

MEDIA RELEASE
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EXPLORING THE DAVIDS AND GOLIATHS OF THERAPEUTIC MOLECULES

A*STAR inks deals with Siena Biotech to develop small- and large-molecule therapies for cancer and bone loss diseases

1. Two research units under Singapore's Agency for Science, Technology and Research (A*STAR), the Experimental Therapeutics Centre (ETC) and Singapore Immunology Network (SIgN), are collaborating with Italy's Siena Biotech S.p.A. to develop new drugs and targeted antibodies respectively, which will potentially help millions of cancer and bone loss patients across the world. This is the fifth major collaboration A*STAR has with research centres and universities in Italy¹.

Small molecule for cancer therapy

2. ETC and Siena Biotech are developing molecular inhibitors of a major signalling pathway in oncology to target difficult-to-treat forms of cancer such as gastric cancer, leukaemia and brain tumours. During this collaboration, up to six groups from ETC and some 30 scientists from Siena Biotech will be conducting tests on synthetic compounds to characterise and optimise their inhibitor function in cancer cells. A drug is expected to enter clinical trials in 2011.

3. Targeted forms of cancer therapy have gained significant interest since the late 1990s. They employ small molecules that inhibit mutated, overexpressed, or otherwise critical proteins characteristic of a particular cancer cell, rather than non-specifically inhibiting and killing of all rapidly dividing cells within the body. ETC and Siena Biotech's molecular inhibitors may improve the prognosis for a very significant number of cancer patients, given that gastric cancer is the fourth most common cancer in the world and the second leading cause of cancer death. Gastric cancer is also one of the most common in Singapore (fifth highest in men and seventh highest

¹ A*STAR's first four collaborations with Italy are: Memorandum of Intent (MOI) with the University of Milano-Bicocca (2007) to promote scientific exchange between the two organisations; the launch of the A*STAR-University of Milano-Bicocca Research Attachment Programme (March 2009) allowing University of Milano-Bicocca PhD students to receive part of their research training at A*STAR research institutes; an MOI with the FIRC Institute of Molecular Oncology (FIRC), the European Institute of Oncology (IEO) and the European School of Molecular Medicine (SEMM) (March 2009) to advance basic scientific findings into new strategies of cancer treatment and prevention; and a Memorandum of Understanding (MOU) with Regione Lombardia (April 2009), the signing of which was witnessed by Senior Minister-Of-State S Iswaran and Senior Minister Goh Chok Tong.

in women, according to the Singapore Cancer Registry), with over 600 cases diagnosed every year.

4. “ETC is committed to translating early-stage scientific discoveries into practical applications,” said Prof Alex Matter, CEO of ETC and leader of the research team that discovered the first targeted anti-cancer drug, Gleevec². “Leveraging on our technological know-how and the industry experience of Siena Biotech, we expect our partnership to spark new breakthroughs for cancer research. We especially appreciate the power of collaboration in the dynamic arena of cancer drug discovery.”

Large molecule to treat bone diseases

5. SlgN and Siena Biotech are jointly developing a novel monoclonal antibody³ applicable to bone diseases such as osteoporosis. Under the agreement, Siena Biotech will characterise, develop and test the effectiveness of the monoclonal antibodies while SlgN will isolate the disease-specific human monoclonal antibody from a pool of tens of billions of polyclonal antibodies.

6. SlgN and Siena Biotech’s antibody is another example of the world-class research being done on targeted disease therapies. The monoclonal antibody is intended to block a specific extracellular component in the molecular pathway that leads to bone loss, and thus stop the disease progression. If successful, it would reduce the risk of bone fractures and hence the associated healthcare costs for those suffering from various forms of bone frailty. Osteoporosis alone is estimated to afflict 1 in 3 women and 1 in 12 men over the age of 50 worldwide.

7. SlgN Chairman, Prof Philippe Kourilsky commented, “It is thanks to the excellent relationship that Singapore shares with Italy that we can collaborate in the often-neglected area of bone and tissue loss. Together with Siena Biotech, we will be using some of the world’s most advanced molecular biology and antibody engineering techniques to hopefully make good progress in this area of research, and meet the dire healthcare needs of the world’s ageing population.”

8. “The strong synergies derived from shared commitment and knowledge coupled with complementary technology platforms between ETC, SlgN, and Siena Biotech will accelerate the development of novel therapies in difficult to treat diseases making them quickly available to the patients,” said Dr Giovanni Gaviraghi, CEO of Siena Biotech.

² Gleevec (Gleevec in the US, or Glivec in Europe/ Australia/ Latin America) is the market name for Imatinib, a targeted drugs which specifically inhibits the enzyme tyrosine kinase. In chronic myeloid leukaemia, tyrosine kinase is stuck in the “on” position. Imatinib binds to the site of tyrosine kinase activity, thus preventing the adverse effects of renegade cancer cells while avoiding the killing of non-cancer cells.

³ Monoclonal antibodies have been shown to be more potent and cause less side effects than some conventional drugs, as they are highly selective against a disease target, and do not interact with other molecules in the body that have nothing to do with the disease. SlgN and Siena Biotech will be employing a unique phage-display approach to produce “human” antibodies with very low chance of rejection.

9. "We are delighted that new scientific collaborations have been agreed between Siena Biotech and A* STAR. The common vision between A* STAR and the Fondazione Monte dei Paschi di Siena, to evolve and develop of their local economies, has been one of the pillars of the collaboration which we hope will bring new and effective medicines to the patients," added Marco Parlangeli, President of Siena Biotech and General Manager of Fondazione Monte Paschi di Siena.

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About the Experimental Therapeutics Centre (ETC)

ETC was set up in 2006 to play an increasingly important role in translating early-stage scientific discoveries into practical applications. From engaging in early stage drug discovery and development to developing innovative research tools for clinical analysis, as well as setting up public-private partnerships to facilitate the advancement of drug candidates, ETC augments Singapore's capabilities and resources in the drug discovery process. ETC's capabilities and resources are currently focused on oncology and infectious diseases. It also incubates new technologies for commercialisation and mentors young scientists for careers in the pharmaceutical and biotech industry.

For more information about ETC, please visit www.etc.a-star.edu.sg.

About the Singapore Immunology Network (SIgN)

SIgN, officially inaugurated on 15 January 2008, is a research consortium under A*STAR's Biomedical Research Council. It is aimed at building on the strengths of the existing immunology research groups at A*STAR, as well as expanding and strengthening the immunology research expertise in Singapore. SIgN's objectives

include coordinating basic, translational and clinical research needed to establish immunology as a core capability in Singapore. The major focus areas of research at SIgN are Infection and Inflammation, in which SIgN researchers investigate immune responses and regulation in disease-specific contexts. Through this, SIgN aims to build up 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 initiatives within Biopolis and across Singapore, as well as to obtain international recognition as a leading immunology research hub while establishing relationships with the best institutions in the world.

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

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

A*STAR is the lead agency for fostering world-class scientific research and talent for a vibrant knowledge-based and innovation-driven Singapore. A*STAR oversees 14 biomedical sciences, and physical sciences and engineering research institutes, and nine consortia & centres, which are located in Biopolis and Fusionopolis, as well as their immediate vicinity.

A*STAR supports Singapore's key economic clusters by providing intellectual, human and industrial capital to its partners in industry. It also supports extramural research in the universities, hospitals, research centres, and with other local and international partners.

For more information on A*STAR, please visit www.a-star.edu.sg.

About Siena Biotech S.p.A.

Siena Biotech S.p.A. is an innovative, clinical-stage drug discovery company whose R&D efforts are mainly focused on discovering new drugs for therapeutic intervention against neurodegenerative diseases and oncology. The company, based in Siena, Italy, is the instrumental company of the Monte dei Paschi di Siena Foundation to operate in the field of scientific research and biotechnology, in line with its founding charter and mission.

Siena Biotech is structured around drug discovery platforms encompassing all the skill sets and technologies needed from target identification to clinical proof of concept. The company has developed an internal portfolio of several innovative R&D projects in three therapeutic areas: Alzheimer's disease, Huntington's disease, and oncology. The projects are rapidly progressed through the pipeline, in some cases capitalising on strategic alliances with major pharmaceutical companies to best ensure rapid progress to and through clinical trials. In addition, Siena Biotech has built a wide network of external collaborations, in both the academic and business communities, to add to its scientific excellence, bring in new ideas, and to provide business opportunity, thus creating a sound base for its interactions with patients and physicians.

More information about Siena Biotech is available at www.sienabiotech.com.