

Technology/ Title	MAP4K3 is a therapeutic target for cancer and IL-17A-mediated autoimmune disease	
Technology Type	<input checked="" type="checkbox"/> Biotechnology	<input type="checkbox"/> Device/Diagnostics
	<input type="checkbox"/> Pharmaceutical	<input type="checkbox"/> Others: _____ -
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Technology Description	<p>Our team has identified MAP4K3 (GLK), MAP4K1 (HPK1), and MAP4K4 (HGK) in the 1990s.</p> <p>We reported that MAP4K3 (GLK) overexpression is correlated with human autoimmune diseases and cancer recurrence. Using MAP4K3-deficient and MAP4K3 transgenic mice, we demonstrated that MAP4K3 overexpression selectively induces IL-17A overproduction through AhR-RORγt complex in T cells, leading to autoimmune responses. Our findings indicate that MAP4K3 is a therapeutic target for autoimmune disease, cancer, and IL-17A-mediated disease. We further showed proof of concept by treatment of GLK inhibitors in mouse disease models.</p> <p>Our team also demonstrated that HPK1 (MAP4K1) is a negative regulator of T-cell activation in 2007. Based on our finding, at least 10 companies have filed 23 patents on HPK1 inhibitors (plus anti-PD1) for cancer immunotherapy.</p>	

Intellectual Property	<p>MAP4K3 as a biomarker and therapeutic target for autoimmune disease, cancer, inflammation and IL-17-associated disease.</p> <ol style="list-style-type: none"> 1. US patent (US8846311, 2014/09/30) 2. Taiwan patent (TWI510629, 2015/12/01) 3. Europe patent (EP2732045, 2017/07/19, Nations registered: Germany, French, UK, Switzerland) 4. China patent (CN103827310, 2017/09/22) 5. Japan patent (JP6351503, 2018/06/15) 6. Korea patent (KR101640326, 2016/07/11) <p>The AhR-RORyt complex as a biomarker and therapeutic target for autoimmune disease and IL-17-associated disease. (U.S. provisional patent application, 2018)</p>
Key Publications	<p>2011 Chuang, H.C., J.L. Lan, D.Y. Chen, C.Y. Yang, Y.M. Chen, J.P. Li, C.Y. Huang, P.E. Liu, X. Wang, and T.-H. Tan. 2011. The kinase GLK controls autoimmunity and NF-κB signaling by activating the kinase PKC-θ in T cells. Nature Immunology, 12:1113-1118.</p> <p>2018 Chuang HC, CY Tsai, CH Hsueh and T.-H. Tan. 2018. GLK-IKKβ signaling induces dimerization and translocation of the AhR-RORyt complex in IL-17A induction and autoimmune disease. Science Advances, 4: eaat5401.</p> <p>2007 Shui, J.-W., J.S. Boomer, J. Han, J. Xu, G.A. Dement, G. Zhou, and T.-H. Tan. 2007. HPK1 negatively regulates T-cell receptor signaling and T-cell-mediated immune responses. Nature Immunology, 8:84-91.</p>
Business Opportunity	<p>Technology transfer (license out) and co-development of novel MAP4K inhibitors and biomarkers for cancer and IL-17A-mediated autoimmune disease.</p> <ol style="list-style-type: none"> 1. Small-molecule inhibitors of MAP4K3 (GLK) should be cost-effective therapeutic drugs for cancer and IL-17A-mediated autoimmune disease. 2. Screening MAP4K3 (GLK) inhibitors should also help development of HPK1 (MAP4K1) inhibitors.