

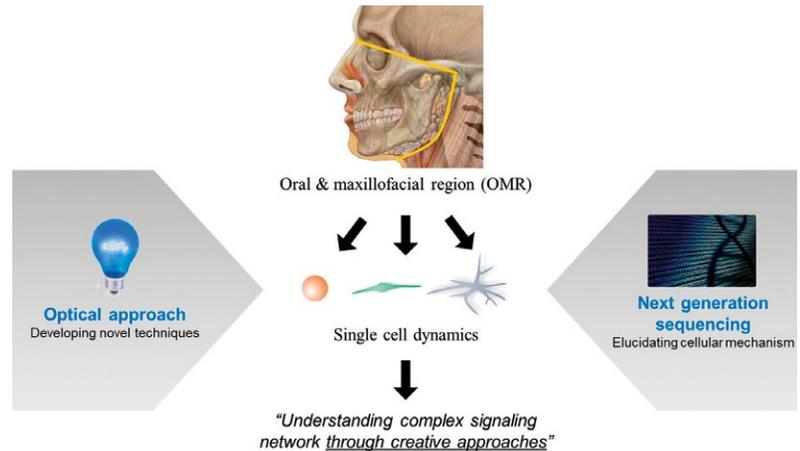
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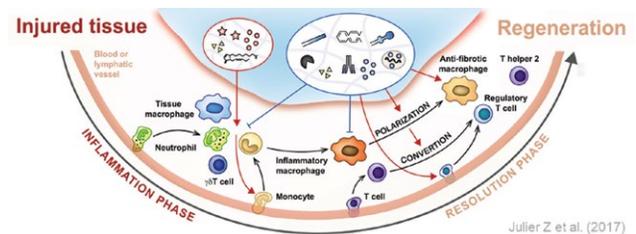
RESEARCH OVERVIEW

The research goal of Cell Signaling Networks lab is to dissect complex signaling networks in the regenerative process of oral & maxillofacial region. To this end, we have designed and applied creative single-cell based approaches for diverse biological contexts, especially customized to the immune-stem cell interaction. The new discoveries from our study provide crucial theoretical background for advanced therapeutic strategies in regenerative medicine and dentistry.



RESEARCH CONTENTS

1. GPCR signaling networks in pulp-dentin complex: We designed a customized screening platform optimized to find the GPCR candidates with regenerative potential. Through the screening process, we recently identified a key candidate group of GPCRs, and dissected mechanism underlying the regenerative process. According to these findings, our goal is to develop the new therapeutic approaches based on the GPCR regulation.
2. Immune-stem cell cross talk: we investigate the cellular language (cell signaling networks) between immune cells and mesenchymal stem (stromal) cells through multidisciplinary approaches. We recently identified the unique immune cell population in the tissues with high regenerative potential by scRNA-seq, and are now validating the core mediator and underlying molecular mechanism.
3. Development & application of novel technologies: we have designed and applied creative optical/single-cell based approaches customized to the field of dental science. Using scRNA-seq, we identified novel cell population in developing oral tissues, and protein targeted degradation systems were applied to promote biomineralization process of tooth and alveolar bone.



[Key words] cell signaling, immune cell, pulp-dentin complex, GPCR, single cell biology

KEY PUBLICATIONS

1. Kim JM*, Jo Y, Jung JW, Park K*, A mechanogenetic role of actomyosin complex in branching morphogenesis of epithelial organs. *Development*. 2021;148(6) (*co-corresponding)
2. Chang F*, Kim JM*, Choi Y, Park K. MTA promotes chemotaxis and chemokinesis of immune cells through distinct calcium-sensing receptor signaling pathways. *Biomaterials*. 2018;150:14-24. (*co-first)
3. Kim JM*, Choi S*, Kwack KH, Kim SY, Lee HW, Park K. G protein-coupled calcium-sensing receptor is a crucial mediator of MTA-induced biological activities. *Biomaterials*. 2017;127:107-16. (*co-first)

