Tackling Mosquito-borne infectious disease challenges in Malaysia and Southeast Asia

KIRIN R&D DAY 2025

Kirin Holdings Company, Limited. Institute of Health Sciences

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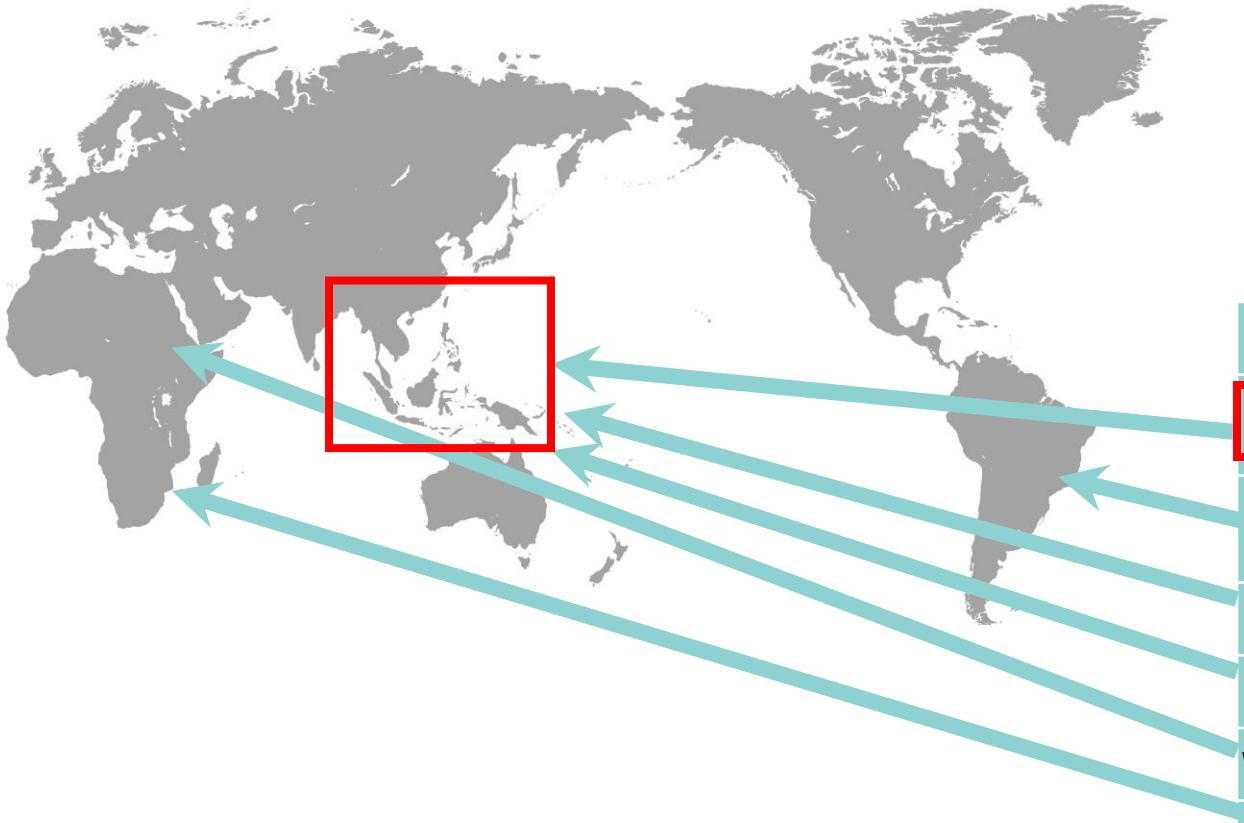
Mosquito-borne infectious diseases remain a major global public health issue



Mosquitoes
are the deadliest animals to humans

Disease	Main endemic regions	Estimated annual infections	Estimated annual deaths
Dengue fever	Tropics & Subtropics（SE Asia, Western Pacific, Americas, Africa）	14.6 million	12,000
Zika fever	Latin America, Caribbean, Africa, SE Asia, Pacific Islands	Highly variable (hundreds of thousands)	Few
Japanese encephalitis	South/SE Asia, Western Pacific (rural, suburban)	68,000	14,000 – 20,000
Chikungunya	Africa, South/SE-Asia, Indian Ocean, Americas	Tens of millions	Very rare
West Nile fever	Africa, Middle East, Eastern Europe, Mediterranean, North America	2,000	~120 in US
Yellow fever	Sub-Saharan Africa, Central/South America	Hundreds	Few

In our strategic region APAC, especially in Southeast Asia,

Dengue Fever is the most significant threat

Why Dengue transmission is spreading

Climate change

Warmer, more humid climates are increasing mosquito populations and expanding their habitats. Mosquito control is becoming more difficult

Increased human mobility

Travel to dengue-endemic regions continues to rise, contributing to disease spread

What can Kirin do to help?

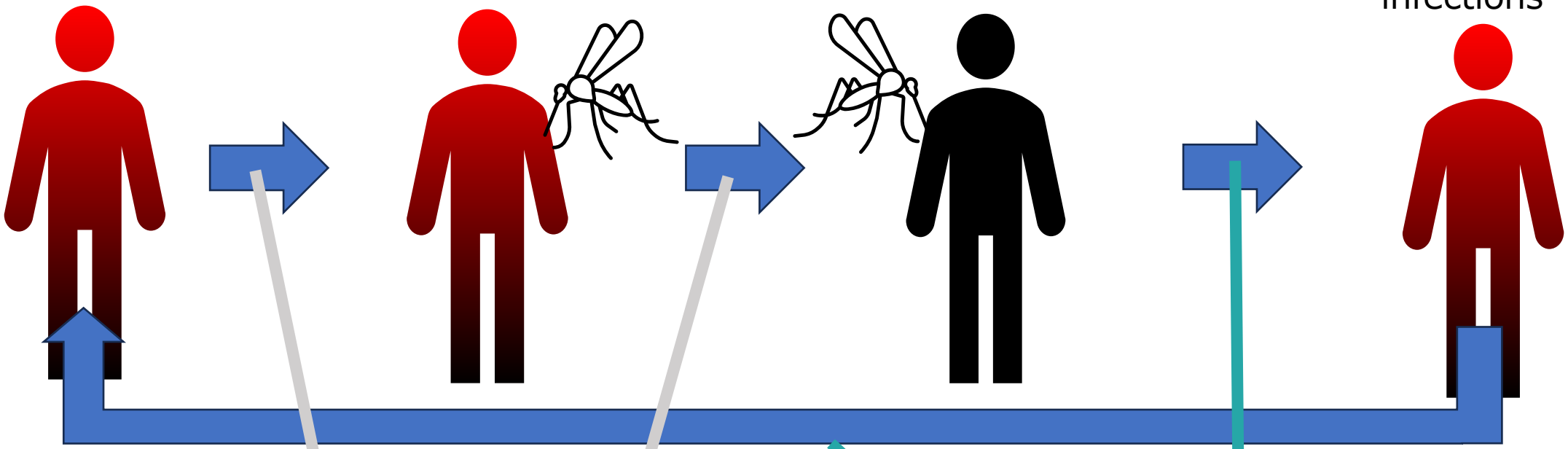
Dengue transmission steps and countermeasures

①A person is infected

②Mosquito bites infected person and acquires virus

③Infected mosquito bites healthy individual

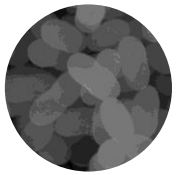
④Viral replication leads to new infections



Conventional measures:
- prevent mosquito breeding, avoid mosquito bites

A new Immunity-based approach - can reduce both viral load and number of infected people

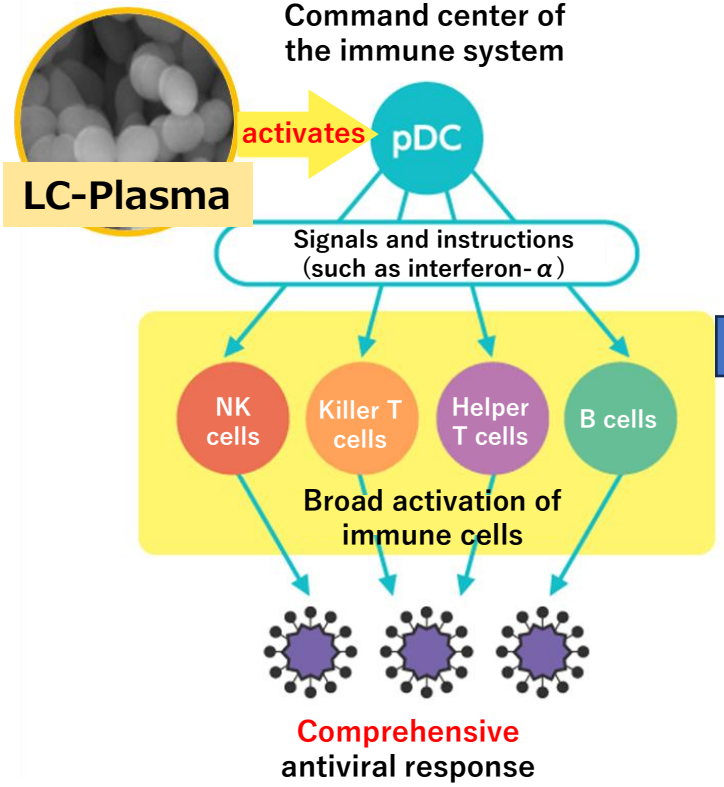
Cases are increasing annually, and there are limits to what current measures can achieve



Addresses limitations of existing strategies
→ LC-Plasma offers a promising solution!

Past research findings helped build trust in Malaysia and paved the way for collaborative studies

Kirin's proprietary functional lactic acid bacterium



Previous research findings on Dengue using LC-Plasma

In vitro

Induction of anti-viral genes mediated by humoral factors upon stimulation with Lactococcus lactis strain plasma results in repression of dengue virus replication in vitro
Antiviral Res. 2018 Dec:160:101-108

In vivo

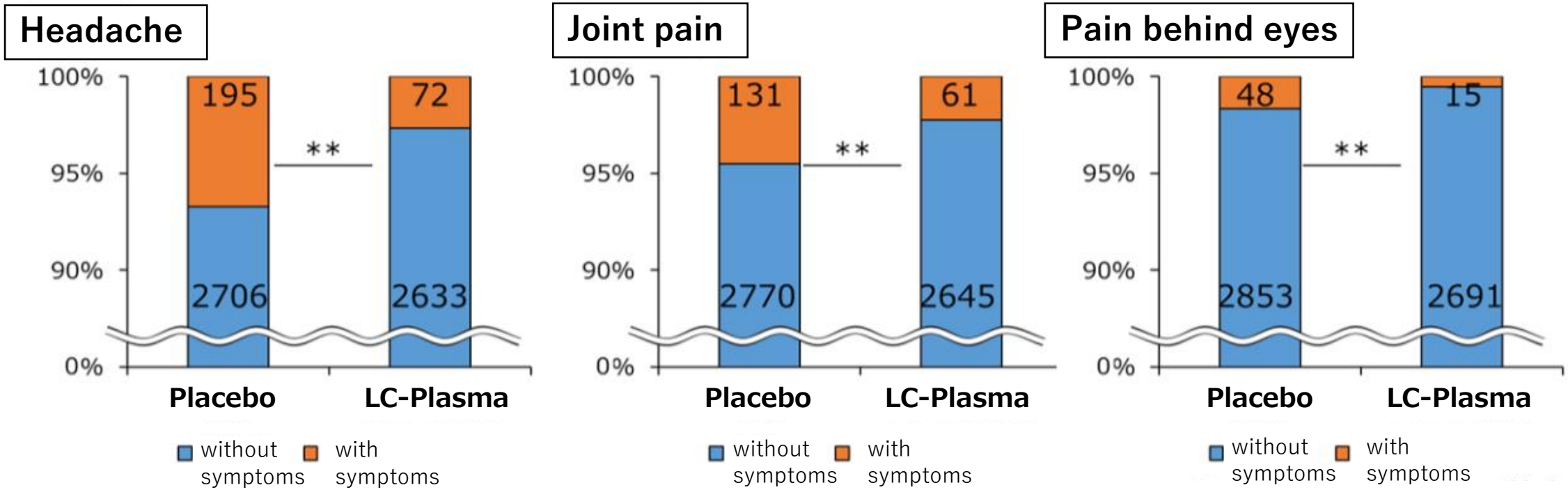
Administration of plasmacytoid dendritic cell-stimulative lactic acid bacteria is effective against dengue virus infection in mice
Int J Mol Med. 2019 Jan;43(1):426-434

Initiating collaboration with experts in endemic regions

Malaysia | University of Malaya・TIDREC (Tropical Infectious Diseases Research & Education Centre)

Led to research collaboration with Prof. Abu Bakar (University of Malaya), a world-renowned infectious disease researcher

Clinical trials evaluated the effectiveness of LC-Plasma on the symptoms of Dengue



**: $p<0.01$, Chi-square test

Ref: *Nutrients* 2021

LC-Plasma was able to alleviate various symptoms

LC-Plasma demonstrated effectiveness against other mosquito-borne diseases at the cellular level

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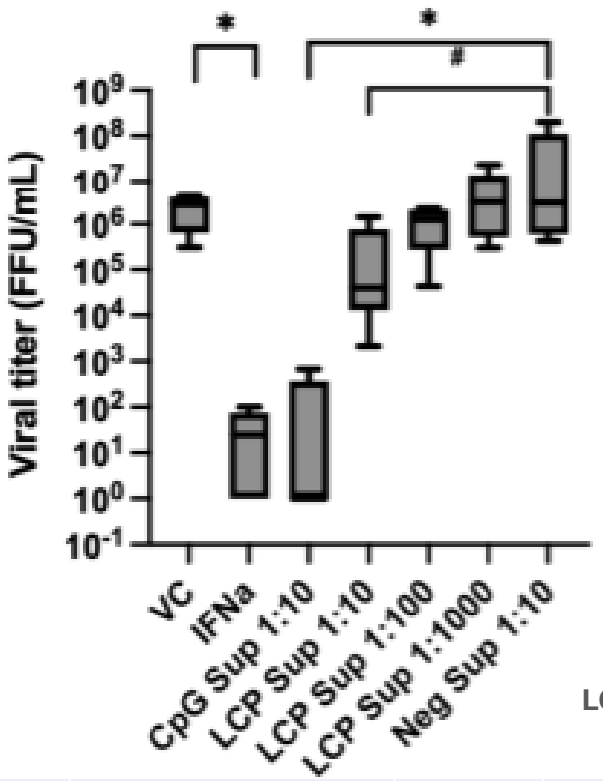
Dengue virus



LCP:LC-Plasma

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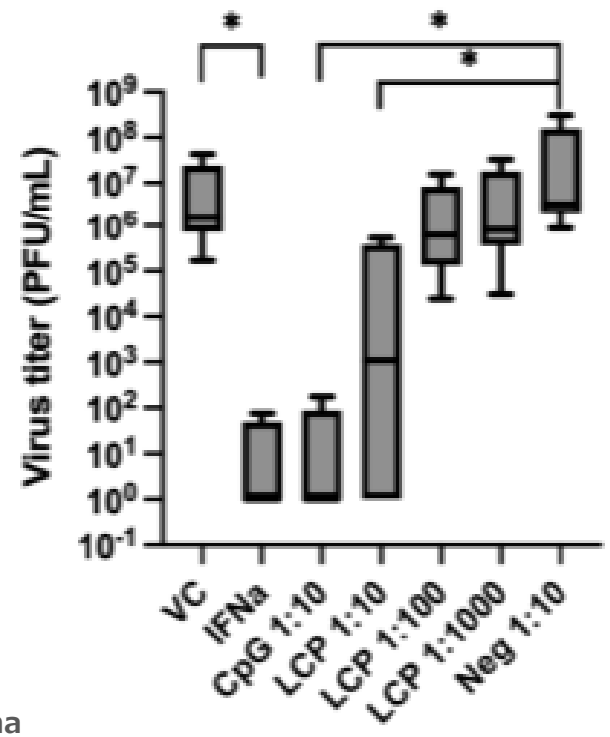
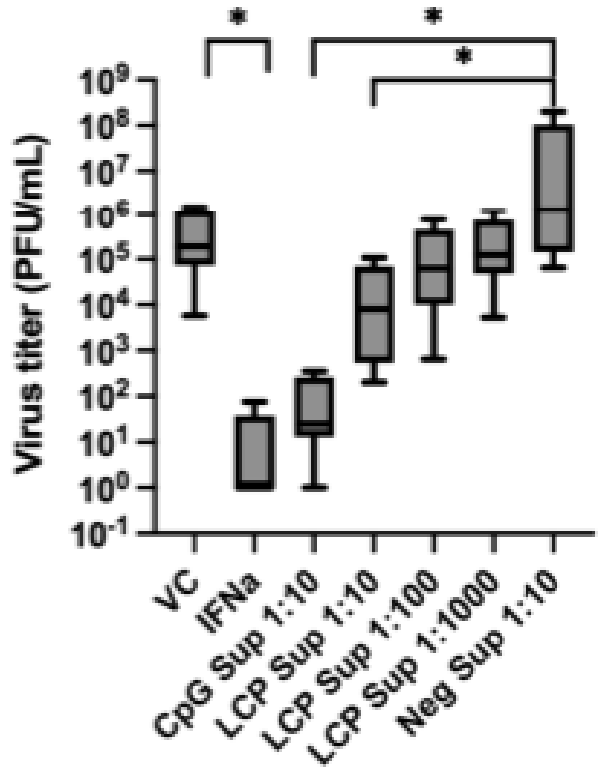
Chikungunya virus



Disease	Main endemic regions	Estimated annual infections	Estimated annual deaths
Chikungunya	Africa, South/SE-Asia, Indian Ocean, Americas	Tens of millions	Very rare

Zika virus



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- **Confirmed antiviral responses against DENV, CHIKV, ZIKV** *-Microorganisms* 2024

Positioned to address even broader global challenges going forward

Expanding business in Malaysia and across Southeast Asia

Laying the groundwork for business expansion into Malaysia

With support from Professor Abu Bakar, confidence in the science behind LC-Plasma has grown

Efforts to translate research outcomes into business initiatives

Preventing infectious disease delivers substantial CSV

Within Japan,

- ✅ **34.98 million** people could improve mental and physical health through daily intake of LC-Plasma
- ✅ Annual medical expenses due to illness is at least **¥1.3801 trillion**
  ➡ potentially could save up to **¥990.2 billion**
- ✅ Income loss due to people missing work for illness is at least **¥3.4807 trillion**
  ➡ could potentially reduce this by **¥1.5374 trillion**

Source : Kirin Integrated Report P.57

With Southeast Asia's population of 700 million, even greater contributions can be expected