MedicalXpress

Scientists identify new biomarker for cancer in bone marrow: Promise for patients of multiple myeloma

December 13 2012

Singapore scientists have identified FAIM, a molecule that typically prevents cell death, as a potential biomarker to identify an incurable form of cancer in the bone marrow. Patients with this form of cancer usually do not get cured with current standard treatments such as chemotherapy and stem cell transplantation, with an average survival of only about four years. FAIM could thus be a therapeutic target in these patients, as drugs developed to target the molecule could destroy multiple myeloma cells and hence eradicate the cancer.

Multiple myeloma is an incurable cancer of blood cells, which arises due to an uncontrollable accumulation of antibody-producing plasma cells in the bone marrow. In Singapore, about 80 new cases of multiple myeloma are diagnosed every year. Unfortunately, most people who develop multiple myeloma have no clearly identifiable risk factors for the disease but factors such as individuals older than 50 years of age, men and obesity, may predispose one to the cancer.

The scientists discovered that a protein called Fas apoptosis inhibitory molecule (FAIM) can affect the activation of Akt, an important enzyme required for cancer cell proliferation. By silencing the expression of FAIM, the team showed that the myeloma cells could be destroyed. It was also found that this protein was present at higher levels in the plasma cells of these patients as compared to normal individuals, and that higher levels of FAIM correlated to poorer survival outcomes of patients. This

is an important breakthrough as it not only identifies FAIM as a useful biomarker of multiple myeloma patients, but also as a good target that drugs can be developed for, in order to get rid of the cancer cells.

This collaborative research was conducted by scientists at A*STAR's Bioprocessing Technology Institute (BTI) led by Prof Lam Kong-Peng, along with clinician-scientists at National University Cancer Institute, Singapore (NCIS) and the Cancer Science Institute of Singapore (CSI Singapore) at the National University of Singapore. The research findings were published in *Leukemia* on 5 December 2012.

Prof Lam said, "This study adds onto previous studies in the institute demonstrating the utility of FAIM not only in biotechnology but now potentially in the clinic. It is a prime example of how a better understanding of FAIM protein function enables us to first use it to increase yield in biologics manufacturing, and now as a potential prognostic biomarker in the clinic for a deadly human disease such as multiple myeloma. This is really a translation from bench-to-bioreactor and bench-to-bedside."

"Treatment failure due to drug resistance is an important reason why patients with multiple myeloma have a poor outcome. In this study, we identified FAIM as a new biomarker that is associated with poor outcome as well as an important mediator of growth signals in myeloma cells that could lead to drug resistance. The detection of this biomarker will allow us to identify these high risk patients and possibly develop treatments that target FAIM to improve their outcome. This study also underlines the potential for collaborative work between A*STAR research institutes (BTI), CSI Singapore and the National University Cancer Institute of Singapore (NCIS) to perform research that may have significant impact on patients," said Associate Professor Chng Wee Joo, who is Senior Consultant Haematologist at the Department of Haematology-Oncology, NCIS and Senior Principal Investigator at CSI.

More information: Huo, J. et al., Fas Apoptosis Inhibitory Molecule (FAIM) is up-regulated by IGF-1 signaling and modulates Akt activation and IRF4 expression in Multiple Myeloma, *Leukemia*.

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Provided by Agency for Science, Technology and Research (A*STAR), Singapore