FUNDING PROGRAM FOR NEXT GENERATION WORLD-LEADING RESEARCHERS

Project Title: Analysis of Pathogenesis for Organ-Specific Autoimmune Disease by Imaging Technology	
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1. Background of research

Immune cells attack extraneous bacteria or viruses without harming the body's own cells or tissues. However, occurrence of any abnormality in such immune cells may consequently result in cell or tissue damage. This condition is known as an "autoimmune disease," which is difficult to treat.

2. Research objectives

A variety of organs, including the joints, pancreas, and salivary glands, are the targets of this disease; however, the reason for the vulnerability of these organs to auto-immune antibodies is unknown. Using imaging techniques, we aim to understand the mechanisms underlying the development of autoimmune diseases in these specific organs, which could lead to the development of novel therapeutic interventions.

3. Research characteristics (incl. originality and creativity)

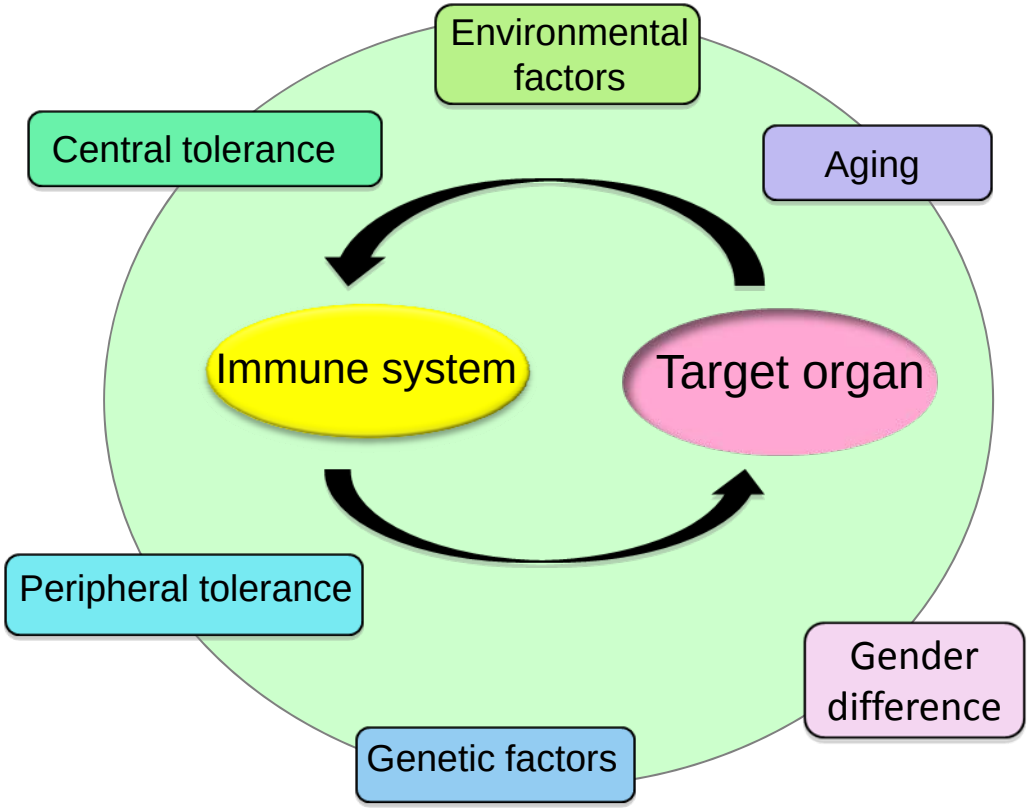
Although a number of underlying causes have previously been described for various autoimmune diseases, the specific mechanisms that trigger their onset and lead to their development remain unexplained. The unique aspect of this research will be the establishment of techniques that will enable the visual confirmation of the mechanisms that control the autoimmune disease, the determination of the timing and benefits of the treatment, and the development of appropriate therapeutic approaches.

4. Anticipated effects and future applications of research

It is a fact that as many as several million patients suffer from various forms of autoimmune disease. Fundamental treatments have not yet been established; instead, patients currently receive support to relieve the symptoms associated with autoimmune diseases. The active promotion of this research will enable the establishment of treatment methods for eliminating the underlying causes of the diseases, with the ultimate goal that patients regain their health. Additionally, such research has sufficient potential to be applied to other conditions, such as communicative diseases or cancer.

Research Plan

Autoimmunity is multifactorial disorder



Why is the particular subject to attack?

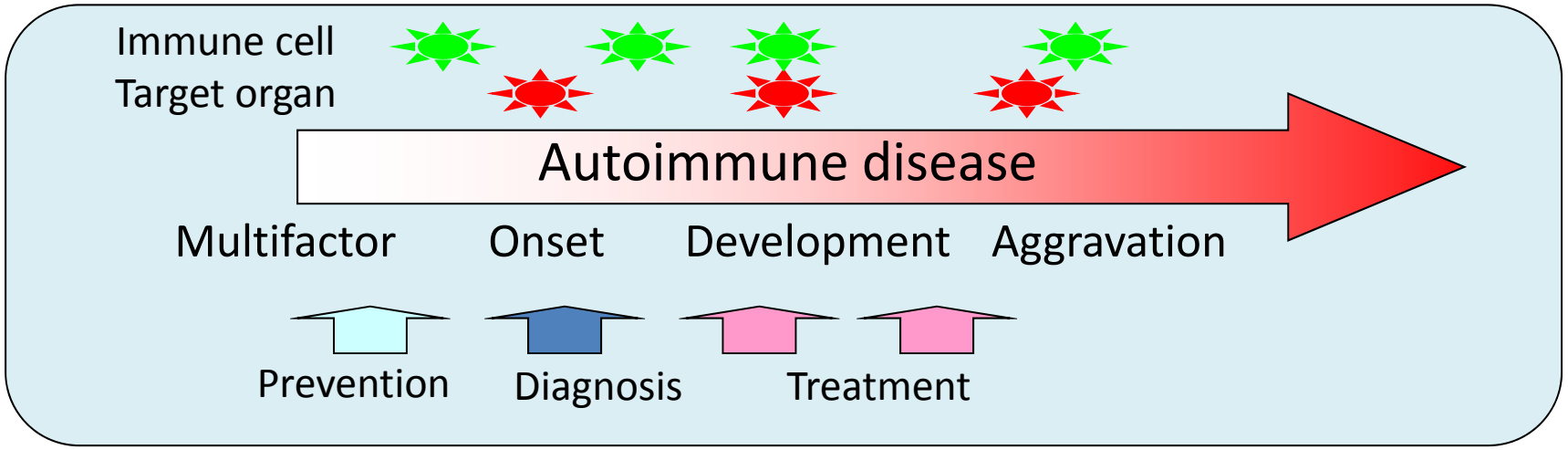
What is the relation between immune disorder and its target organ?

To visualize the complex biological reaction

Introduction of imaging technique

To elucidate the pathogenesis of the autoimmune diseases

Bio-imaging analysis using multiple molecular markers



To elucidate the pathogenic mechanism of autoimmune disease

To diagnose pathologic conditions, reflecting each stage of disease

To determine the possibility of tailor-made treatment based on the diagnosis of pathogenic condition

To develop a novel therapeutic approach based on the etiology of autoimmune disease

Sjogren's syndrome, Type I diabetic mellitus, Rheumatoid arthritis and others