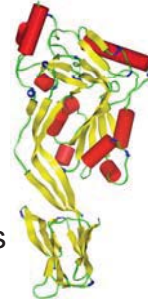


1. Search and characterization of BBM

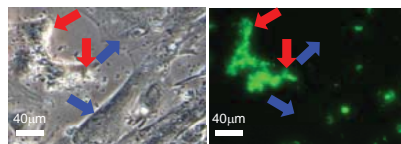
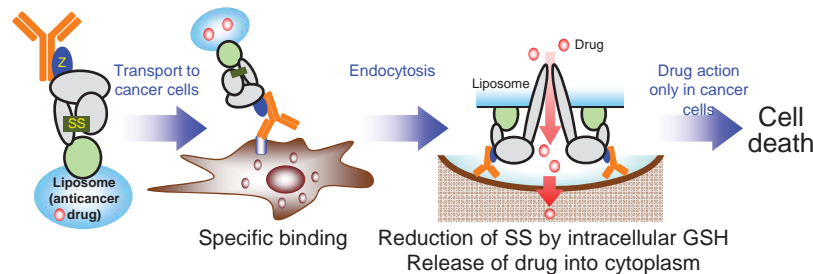
To clarify the molecular mechanism of pathogenicity of pathogenic bacteria and to overcome the infectious diseases, molecular investigations on BBM such as CDC are proceeding.



intermedilysin

2. Application: anti-cancer DDS by CDC variants

Based on the findings in CDC investigations, CDCs were remodeled as the variants for nano-biotool of DDS with a module for fixation of cancer-targeting molecule and controlled toxicity *in vivo*.



Targeting of fluorescent liposomes to cancer cells by an anti-CEA-CDC variant
Red arrow : HepG2 cell, Blue arrow : Human normal fibroblast

3. PCR immunochromatography for pathogen detection

After amplification and simultaneous labeling of marker gene(s) for various pathogens, the amplicon(s) is detected by immunochromatostrip within 10 min.



Content:

Bacteria produce various bacterial bioactive molecules (BBM) such as toxins, enzymes, chaperones, and small metabolites on their growth stage in the habitat/host. Our main interest is on these BBM in the aspects of understanding of pathogenicity and their application for medical and industrial fields. We currently investigate Gram-positive BBM. For example, we searched cytolytins as oral streptococcal virulence factors, discovered unique cholesterol-dependent cytolytins (CDC) with specificity and directivity to human cells (intermedilysin from *S. intermedius* and Sm-hPAF from *S. mitis*, respectively) and twin peptide cytolytins (*i.e.*, streptolysin S of *S. anginosus*), and characterized them. Our team is continuing further investigations on their molecular action mechanism, regulation of gene expression and roles in pathogenicity. Moreover, development of DDS for anticancer treatment is also proceeding by using nano-biotool: CDC variants designed to have cancer-targeting module and controlled toxicity only in intracellular condition. We are also promoting development of inexpensive and rapid PCR immunochromatography system for diagnosis and for hygiene control in food processing and medical facilities.

Keywords: bacteria, toxin, enzyme, DDS, diagnosis system

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