent human germ cell-like cells derived from human embryonic stem cells induced by BMP4/WNT3A signaling and OCT4/EpCAM selection. *Journal of Biological Chemistry.* 287: 14389-14401.

39. Wu, Y.-H., Yang, C.-Y., Chien, W.-L., **Lin, K.-I** and Lai, M.-Z. (2012) Removal of Syndecan-1 promotes TRAIL-induced apoptosis in myeloma cells. *J. Immunol*. 188: 2914-2921.

40. Hsu, Y, Lu, X.-A.; Zulueta, M., Tsai, C.-M., **Lin, K.-I,** Hung, S.-C. and Wong, C.-H. (2012) Acyl and Silyl group effects in reactivity-based one-pot glycosylation: synthesis of embryonic stem cell surface carbohydrates Lc4 and IV2Fuc-Lc4. *Journal of the American Chemical Society*. 134: 4549-4552.

41. Tsai, C.-M., Guan, C.-H., Hsieh, H.-W, Hsu, T.-L., Tu, Z., Wu, K.-J., Lin, C.-H*. and **Lin, K.-I*** (2011) Galectin-1 and galectin-8 have redundant roles in promoting plasma cell formation. *J. Immunol*. 187(4): 1643-1652. ***corresponding author**

42. Chan, Y.-H., Chiang, M.-F., Tsai, Y.-C., Su, S.-T., Chen, M.-H., Hou, M.-S. and **Lin, K.-I*** (2009) Absence of the transcriptional repressor Blimp-1 in hematopoietic lineages reveals its role in the conventional dendritic cell homeostatic development and function. *J. Immunol*. 183: 7039-7046. ***corresponding author** *(Highlighted by Journal of Immunology)*

43. Su, S.-T., Ying, H.-Y., Chiu, Y.-K., Lin, F.-R., Chen, M.-Y. and **Lin, K.-I*** (2009) Involvement of LSD1 in Blimp-1-mediated gene repression during plasma cell differentiation. *Mol Cell Biol.*

29: 1421-1431. ***corresponding author**

44. Tsai, C.-M., Chiu, Y.-K., Hsu, T.-L., Lin, I-Y., Hsieh, S.-L. and **Lin, K.-I*** (2008) Galectin-1 promotes immunoglobulin production during plasma cell differentiation. *J. Immunol*. 181: 4570-4579. ***corresponding author** *(Highlighted by Consortium for Functional Glycomics)*

45. Lin, F.-R., Kuo, H.-K., Ying, H.-Y., Yang, F.-H. and **Lin, K.-I*** (2007) Induction of apoptosis in plasma cells by Blimp-1 knockdown. *Cancer Research*. 67: 11914-11923. ***corresponding author**

46. **Lin, K.-I***, Kao, Y.-Y., Kuo, H.-K., Yang, W.-B., Chou, A., Lin, H.-H., Yu, A.L. and Wong, C.-H. (2006) Reishi polysaccharides induce immunoglobulin production through the TLR4/TLR2-mediated induction of transcription factor blimp-1. *J. Biol. Chem.* 281: 24111-24123. ***corresponding author**

47. Shapiro-Shelef, M., **Lin, K.-I**, Savitsky, D., Liao, J. and Calame, K. (2005) Blimp-1 is required for maintenance of long-lived plasma cells in the bone marrow. *J. Exp. Med.* 202:1471-1476

48. Johnson, K., Pflugh, D.L., Yu, D., Hesslein, D.G.T., **Lin, K.-I**, Bothwell, A.L., Thomas-Tikhonenko, A., Schatz, D.G. and Calame K. (2004) B-cell specific loss of histone 3 Lysine 9 methylation in the V_H locus depends on Pax5. *Nature Immunology*. 5: 853-861.

49. **Lin, K.-I** and Calame, K. (2004) Introduction of genes into primary murine splenic B cells using retrovirus vectors. *Methods Mol Biol.* 271: 139-148.

50. Shapiro-Shelef, M., **Lin, K.-I**, McHeyzer –Williams, L.J., Liao, J., McHeyzer-Williams, M.G. and Calame, K. (2003) Blimp-1 is required for the formation of immunoglobulin secreting plasma cells and pre-plasma memory B cells. *Immunity*. 19: 607-620.

51. **Lin, K.-I**, Tunyaplin, C. and Calame, K. (2003) Transcriptional regulatory cascades controlling plasma cell differentiation. *Immunological Review*. 194, 19-28.

52. Calame, K., **Lin, K.-I** and Tunyaplin, C. (2003). Regulatory mechanisms that determine the development and function of plasma cells. *Annu Rev Immunol*. 21: 205-230.

53. Angelin-Duclos, C., Johnson, K., Liao, J., **Lin, K.-I** and Calame K. (2002) An interfering form of Blimp-1 increases IgM secreting plasma cells and blocks maturation of peripheral B cells. *Eur. J. of Immunol*. 32: 3765-3775.

54. Shaffer, A.L.[#], **Lin, K.-I[#]**, Kuo T. C., Yu, X., Hurt, E.M., Rosenwald, A., Giltnane, J.M., Yang, L., Zhao, H., Calame K. and Staudt, L.M. (2002) Blimp-1 orchestrates plasma cell differentiation by extinguishing the mature B cell gene expression program. *Immunity.* 17: 51-62. **[#]co-first authors**

55. **Lin, K.-I**, Angelin-Duclos, C., Kuo, T.C. and Calame K. (2002) Blimp-1-dependent repression of *Pax-5* is required for differentiation of B cells to IgM secreting plasma cells. *Mol Cell Biol*. 22: 4771-4780.

56. **Lin, K.-I,** Lin, Y. and Calame K. (2000) Repression of c-myc is necessary but not sufficient for terminal differentiation of B lymphocytes in vitro. *Mol Cell Biol*. 20: 8684-8695**.**

57. Angelin-Duclos, C., Cattoretti, G., **Lin, K.-I**, and Calame K. (2000) Commitment of B lymphocytes to a plasma cell fate is associated with Blimp-1 expression in vivo. *J. Immunol.* 165: 5462-5471.

58. Piskurich, J. F.[#], **Lin, K.-I[#]**, Lin, Y., Wang, Y., Ting, J. P.-Y. and Calame K. (2000) BLIMP-I mediates extinction of major histocompatibility class II transactivator expression in plasma cells. *Nature Immunology*. 1: 526-532. **[#]co-first authors**

59. Angelin-Duclos, C., Cattoretti, G., Chang, D.H., **Lin, K.-I**, Lin, Y., Yu, J. and Calame K. (1999) The role of B lymphocyte induced maturation protein-1 (BLIMP-1) in terminal differentiation of B cells and other cell lineages. *Cold Spring Harb Symp Quant Biol* 64: 61-70.

60. Zaman K., Ryu, H., Hall, D., O'Donovan, K., **Lin, K.-I**, Miller, M.P., Marquis, J.C., Baraban, J.M., Semenza, G.L. and Ratan, R.R. (1999) Protection from oxidative stress-induced apoptosis in cortical neuronal cultures by iron chelators is associated with enhanced DNA binding of hypoxia-inducible factor-1 and ATF-1/CREB and increased expression of glycolytic enzymes, p21waf1/cip1, and erythropoietin. *J. Nurosci.* 19: 9821-9830.

61. **Lin, K.-I**, Pulsinelli P. Brown, R. H., Hardwick, J. M. and Ratan, R. R. (1999) Decreased intracellular superoxide levels activate Sindbis virus-induced apoptosis: a role for reductive stress in modulating cell death. *J. Biol. Chem*. 274: 13650-13655.

62. **Lin, K.-I**, Chattopadhyay, N., Bei, M., Alvarez, R., Dang, C. V., Baraban, J. M., Brown, E. M.

and Ratan, R. R. (1998) Elevated extracellular calcium can prevent apoptosis via the calcium-sensing receptor. *Biochem. Biophys. Res. Commun*. 249: 325-331.

63. **Lin, K.-I**, Baraban, J. M. and Ratan, R. R. (1998) Inhibition versus induction of apoptosis by proteasome inhibitors depends on concentration. *Cell Death and Differentiation*. 5: 577-583.

64. **Lin, K.-I**, DiDonato, J. A. Hoffmann, A., Hardwick, J. M. and Ratan, R. R. (1998) Suppression of steady-state, but not stimulus-induced NF-kappa B activity inhibits alphavirus-induced apotposis. *J. Cell Biol*. 141: 1479-1487.

65. Esch, F., **Lin, K.-I**, Hills, A., Zaman, K., Chatterjee, S., Rubin, L., Ash, D. E. and Ratan, R. R. (1998) Purification of a multipotent antideath activity from bovine liver and its identification as arginase : nitric oxide-independent inhibition of neuronal apoptosis. *J. Neurosci.* 18: 4083-4095.

66. Irani, D. N., **Lin, K.-I** and Griffin, D. E. (1997) Regulation of brain-derived T cells during acute central nervous system inflammation. *J. Immunol*. 158: 2318-2326.

67. Irani, D. N., **Lin, K.-I** and Griffin, D. E. (1996) Brain-derived gangliosides regulates the cytokine production and proliferation of activated T cells. *J. Immunol.* 157: 4333-4340.

68. **Lin, K.-I**, Lee, S.-H., Narayanan, R., Baraban, J. M., Hardwick, J. M. and Ratan, R. R**.** (1995) Thiol agents and Bcl-2 identify an alphavirus-induced apoptotic pathway that requires activation of the transcription factor NF-kappa B. *J. Cell Biol*. 131: 1149-1161.

69. Lin, S. B., Chang, G. W., The, G.-W., **Lin, K.-I** and Au, L.-C**.** (1993). A simple and rapid method for purification of oligodeoxyribonucleoside methylphosphonates. *Biotechniques*. 14: 795-798.

C. PATENTS

1. Wong, C.-H., Hsu, H.-Y., Hua, K.-F., Lin, C-H., Hsu, J., Chen, S.-T., **Lin, K.-I,** Yang, W.-B., Yu, J. and Yu, A.L. Methods and compositions associated with administration of an extract of Ganoderma lucidum. PCT Patent No. PCT/US2005/036961 (2005); TW Patent No. 095131055 (2005).

2. Yu, A.L., Yu, J., **Lin, K.-I,** Yang, W.-B. and Wong, C.-H. Fungal immunostimulatory compositions. US Patent No. 11, 549, 215 (2006); TW Patent No. 095137640 (2006), TW No. I 386220 (2013)

3. **Lin, K.-I,** Hung, S.-C., and Liu, C.-H. A biomarker and target for diagnosis, prognosis and treatment of ankylosing spondylitis. PCT/US2019/041157 (2019), 108124397 Taiwan 用於診斷，評估預後及治療僵直性脊椎炎的生物標記及標的 (2019).

4. Liao, H.-Y., Wang, S.-C., Ko, Y.-A. **Lin, K.**-I, Ma, C., Cheng, R. T.-J., and Wong, C.-H. A designer chimeric hemagglutinin elicits broad-protective CD4 and CD8 T-cell responses 可引發廣效保護力及 T 細胞反應的流感血凝素疫苗 (2020).

Molecular mechanisms underlying the regulation of differentiation and effector functions of B cells

Kuo-I Lin

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B cells are a unique type of immune cells that can produce antibody once they are activated and differentiated, and provide the long-term memory and humoral antibody immunity. In addition to their function in providing antibody immunity and serving as antigen presenting cells, certain B cells called regulatory B cells (Bregs) are able to negatively regulate immune responses. My laboratory has been investigating the molecular mechanisms controlling B cell activation and differentiation, with an emphasis on the roles of transcriptional and post-translational modifications. We have a long-standing interest in the functional role of transcription factor Blimp-1 in B cells. Blimp-1 is critical for the differentiation of antibody-producing plasma cells. We showed that Blimp-1 contributes to the generation of IL-10-producing Bregs (B10 cells) and is important for B10 cell ($CD19^{+}CD1d^{hi}CD5^{+}$ Breg)-mediated suppression of the proliferation of activated $CD4^{+}$ T cells. Blimp-1 is not only required for the generation of plasma cells, but also continuously needed for the maintenance of the long-lived plasma cells in bone marrow and for the survival of transformed plasma cells, multiple myeloma (MM). We dissected how Blimp-1 maintains the survival of MM cells via interaction with another transcription factor, Aiolos. I will also discuss the roles of *O*-GlcNAcylation in B cells. *O*-GlcNAcylation, a type of post-translational modification, adds a GlcNAc to serine or threonine residue of nuclear and cytosolic proteins. *O*-GlcNAcylation is catalyzed by *O*-GlcNAc transferase (OGT) and is removed by *O*-GlcNAcase (OGA). I will present the interplay between *O*-GlcNAcylation and phosphorylation in the regulation of B cell activation and apoptosis following stimulation, and the physiological roles of *O*-GlcNAcylation in B cell lineage using B cell-specific *Ogt*-deficient mice. Lastly, I would like to discuss the effector functions of antibody. The protective efficacy of antibodies in infectious diseases is generally related to their neutralization potency. We have isolated a head-domain recognizing, but non-neutralizing, monoclonal antibody carried prophylactic and therapeutic efficacy against a broad spectrum of influenza virus infections via engagement of Fc receptors on effector cells. The underlying effector cells involved will be discussed.