



## Development of designer niche cell that governs tissue microenvironment

**TODA Satoshi**

Assistant Professor, Nano Life Science Institute, Kanazawa University

Recent advances in stem cell biology have enabled researchers to culture *in vitro* 3D tissues called organoids, which capture some of key features of organs. Organoid systems allow us to analyze organogenesis processes and have enormous potentials in medical applications such as an alternative therapy for organ transplantation. However, how transplanted organoids can regenerate patient organs where tissue microenvironment or niche is destroyed by disease and inflammation remains unresolved. In this study, using synthetic receptor technologies, we aim to develop new therapeutic cell called “designer niche cell”, which can recognize transplanted organoids and provide user-defined growth factors that can form a niche. By transplanting both organoids and designer niche cells, the designer niche cells will form a local niche around transplanted organoids to specifically enhance tissue regeneration by transplanted cells. We will also program the secretion of both growth factors and anti-inflammatory factors in the designer niche cells to induce tissue regeneration and reduce inflammation at the same time to achieve more effective cell-based regenerative therapy.

