

## **MEDIA RELEASE FOR IMMEDIATE RELEASE**

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### **A\*STAR'S IME AND INEX INNOVATIONS EXCHANGE TO DEVELOP NON- INVASIVE PRENATAL DIAGNOSTIC TECHNOLOGY**

*IME's rare cell isolation technology will eliminate risk of pregnancy loss associated with invasive diagnostic testing, paving the way for effective therapy treatments of genetic fetal abnormalities*

**Singapore** – A\*STAR's Institute of Microelectronics (IME) and INEX Innovations Exchange (INEX), a local molecular diagnostic company, today announced they are collaborating to develop a non-invasive prenatal diagnostic technology that is as effective as and safer than prevailing prenatal diagnostic procedures. The collaboration will leverage IME's expertise in microfabrication and INEX's translational research capabilities in creating products valued by the clinical community.

Expectant mothers whose prenatal screening results show signs of fetal anomaly are often recommended to undergo prenatal diagnostic tests for a definitive diagnosis of fetal genetic abnormalities, as this allows for early medical treatment of these conditions. However, prevailing diagnostic procedures such as amniocentesis and chorionic villus sampling (CVS), while reliable, are invasive and carry a risk of pregnancy loss of up to approximately 5 per cent<sup>1</sup>.

The partnership aims to overcome this risk by leveraging IME's rare cell isolation technology – a microfluidic chip that contains a microfabricated filter membrane to isolate and enrich fetal cells found in maternal blood.

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<sup>1</sup> Cynthia L. Anderson, MD, and Charles E. L. Brown, MD, MBA, "Fetal Chromosomal Abnormalities: Antenatal Screening and Diagnosis, American Family Physician, 2009 Jan 15;79(2):117-123.

Cell isolation and enrichment is a process to isolate, identify, and extract target cells such as fetal cells from blood sample, through depleting non-target cells such as red blood cells and platelets. IME's microfluidic chip enables its microfabricated filter to successfully deplete more than 99.9 per cent of non-target cells out of all the cells in a blood sample and effectively capture fetal cells with high recovery rate of approximately 85 per cent. It is also less likely to cause target cell loss compared to existing methods that separate or remove non-target cells that involve mechanical centrifugation or chemically cell lysis steps. IME's rare cell isolation technology could also potentially be applied to the prognosis of cancer through the isolation and enrichment of cells shredded from a cancer tumour, also referred as circulating tumour cells.

IME's technology overcomes the critical challenge of isolating fetal cells known for their rarity<sup>2</sup>, to produce high purity sample for clinical downstream molecular analysis of aneuploidies or chromosomal abnormalities, and identification of various genetic disorders. It could also potentially be used from the eighth week of pregnancy, the earliest among all current prenatal diagnostic technologies<sup>3</sup>.

Clinicians will only need to draw a few millilitres of blood from an expectant mother to generate results of the health condition of the fetus.

Statistics have shown that without proper prenatal diagnosis and effective fetal treatment therapy, one in 50 babies would be born with serious physical and mental handicap and as many as one in 30 newborns would develop some form of congenital malformation<sup>4</sup>.

This diagnostic technology is expected to eliminate the risk of pregnancy loss associated with invasive prenatal testing, and allow effective treatment of genetic fetal abnormalities.

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<sup>2</sup> Reported only one fetal cell is present among billions of cells in one milliliter of blood sample. Source: Bianchi DW, Williams JM, Sullivan LM, Hanson FW, Klinger KW, Shuber AP, "PCR quantitation of fetal cells in maternal blood in normal and aneuploid pregnancies", American Journal of Human Genetics, 1997 Oct; 61(4): 822–829.

<sup>3</sup> CVS for genetic diagnosis is performed between 10 and 13 weeks while amniocentesis is typically performed between 16 and 18 weeks' of gestation. Recently developed noninvasive prenatal testing (NIPT) was recommended to be performed only after 10 weeks of gestation to ensure greater accuracy.

Source: Jon Hyett, "Non-invasive prenatal testing for Down Syndrome", Australian Prescriber, 2014 April Vol 37 (2):51-55.

<sup>4</sup> Harper P. Practical genetic counselling (5th ed). Oxford:Butterworth-Heinemann 1998.

“Over the years, advancements in science and technology have improved surgical fetal therapies that treat prenatally diagnosed abnormalities. As fetal care continues to improve, innovations in prenatal diagnostics, such as effective non-invasive prenatal diagnostic tests that enable early risk assessment, will support doctors in their counsel to patients and better manage fetal conditions”, said Prof. Mahesh Choolani, Senior Consultant at the Department of Obstetrics & Gynaecology of NUH.

Prof. Dim-Lee Kwong, Executive Director of IME, said “It is exciting to see more medical technology companies in Singapore and worldwide working with IME. In IME, particularly our Bioelectronics programme, we work closely with clinicians and position ourselves to develop technologies to fulfill clinical unmet needs. We expect this breakthrough to utilise IME’s core capabilities in medical technology to get a head start in developing rare cell isolation technology to benefit clinicians and patients”.

“As a company focused on women’s and fetal health, we are delighted to collaborate with IME to bring new capabilities to the world to improve women’s health. IME’s rare cell isolation system is simple to use and has the potential to revolutionise the practice of prenatal diagnosis globally. We are confident that the partnership with IME would prove to be an exciting and fruitful journey”, said Ms. Sim Hui Shan, Vice President -Commercial of INEX.

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## **About A\*STAR's Institute of Microelectronics (IME)**

The Institute of Microelectronics (IME) is a research institute of the Science and Engineering Research Council of the Agency for Science, Technology and Research (A\*STAR). Positioned to bridge the R&D between academia and industry, IME's mission is to add value to Singapore's semiconductor industry by developing strategic competencies, innovative technologies and intellectual property; enabling enterprises to be technologically competitive; and cultivating a technology talent pool to inject new knowledge to the industry. Its key research areas are in integrated circuits design, advanced packaging, bioelectronics and medical devices, MEMS, nanoelectronics, and photonics.

For more information about IME, please visit <http://www.ime.a-star.edu.sg>.

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

The Agency for Science, Technology and Research (A\*STAR) is Singapore's lead public sector agency that spearheads economic oriented research to advance scientific discovery and develop innovative technology. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit society.

As a Science and Technology Organisation, A\*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and Research Institutes, the wider research community and industry. A\*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities primarily located in Biopolis and Fusionopolis.

For more information on A\*STAR, please visit <http://www.a-star.edu.sg>.

## **About INEX Innovations Exchange Pte Ltd (INEX)**

Established in 2006, INEX Innovations Exchange Pte Ltd (INEX) is a pioneering molecular diagnostic company focused on the research, development, marketing and licensing of innovative technology for the advancement of women's health, including maternal and fetal health. A spinoff from the National University of Singapore (NUS), INEX collaborates with prominent clinical scientists and academic institutions to leverage innovative technologies and revolutionize medicine for improved and safer outcomes. INEX is headquartered in Singapore.

Please visit <http://www.inex.sg>.