FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Development of a novel vaccine against refractory protozoan diseases	
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1. Background of research

Protozoa are a diverse group of single-cell eukaryotic organisms, which include many parasitic species that cause serious disease in mammals. These parasites are also important within the medical, veterinary and agricultural sectors, such as the *Plasmodium* and *Toxoplasma*, which have major impacts on human health and livestock productivity. Although many researchers worldwide have attempted to develop vaccines against protozoan diseases, they have ultimately been unsuccessful because these species possess a unique ability to escape from the vaccine effects.

2. Research objectives

The aim of this study is to develop a next-generation vaccine against protozoan diseases of humans and livestock, and to assess the efficacy of this vaccine using animal infection models.

3. Research characteristics (incl. originality and creativity)

The technology proposed in this study is novel-type of vaccine in which the vaccine components are encapsulated by lipids and oligosaccharide. These novel vaccines are able to induce effective and strong immune responses in human and other animals, overcoming the lower efficacy exhibited by current vaccines.

4. Anticipated effects and future applications of research

It is anticipated that this study will develop the world's first preventive vaccine against protozoan diseases and contribute to improved human health, greater food stability, and vaccine development against other refractory diseases. Such an effective prophylaxis has not previously been established despite the importance of protozoan infections in the fields of medical science, veterinary medicine and public health.

Development of a novel vaccine against refractory protozoan diseases

(Obihiro University of Agriculture and Veterinary Medicine, Yoshifumi NISHIKAWA)

Point of issue: Protozoan diseases are a threat worldwide, and have a negative impact on human health and livestock productivity.

Present situation: Effective vaccines against protozoan diseases have yet to be developed.

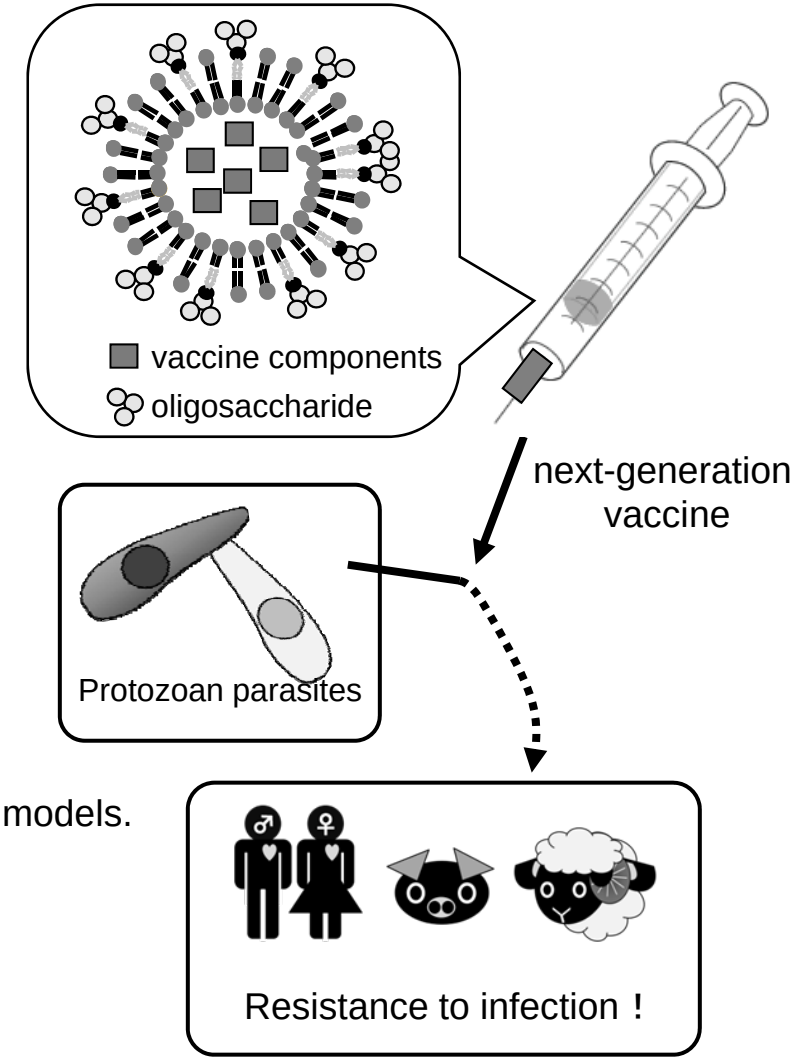
Research objectives:

To develop a next-generation vaccine;

1. Discovery of vaccine components
2. Production of a unique vaccine capsule (oligomannose-coated liposome)
3. To determine vaccine efficacy using animal infection models.

Anticipated effects:

1. Improved public health and greater food stability.
2. A major contribution to vaccine development against refractory diseases.



Target parasites

1. *Plasmodium*
2. *Toxoplasma*
3. *Neospora*