MEDIA RELEASE
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NEW POSSIBILITIES FOR LEUKAEMIA THERAPY WITH A NOVEL MODE OF LEUKAEMIA CELL RECOGNITION

A new class of lipids in human leukaemia cells trigger an immune response to kill the cells

Singapore, 24 June 2014—Scientists at A*STAR’s Singapore Immunology Network (SIgN) have discovered a new class of lipids in the leukaemia cells that are detected by a unique group of immune cells. By recognising the lipids, the immune cells stimulate an immune response to destroy the leukaemia cells and suppress their growth. The newly identified mode of cancer cell recognition by the immune system opens up new possibilities for leukaemia immunotherapy.¹

Leukaemia is characterized by the accumulation of cancer cells originating from blood cells, in the blood or bone marrow. Current treatments for leukaemia largely involve chemotherapy to eradicate all cancer cells, followed by stem cell transplants to restore healthy blood cells in the patients.

In a recent study reported in the Journal of Experimental Medicine (JEM) online, the team co-led by Dr Lucia Mori and Prof Gennaro De Libero identified a new class of lipids, methyl-lysophosphatidic acids (mLPA), which accumulate in leukaemia cells. Following which, the team identified a specific group of immune cells, described as mLPA-specific T-cells that are capable of recognising the mLPA in the leukaemia cells. The detection triggers an immune response that activates the T cells to kill the leukaemia cells and limits cancer progression. The efficacy of the T cells in killing leukaemia cells was also demonstrated in a mouse model of human leukaemia.

Thus far, only proteins in cancer cells have been known to activate T cells. This study is a pioneer in its discovery of mLPA, and the specific T cells which can identify lipids expressed by cancer cells. Unlike proteins, lipids in cancer cells do

¹ Immunotherapy refers to treatment of diseases by modifying immune cells and re-introducing them into the patients to induce, enhance, or suppress an immune response.
not differ between individuals, indicating that the recognition of mLPA by mLPA-specific T-cells happens in all leukaemia patients. This new mode of cancer cell recognition suggests that the T-cells can potentially be harnessed for a leukaemia immunotherapy that is effective in all patients.

“The identification of mLPA and its role in activating specific T cells is novel. This knowledge not only sheds light on future leukaemia studies, but also complements ongoing leukaemia immunotherapy studies focusing on proteins in cancer cells,” said Dr Lucia Mori, Principal Investigator at SlgN. “Current treatments run the risk of failure due to re-growth of residual leukaemia cells that survive after stem cell transplants. T-cell immunotherapy may serve as a complementary treatment for more effective and safer therapeutic approach towards leukaemia.”

Professor Laurent Renia, Acting Executive Director of SlgN, said, “At SlgN, we study how the human immune system protects us naturally from infections. We engage in promising disease-specific research projects that ultimately pave the way for the development of treatments and drugs which can better combat these diseases. A pertinent example will be this study; this mode of immune recognition of leukaemia cells is an insightful discovery that will create new opportunities for immunotherapy to improve the lives of leukaemia patients.”

Notes to Editor:

The research findings described in this media release can be found in the Journal of Experimental Medicine, under the title, “A novel self-lipid antigen targets human T cells against CD1c+ leukaemias” by Marco Lepore¹,²,¹¹, Claudia de Lalla²,¹¹, Gundimeda S. Ramanjaneyulu¹,¹¹, Heiko Gsellinger³, Michela Consonni², Claudio Garavaglia², Sebastiano Sansano¹, Francesco Piccolo², Andrea Scelfo², Daniel Häussinger³, Daniela Montagna⁴, Franco Locatelli⁵, Chiara Bonini⁶, Attilio Bondanza⁶, Alessandra Forcina⁷, Zhiyuan Li⁸, Guanghui Ni, Fabio Ciceri⁷, Paul Jenö⁹, Chengueng Xia⁸, Lucia Mori¹,¹⁰, Paolo Dellabona², Giulia Casorati² and Gennaro De Libero¹,¹⁰

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Full text of the Journal of Experimental Medicine paper can be accessed online from: http://jem.rupress.org/content/early/2014/06/11/jem.20140410.abstract

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About the Singapore Immunology Network (SIgN)

The Singapore Immunology Network (SIgN), officially inaugurated on 15 January 2008, is a research consortium under the Agency for Science, Technology and Research (A*STAR)’s Biomedical Research Council. The mandate of SIgN is to advance human immunology research and participate in international efforts to combat major health problems. Since its launch, SIgN has grown rapidly and currently includes 250 scientists from 26 different countries around the world working under 28 renowned principal investigators. At SIgN, researchers investigate immunity during infection and various inflammatory conditions including cancer and are supported by cutting edge technological research platforms and core services.

Through this, SIgN aims to build a strong platform in basic human immunology research for better translation of research findings into clinical applications. SIgN also sets out to establish productive links with local and international institutions, and encourage the exchange of ideas and expertise between academic, industrial and clinical partners and thus contribute to a vibrant research environment in Singapore.

For more information about SIgN, please visit www.sign.a-star.edu.sg.
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