

PRESS RELEASE

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Singaporean Research Team Develops First Cytotoxic Antibody against Undifferentiated Stem Cells

Finding could lead to safer stem cell use for clinical applications

A*STAR's Bioprocessing Technology Institute (BTI) researchers have developed a monoclonal antibody that is able to specifically target undifferentiated human embryonic stem cells (hESCs) and cause them to undergo induced cell death. The research team's findings were published online on 20th March 2008 in the journal *Stem Cells*.

When the scientists added the monoclonal antibody, *mAb 84*, to laboratory cultures of hESCs, it specifically eliminated undifferentiated cells within 30 minutes but left differentiated cells untouched.

"Some people find it strange why we want to develop antibodies to kill off stem cells," said BTI Senior Scientist Dr. Andre Choo. "Indeed, stem cells are pluripotent but what is less known about them is that the very same cells can cause teratoma formations. The antibody, *mAb 84* can be used before transplantation to remove any residual undifferentiated cells and therefore reduce the risk of teratoma formation. This will help address safety concerns when clinical approval for stem cell therapies is required in the future."

Stem cells are well known for their ability to differentiate into virtually any type of cell, given the correct growth signals. However, stem cells that fail to differentiate can form cancerous growths called *teratomas*¹. Studies have shown that even as little as two residual undifferentiated stem cells can cause teratoma formation.

Professor Miranda Yap, Executive Director of BTI added, "The work done by Andre's team has helped reinforce BTI as a leader in biologics development. It is a significant step for preclinical stem cell therapy applications. We are actively seeking collaboration with other stem cell researchers to further explore possible applications and exploit the therapeutic potential behind it."

¹ Teratoma: a tumor derived from more than one embryonic layer and made up of a heterogeneous mixture of tissues.

Work has already started by the team to determine the molecular mechanisms behind the process of cell killing. In the laboratory, the researchers also are investigating potential therapeutic applications of *mAb 84*. BTI also is collaborating with Raven Biotechnologies, a California-based company that specializes in antibody therapeutics, to further generate novel antibodies to further the research.

Professor Yap said that other possible applications arising from this work include the development of robust cell separation methods to isolate specific populations of stem cells, a pre-requisite for using hESCs in clinical treatments.

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Information Sheet

Research publication

The research findings described in this press release can be found online at *Stem Cells Express*, under the title “Selection Against Undifferentiated Human Embryonic Stem Cells by a Cytotoxic Antibody Recognizing Podocalyxin-like Protein-1”, published on 20th March 2008.

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About Bioprocessing Technology Institute (BTI)

<http://www.bti.a-star.edu.sg>

Bioprocessing Technology Institute (BTI) is a member of the Agency for Science, Technology and Research (A*STAR). Established in 1990 as the Bioprocessing Technology Unit, it was renamed the Bioprocessing Technology Institute (BTI) in 2003. The research institute’s mission is to develop manpower capabilities and establish cutting-edge technologies relevant to the bioprocessing community. Some of the key research areas include expression engineering, animal cell technology, stem cell research, microbial fermentation, downstream purification and analytics.