



Genome Institute  
of Singapore

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## PRESS RELEASE

**Embargoed until: December 16, 2009 (Wednesday), 1700 hrs, EST, USA**  
**December 17, 2009 (Thursday), 0600 hrs, Singapore**

### **Scientists at the Genome Institute of Singapore and 26 institutes in China identify leprosy genes**

In a first-time-ever genome-wide association study (GWAS) of leprosy and the largest GWAS effort on infectious diseases in the world, scientists at the Genome Institute of Singapore (GIS) and 26 institutes in China found seven genes that can cause people to become susceptible to leprosy. The discovery of these genes – known as CCDC122, C13orf31, NOD2, TNFSF15, HLA-DR, RIPK2 and LRRK2 – highlights the important role of the innate immune response in the development of leprosy.

Led by Dr Jianjun Liu, Human Genetics Group Leader at the GIS, Dr Fu-Ren Zhang at the Shandong Provincial Institute of Dermatology and Venereology, and Dr Xue-jun Zhang at the Institute of Dermatology and Department of Dermatology at the No.1 Hospital, Anhui Medical University, China, the research involved over 10,000 samples of Chinese leprosy patients and health controls. The study was published on 16 December 2009 in the prestigious *New England Journal of Medicine*. The GIS is a biomedical research institute of the Agency for Science, Technology and Research (A\*STAR), Singapore.

Dr Jianjun Liu said, “This is a very significant find, and one that can only be achieved through large-scale genetic studies, with close collaborative efforts among multi-disciplinary research groups, often across different countries. The discovery of these genes is a major breakthrough for research in leprosy and infectious diseases in general, and will be significant in the early diagnosis and development of new treatments.”



“This study represents one of the largest and best organized studies of the host genetics in infectious diseases published,” said Prof Edison Liu, Executive Director at the GIS. “Though leprosy is not common, the discoveries have significant ramifications for chronic infectious disorders and for host-pathogen interactions in other more prevalent mycobacterial diseases such as TB (tuberculosis).”

Prof Edison Liu added, “This is a continuation of a number of deep collaborative studies between the GIS and Chinese scientists in using population sciences to uncover genetic modifiers of human disease. The strength of Chinese clinical sciences and of Singapore’s targeted genomic capabilities makes a powerful scientific combination. The key to this collaboration and one that was recently published on the genetics of Asian migration is that the studies were initiated and executed by Asian partners acting as equals. Hopefully, this will initiate a new phase of cooperation between historically competing Asian countries whose primary links have been with western communities.”

Prof Tom H. M. Ottenhoff, MD, PhD, Professor in Immunology, Head group Immunology and Immunogenetics of Bacterial Infectious Diseases, Leiden University Medical Center said, “This is a very impressive study, which uncovers entirely new genes that control susceptibility to leprosy and perhaps also other related diseases. A great asset is that the study underpins the genetic data with plausible functional biology experimentation, which is not often seen.”

Leprosy is a chronic infectious disease caused by a bacterium known as *Mycobacterium leprae* (*M. leprae*). It mainly affects skin and peripheral nerves and may lead to irreversible disabilities. Although it has been largely eliminated in developed countries, leprosy is still a major public health problem in many developing countries, particularly in tropic and sub-tropic regions. According to the World Health Organization’s (WHO) report, 254,525 new cases of leprosy were diagnosed in 2007. Although many people are potentially exposed to *M. leprae* in endemic regions, only a small minority will be infected and develop into clinically overt leprosy, suggesting that only some individuals are susceptible to this disease.

Because *M. leprae* cannot be cultured in the laboratory, and because it only infects humans and the Armadillo, research and thus the biological understanding of leprosy



are very limited. The discovery of the 7 susceptibility genes has not only helped to understand some people's susceptibility to this disease, but also opened the door for further biological and clinical research to reveal the mechanism of leprosy development.

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#### **Notes to the Editor:**

##### Research publication:

The research findings described in the press release can be found in the December 16, 2009 online issue of *New England Journal of Medicine* under the title "**Genomewide association study of leprosy**".

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### **About the Genome Institute of Singapore**

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The Genome Institute of Singapore (GIS) is a member of the Agency for Science, Technology and Research (A\*STAR). It is a national initiative with a global vision that seeks to use genomic sciences to improve public health and public prosperity. Established in 2001 as a centre for genomic discovery, the GIS will pursue the integration of technology, genetics and biology towards the goal of individualized medicine. The key research areas at the GIS include Systems Biology, Stem Cell & Developmental Biology, Cancer Biology & Pharmacology, Human Genetics, Infectious Diseases, Genomic Technologies, and Computational & Mathematical Biology. The genomics infrastructure at the GIS is utilized to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

### **About the Agency for Science, Technology and Research (A\*STAR)**

[www.a-star.edu.sg](http://www.a-star.edu.sg)

The Agency for Science, Technology and Research (A\*STAR) is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A\*STAR oversees 14 biomedical sciences, and physical sciences and engineering research institutes, and seven consortia & centre, which are located in Biopolis and Fusionopolis, as well as their immediate vicinity.

A\*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners.

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