

School of Integrative and Global Majors
Ph.D. Program in Human Biology (HBP)

論文概要

Dissertation Abstract

Title of Doctor Dissertation: Defining diversity and similarity of epithelial stem cells and their environment in skin epidermis and oral epithelium

(皮膚と口腔粘膜における上皮幹細胞システムの共通性と多様性)

Last or Family Name	First	Middle
Ngo	Yen	Xuan

Student Number 201730546

Primary Academic Advisors

Affiliation: Life Science Center for Survival Dynamics, Tsukuba Advanced Research Alliance

Name: Hiromi Yanagisawa

Abstract

Skin and oral epithelium provide a barrier against physical stress and infection and are continuously regenerated by resident epithelial stem cells. Mouse skin epidermis harbors slow- and fast-cycling stem cell populations correspond to specialized tissue architectures, interscale, and scale, respectively. In human skin and mouse oral epithelium, there is a unique undulation structure called rete ridges and dermal papillae. However, it remains elusive whether epithelial stem cells in different tissues have any common or tissue-specific features in relation to tissue architectures; and how stem cell patterns are regulated by responding to environmental cues. In my study, I analyze stem cell dynamics, anatomical structure, and transcriptome profiles in the murine oral and skin epithelium. Combining H2B-GFP pulse-chase analysis and lineage tracing with *Dlx1*CreER and *Slc1a3*CreER markers, I find that slow- and fast-cycling stem cells in oral epithelium lie in a specific anatomical location relative to the rete ridges and regenerate their own territory during homeostasis. The RNA-sequencing analysis provides common gene signatures of slow- and fast-cycling populations between the skin and oral epithelium and identifies possible markers for capturing stem cell heterogeneity in vivo. This work provides cellular atlas and molecular basis of stem cell heterogeneity in epithelial tissues, which will lead to future in-depth studies of stem cell-niche interactions and applications in regenerative medicine.

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