

International Vaccine Design Center

Division of Infection Immunology (Human Immune-Profilng Team)

ヒト免疫プロファイリング系・感染免疫学分野

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As a member of the International Vaccine Design Center of IMSUT (VDeSC), we focus on the elucidation of host-pathogen interactions in the context of malaria and Leishmania parasites, and the respiratory viruses, to be able to understand their way of causing pathology to create successful vaccines against them. Our recent topics include how to bolster B cell memory responses against pathogens.

1. Novel adjuvant discovery and development

Adjuvants are known as must-have vaccine components for the potentiation of vaccine responses. As a member of IMSUT International Vaccine Design Center (<https://vdesc.ims.u-tokyo.ac.jp/en/>), we have been involved in the screening of herbal medicine extracts as safe and ready-to-use adjuvants for current human vaccines. We have been systematically screening innate and adaptive immune signaling molecules taking part in the mode of action (MOA) of adjuvants and vaccines. One of the recent findings involves understanding how the combination of TLR9 and STING agonists synergistically induce innate and adaptive responses to become an advantageous type 1 adjuvant while suppressing type 2 immunity which leads to generation of robust anti-tumor responses.

Our recent projects focus on the investigation of B cell development and pathways involved in the germinal center (GC) formation for the generation of potent antibody responses against infections and during

vaccinations. We have found that TBK1, the famous innate immune signaling kinase for controlling anti-viral immune responses and nucleic-acid mediated type-I interferon responses, is very important for the generation of GC which confers sterile immunity to reinfections.

2. Elucidation of malaria-mediated pathologies

Malaria killed 50% more children last year due to Covid-19-mediated lockdowns and restrictions which prevented remedies to reach those who needed them. Our lab has been investigating cerebral malaria immunopathology by using imaging techniques such as CUBIC clearance of the brain. The research has been ongoing for the investigation of olfactory bulb-mediated pathology in experimental cerebral malaria models in mice. We have made significant progress in the understanding of new cell types in the olfactory bulb and signaling molecules taking part.

Publications

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