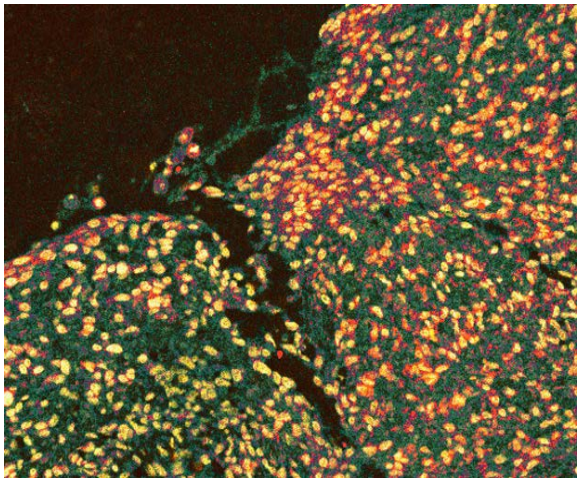
Institute of Molecular and Cell Biology
IMCB

MEDIA FACT SHEET

6 DECEMBER 2021

A NOVEL PROTEIN THERAPY FOR EFFICIENT SKIN WOUND HEALING

***Singapore scientists have discovered a protein that could be used in wound dressings to heal chronic wounds*.**



*Advanced imaging showing sAgrin treated wounded human skin tissue express biomarkers (cyan) while improving skin architecture (green). The nuclei of skin cells are shown in golden. Image credit: Dr Sayan Chakraborty, Institute of Molecular and Cell Biology (IMCB), A*STAR*

SINGAPORE – A protein named Agrin has been discovered to promote wound healing and repair, when it is triggered after skin tissue is injured. These findings could pave the way for the development of Agrin protein therapy to accelerate skin tissue healing for chronic wounds from diabetes or burns. The research, led by A*STAR's Institute of Molecular and Cell Biology (IMCB), was published in leading scientific journal Nature Communications on 3 November 2021.

One in 20 Singaporeans is afflicted with chronic wound conditions.[1] Complications in the healing of chronic wounds are prevalent in patients suffering from diabetes or burn injuries,

[1] A One-Stop Centre for Wound Healing, by Changi General Hospital, Wound Healing Centre: https://www.ndcs.com.sg/news/medadvance/a-one-stop-centre-for-wound-healing

and are a leading cause of amputation and decreased emotional wellbeing for patients. During injury, a major chunk of extracellular matrix (ECM)—which helps to rebuild tissue—is lost, therefore delaying wound healing. As such, the timely replenishment of key ECM proteins may accelerate wound healing.

In this study, researchers have shown that timely induction or exogenous supplementation of Agrin, an ECM protein, may promote accelerated healing of injured skin tissues. Using both human and pre-clinical models, they found that physical injury to the skin tissue enhanced the expression of Agrin, which preserves the mechanical architecture of injured skin layers by repairing the skin tissue.

The IMCB team in collaboration with the Mechanobiology Institute, National University of Singapore also discovered that a recombinant fragment of Agrin that can be easily produced, sAgrin, may serve as a bio-additive material to improve healing when applied as a topical hydrogel to the injured skin. These findings would advance the development of Agrin-based bio-scaffolds that could offer accelerated skin tissue healing by restoring the damaged tissue.

"We found that in our preclinical wound healing models, Agrin protein therapy offers accelerated healing, compared to collagen gels that are in the market. Besides healing wounds at a faster pace, Agrin therapy preserves the wound microenvironment that enforces better repair mechanisms than existing controls used in the study. The findings offer the potential for developing Agrin-based wound healing biomaterials that could help patients with chronic wounds," said Dr Sayan Chakraborty, Senior Research Scientist at A*STAR's IMCB and lead researcher of the study.

"Recent studies from various labs in the scientific community have implicated a role of Agrin in repair and regeneration of diverse tissues and organs. This study may offer a novel approach for regenerative medicine beyond conventional chronic wound treatments and improve health outcomes," said Professor Wanjin Hong, Executive Director of IMCB and senior corresponding author of the study.

Moving forward, the research team plans to extend testing of sAgrin therapy on pre-clinical wound healing models to improve the efficacy of the study, as well as to develop bioprinted scaffolds with Agrin that could help to repair damaged tissue.

– END –

Enclosed:

ANNEX A – Notes to Editor on Research Findings

For media queries and clarifications, please contact:

Ms Yip Min ting
Assistant Head, Corporate Communications
Agency for Science, Technology and Research (A*STAR)
Tel: +65 65171977
Email: yip_min_ting@hq.a-star.edu.sg

About A*STAR's Institute of Molecular and Cell Biology (IMCB)

The vision of Institute of Molecular and Cell Biology (IMCB) is to be a premier cell and molecular biology institute which addresses the mechanistic basis of human diseases and its mission is to conduct cutting-edge discovery research in disease pathways; to groom early career researchers to be future leaders in research; and to collaborate with the public sector, medical and industry communities for research impact. IMCB plays an important role training and recruiting scientific talents, and has contributed to the development of other research entities in Singapore. Its success in fostering a biomedical research culture in Singapore has catalysed Singapore's transformation into an international hub for biomedical research, development and innovation.

Funded by A*STAR, IMCB's use-inspired research comprises 4 major programmes: Neurometabolism in Health and Diseases; Cancer Signalling and Therapies; Cell Biology and Therapies; and Innovative Technologies. IMCB also has two semi-autonomous programmes, the Disease Intervention Technology Laboratory (DITL), and the Molecular Engineering Laboratory (MEL). IMCB's technologies and platforms focus on Mouse Models of Diseases, Molecular Histopathology, Cellular Microscopy, and Proteomics & Metabolomics. For more information about IMCB, please visit www.a-star.edu.sg/imcb.

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 R&D agency. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit the economy and 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 improving societal outcomes in healthcare, urban living, and sustainability. A*STAR plays a key role in nurturing scientific talent and leaders for the wider research community and industry. A*STAR's R&D activities span biomedical sciences to physical sciences and engineering, with research entities primarily located in Biopolis and Fusionopolis. For ongoing news, visit www.a-star.edu.sg.

Follow us on
Facebook | LinkedIn | Instagram | YouTube | Twitter

ANNEX A – NOTES TO EDITOR

The research findings described in this media release can be found in the *Nature Communications* Journal, under the title, *"*Agrin-Matrix Metalloproteinase-12 axis confers a mechanically competent microenvironment in skin wound healing*".*

Agency for Science, Technology and Research (A*STAR)
1 Fusionopolis Way #20-10 Connexis North Tower Singapore 138632
T + 6826 6111 **W** www.a-star.edu.sg