

## PRESS RELEASE

4 OCT 2008, SINGAPORE

# SCIENTISTS MAKE LANDMARK DISCOVERY OF THE “ENGINE” THAT DRIVES CELL MOVEMENT

1. Researchers here have discovered, for the first time, how a cell assembles its internal machinery required for cell movement. This finding by Dr Thomas Leung and his team in the GSK-IMCB Group from the Institute of Molecular and Cell Biology (IMCB), under the Agency for Science, Technology and Research (A\*STAR), is fundamental to the understanding of how a cell responds to its external environment. It has widespread implications in the fields of cancer growth and spread, wound-healing, learning and memory, and developmental biology.

2. The researchers discovered a complex of three proteins that directly regulates the myosin<sup>1</sup> network within a cell, thus generating traction force to propel the cell forward. This action of the tripartite protein complex may be likened to a spring in a toy motorcar – when the protein complex assembles and moves backwards within the cell, it resembles the wound up “engine” of the toy car that has been pulled backwards. Subsequent disassembling of the protein complex and the resultant forward movement of the cell can be likened to the released spring which unleashes the earlier stored potential energy to propel the car forward. The latest finding was published in the October 2008 issue of *Cell*, one of the top scientific journals.

3. Said Professor Michael Sheetz, who is William R Kenan Jr Professor of Cell Biology at the Department of Biological Sciences, Columbia University and also Distinguished Visiting Professor at the National University of Singapore, “This is an

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<sup>1</sup> Myosin is the most common protein found in muscle cells, and is responsible for the elastic and contractile properties of muscle. A different form of myosin is involved in cell movement.

exciting paper because Leung's group has discovered an unexpected step in cell migration and contractility — a complex of three proteins including a form of myosin, that is responsible for assembling most of the other myosin components involved in motile processes. The assembly mechanism has been a major mystery and is critical in a variety of diseases from cardiovascular to aging. Now we have a new tool to understand the bases of these critical processes.”

4. Of the three proteins MRCK, LRAP35a and MYO18A, MRCK was discovered by the GSK-IMCB group ten years ago, while the other two had hitherto unknown functions. Dr Thomas Leung, who headed the research at the IMCB, said, “The success of the work relies on the commitment and perseverance of the team. A major contributor, Dr Ivan Tan, is a home-grown scientist who has been working on this project for many years and he has had several clues as to how the system functions for some time, but it was only recently that the jigsaw puzzle was put together. The system has the potential to unravel other as yet undiscovered mechanisms that coordinate the different ‘engines’ for proper cell migration.”

5. The research by the GSK-IMCB Group is supported by the GlaxoSmithKline (Singapore) Research Fund that was set up in 1989. Professor Louis Lim, Head of the GSK-IMCB Group said, “The 2008 *Cell* paper represents the culmination of many years of industry and dedication on the part of Dr Thomas Leung and Dr Ivan Tan. Dr Leung has been responsible for defining the role of other signalling enzymes along with other members of the GSK-IMCB Group, and we are very glad to acknowledge the support of the GSK (Singapore) Research Fund throughout these years.”

6. The GSK-IMCB Group also published a landmark paper entitled, “A brain serine/threonine protein kinase activated by Cdc42 and Rac1<sup>2</sup>” in top journal, *Nature*, back in 1994. The paper has been cited more than 900 times by scientists around the world to date.

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<sup>2</sup> E. Manser, T. Leung, H. Salihuddin, Z-S. Zhao and L. Lim (1994). A brain serine/threonine protein kinase activated by Cdc42 and Rac1. *Nature* 367: 40 - 46.

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

The research findings described in the press release can be found in the article “A Tripartite Complex Containing MRCK Modulates Lamellar Actomyosin Retrograde Flow”, in the October 3, 2008 print issue of *Cell*.

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### **About the Institute of Molecular and Cell Biology (IMCB)**

The Institute of Molecular and Cell Biology (IMCB) is a member of Singapore's Agency for Science, Technology and Research (A\*STAR) and is funded through A\*STAR's Biomedical Research Council (BMRC). It is a world-class research institute that focuses its activities on six major fields: Cell Biology, Developmental Biology, Structural Biology, Infectious Diseases, Cancer Biology and Translational Research, with core strengths in cell cycling, cell signalling, cell death, cell motility and protein trafficking. Its recent achievements include leading an international consortium that successfully sequenced the entire pufferfish (Fugu) genome. The IMCB was awarded the Nikkei Prize 2000 for Technological Innovation in recognition of its growth into a leading international research centre and its collaboration with

industry and research institutes worldwide. Established in 1987, the Institute currently has 35 independent research groups with more than 400 staff members. For more information about IMCB, please visit [www.imcb.a-star.edu.sg](http://www.imcb.a-star.edu.sg).

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