

SINGAPORE NATIONAL ACADEMY OF SCIENCE YOUNG SCIENTIST AWARDS 2020

BIOLOGICAL & BIOMEDICAL SCIENCES CATEGORY

Dr Chew Wei Leong

Senior Research Scientist,
Genome Institute of Singapore, Agency for Science, Technology and Research

“For his work in gene editing therapy”

Dr Chew Wei Leong invents technologies to make pinpoint changes to genes. His research encompasses novel DNA and RNA-editing modalities (Clustered Regularly Interspaced Short Palindromic Repeats CRISPR-associated systems, also known as CRISPR-Cas1 that include Cas9, Cas12, and Cas13), gene therapy delivery vectors (adeno-associated viruses or AAVs), and synthetic biology.

Dr Chew contributed seminal works to gene editing. He pioneered disease gene correction and gene expression control with CRISPR-Cas9 in the body. These technologies open up therapeutic avenues against multiple diseases, including severe inherited diseases, viral infections, blood disorders, eye diseases, and cancers.

Dr Chew’s team has been building foundational technologies, including new genome-editing systems for precise edits in the human genome, nucleic acid detection and manipulation tools, as well as high-throughput molecular discovery and engineering platforms that generate new CRISPR-Cas proteins and AAV vectors. Importantly, his work is the first to show that CRISPR-Cas is immunogenic within the body and that it is possible to predict and negate such adverse immune reactions. Dr Chew’s research programme innovates in transformative nucleic acid therapeutics so that these medicines can be safe and efficacious in the clinic.

Dr Chew and his team have contributed numerous patent applications, inventions, and other intellectual properties in the fields of genome engineering and biotechnology. Some of these have gone on to be licensed to multinational corporations and form the technological foundations for new local startups. Dr Chew’s work has been published in journals such as Science, Nature Methods, Nature Biomedical Engineering, and Nature Communications and shared more broadly as publicly accessible pre-prints on bioRxiv. He is also active in international consortia, bioethics advisory groups, and public outreach. Dr Chew has obtained competitive research funding in the areas of synthetic biology, gene editing, oncology, infectious diseases, and biotechnology.