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Basel

## Research Project

### Cell fate decisions during digit development

#### Project funded by own resources

**Project title** Cell fate decisions during digit development

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**Organisation / Research unit**

Departement Umweltwissenschaften / Regulatory Evolution (Tschopp)

**Project Website** <http://evolution.unibas.ch/tschopp/research/index.htm>

**Project start** 01.09.2016

**Probable end** 31.08.2021

**Status** Completed

The highest degree of morphological diversification, as well as functional specialization, of the vertebrate limb skeleton has occurred in its most distal part, the so-called autopod. Most of the diversity relates to the number of digits present, as well as the skeletal patterns of each individual digit. Each digit pattern is determined by the number and size of its bony elements, the phalanges, and how they are connected to each other via synovial joints. These configurations are specified by an embryonic sequence of inducing phalanx versus joint cell fates, as the individual digits are growing out during autopod development. Understanding how these phalanx versus joint cell fate decisions are made would thus allow us to decipher the underlying developmental mechanism of autopod morphological diversification.

We are using experimental embryology, single-cell RNA-sequencing and bioinformatics to unravel the molecular aspects of these cell fate decisions. In collaboration with Dagmar Iber's group (D-BSSE ETH Zürich) we aim to develop in silico models of this patterning process, to better understand its evolutionary flexibility.

**Keywords** Cell fate decision, Morphogen patterning, single-cell RNA-seq

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