



# National Human Genome Research Institute

## Tec Kinase Deficient Mice

### NHGRI INVENTION:

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### KEY WORDS

Tec kinase, T-Cell, T Cell Receptor, Cytokines, Rlk, Itk

### LEAD INVENTOR

Pamela L. Schwartzberg, M.D., Ph.D.  
Genetic Disease Research Branch  
Head of Cell Signaling Branch, NHGRI, NIH

### LICENSING CONTACT

Tara Kirby, Ph.D.  
Senior Licensing and Patenting Manager  
Office of Technology Transfer, NIH  
[kirbyt@mail.nih.gov](mailto:kirbyt@mail.nih.gov)

### NHGRI CONTACT

NHGRI Technology Transfer  
Office [nhgrittoffice@mail.nih.gov](mailto:nhgrittoffice@mail.nih.gov)

## PATENT-PENDING TECHNOLOGY AVAILABLE FOR LICENSING

### SUMMARY

Stimulation of T lymphocytes through the T Cell Receptor (TCR) elicits broad responses required for proper immune function, including cell proliferation, cytokine production and apoptosis. We have developed transgenic mice to address the roles of Tec nonreceptor kinases Rlk and Itk in TCR signaling. Rlk-deficient mice and Rlk/Itk double-deficient mice have defects in TCR responses including proliferation, cytokine production and apoptosis in vitro and adaptive immune response to infectious agents in vivo. Cells from these mice indicate that these kinases are critical for proper regulation of phospholipase C, calcium mobilization and ERK activation, as well as activation of downstream transcription factors in response to TCR stimulation. These models also show abnormal production of cytokines by type 1 and type 2 T helper (Th1 and Th2) cells. Defects in T cell function are minor in Rlk-deficient animals but greatly enhanced in Rlk/Itk double-deficient mice.

### POTENTIAL COMMERCIAL APPLICATIONS

These mice provide a useful model for dissecting out the complex interactions of TCR signaling. Additionally, they can serve in evaluation of therapeutics directed at specific classes of diseases (Th1- or Th2-driven) and of potential global Tec kinase inhibitors..

### RELATED ARTICLES

Schaeffer, EM., et .al. Requirement for Tec kinases Rlk and Itk in T cell receptor signaling and immunity. 284 Science 638 (1999).

<http://www.sciencemag.org/content/284/5414/638.full.pdf>

Schaeffer, EM., et .al. Mutation of Tec family kinases alters T helper cell differentiation. 12 Nature Immunology 1183 (2001).

<http://www.nature.com/ni/journal/v2/n12/pdf/ni734.pdf>

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