

## Roles of orphan transporters in multidrug-resistant bacteria and development of therapeutic strategies to control infectious diseases

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### 【Outline of survey】

Multidrug-resistant bacteria are now encountered frequently and the rates of multidrug resistance have increased considerably in recent years. Genome annotation produces a considerable number of orphan transporters in bacteria. We previously identified orphan transporters related with bacterial multidrug resistance and virulence. These discoveries support the notion that orphan transporters have specific physiological substrates because these transporters have been shown to have roles in bacterial multidrug resistance and virulence. In this study, we will identify natural substrates of orphan transporters in order to understand physiological functions of bacterial transporters. This knowledge should promote the development of novel inhibitors or strategies that could counteract the contribution of transporters to drug resistance and virulence.

### 【Expected results】

It is increasingly evident that bacterial orphan transporters confer clinically relevant resistance to antibiotics that are used to treat human disease. Our recent results present the evidence that orphan transporters have roles in bacterial virulence and propose that these transporters therefore have greater clinical relevance than is usually attributed to them. This knowledge is important for the development of orphan transporter inhibitors, which is an ongoing area of drug development. Our current understanding of orphan transporters indicates that such inhibitors would be valuable tools to help clear bacterial infection because of their dual function: restoration of the activity of agents to which orphan transporters confer resistance and reduction in the ability of bacteria to cause infection.

### 【References】

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【Term of project】 FY2007 - 2011

【Budget allocation】 12,700,000 yen  
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