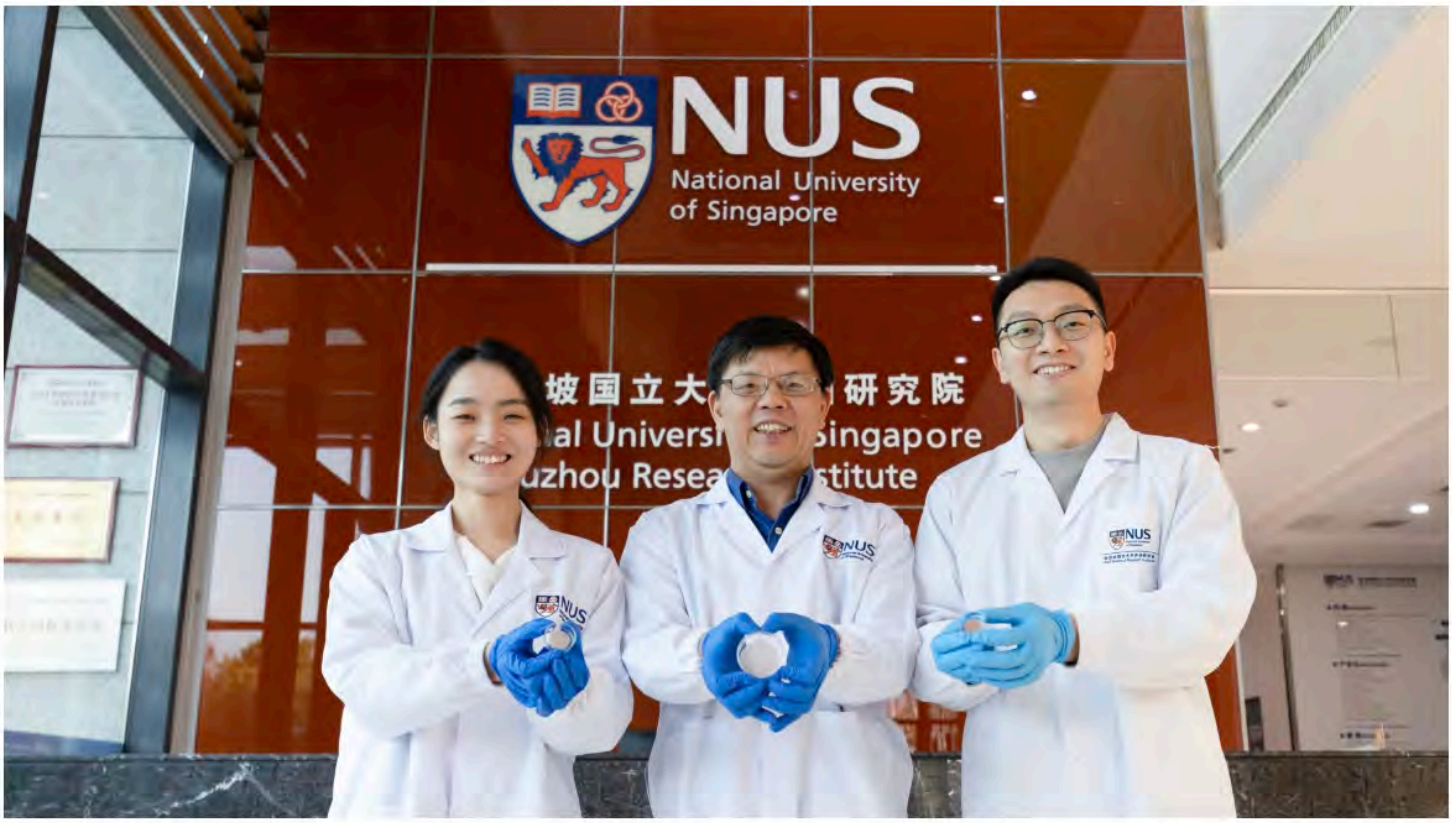
NUS scientists develop plant-based cell culture scaffold for cheaper, more sustainable cultured meat

Besides speeding up the process of lab-based meat cultivation, these edible scaffolds can be 3D-printed using widely available plant prolamins



NUS Professor Huang Dejian (middle) and his research team, which included Ms Su Lingshan (left) and Dr Jing Linzhi (right), developed the plant-based cell culture scaffolds.

A research team from the National University of Singapore (NUS) has successfully used common plant proteins to 3D-print an edible cell culture scaffold, allowing more affordable and sustainable lab-grown meat to be served on the table.

As consumers become more conscious of the environmental and ethical ramifications of their food, lab-grown meat, also known as cultured meat or cell-based meat, is becoming an increasingly popular source of dietary protein. Cultured meat is produced by taking skeletal muscle cells from animals and growing them on three-dimensional constructs called scaffolds, which provide structural support as the cells multiply and develop into tissues.

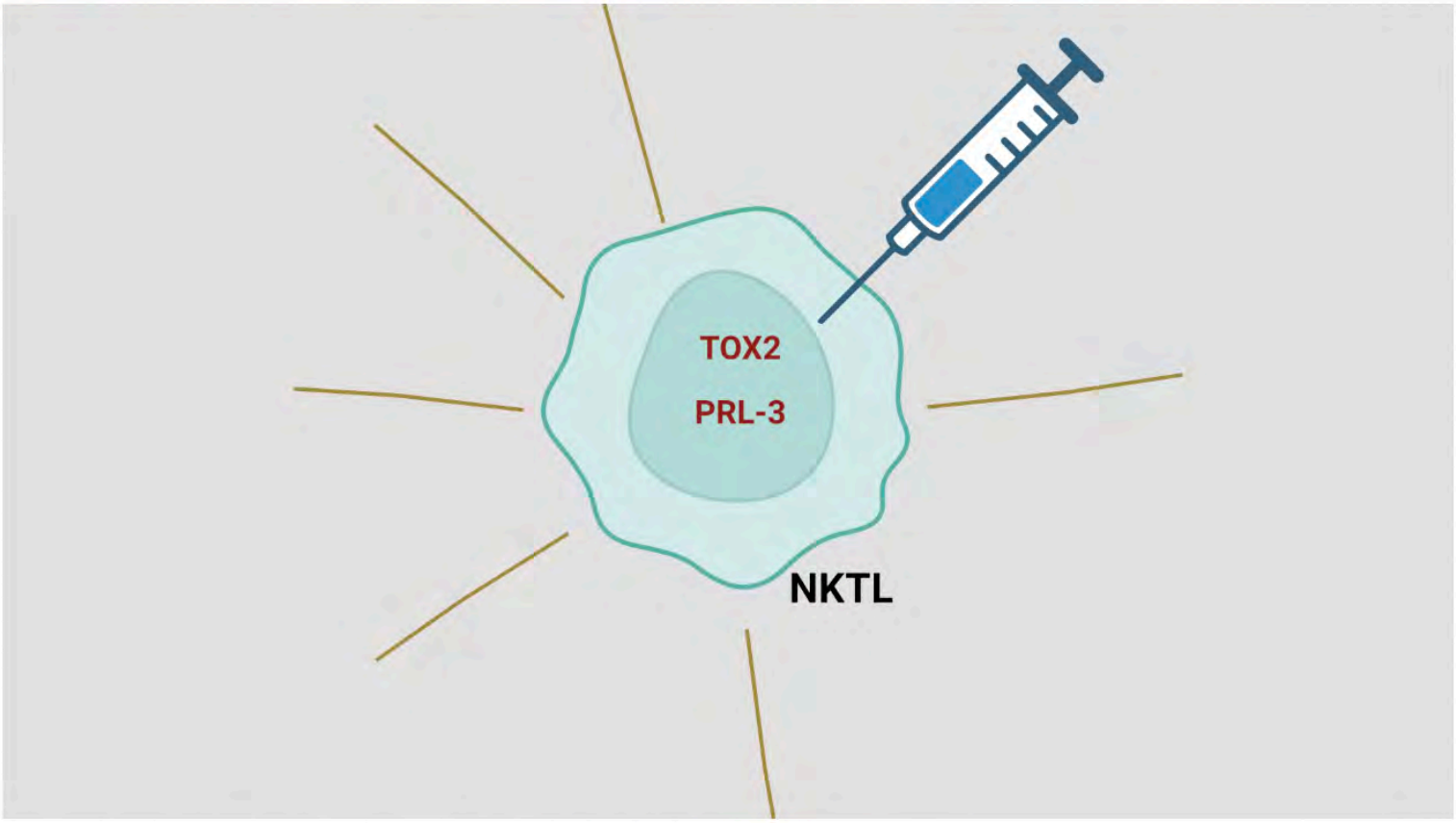
However, cell culture scaffolds are typically made from synthetic or animal-based materials, which are either too expensive or inedible. In search of an alternative, the team led by Professor Huang Dejian, Deputy Head of the NUS Department of Food Science and Technology, turned to plant proteins, which are known to be biodegradable and biocompatible with animal cells. Crucially, plant proteins also satisfy common requirements for food consumption, making the resulting scaffold fit for culturing meat.

“By using readily available cereal prolamins as biomaterials for high-precision 3D printing technology, we open up a new method for manufacturing edible and structured scaffolds to produce cultured muscle meat slices with fibrous qualities,” said Prof Huang.

The team’s work, in line with NUS’ thrust to produce cutting-edge sustainability research, was published in the journal *Advanced Materials* on 22 October 2022.

The making of an edible scaffold

CSI Singapore researchers uncover potential novel therapeutic targets against natural killer/T-cell lymphoma



Potential new therapeutic targets in NKTL. (Illustrated by Dr Jianbiao Zhou)

A team of researchers from the Cancer Science Institute of Singapore (CSI Singapore) at the National University of Singapore (NUS) has discovered that a transcription factor, TOX2, was aberrantly increased in patients with Natural killer/T-cell lymphoma (NKTL). The increased TOX2 level leads to the growth and spread of NKTL, as well as the overproduction of PRL-3 – an oncogenic phosphatase that is a known key player in the survival and metastasis of several other types of cancers. This breakthrough discovery presents a potential novel therapeutic target to treat NKTL.

NKTL is an Epstein-Barr virus (EBV) associated, aggressive non-Hodgkin lymphoma (NHL) with very poor treatment outcomes in the advanced stages. It is prevalent in Asia and Latin America but rare in Europe and North America. Combined radiation therapy and chemotherapy is the consensus standard therapy for NKTL patients, however, they are also often associated with high relapse rate and serious side effects. Thus, improved knowledge of the molecular mechanism leading to NKTL progression, as well as the development of novel targeted therapy strategies, has to be addressed urgently.

Professor Chng Wee Joo and Associate Professor Takaomi Sanda from CSI Singapore, along with Dr Ong Choon Kiat from Duke-NUS Medical School, reported their ground-breaking findings in a paper published in scientific journal *Molecular Cancer* on 10 April 2023. Collective efforts from Dr Jianbiao Zhou, Dr Tze-King Tan, Ms Sabrina Hui-Min Toh, Miss Sinan Xiong, and the rest of the team, have contributed to these pioneering revelations.

Their findings are also the first to show the involvement of TOX2 and PRL-3 in NKTL. These findings were validated