1. Background of research
Understanding the regulation of tissue stem cell proliferation and differentiation is important to understanding organ development and the pathogenesis of diseases such as cancer or skin inflammation. Although phosphoinositide metabolism is well known to be involved in this regulatory system, the details of its mechanism remain unclear.

2. Research objectives
Our primary aim is to characterize the mechanism of disease induction caused by disorders of phosphoinositide metabolism. First, we will focus on the involvement of phosphoinositide metabolism in the differentiation of preadipocytes to white adipocytes, as well as heat production by brown adipocytes. We will also clarify the induction mechanism of skin inflammation and immune disorders, and cancer metastasis by functional disruption of key enzymes in phosphoinositide metabolism. We will attempt to identify targeting molecules for drug development through our understanding of these mechanisms.

3. Research characteristics (incl. originality and creativity)
Phosphoinositide metabolism regulates intracellular calcium concentration and is thereby involved in a variety of physiological functions. This project will focus on understanding the regulatory mechanisms by which disorders of phosphoinositide metabolism induce diseases such as cancer, skin inflammation, or obesity, which is linked to new drug development.

4. Anticipated effects and future applications of research
Our basic medical research may contribute to drug development or molecular diagnostics.