Title:	Studying the Role of Temperature on Pollen Germination and Tracking Stem Cell Specification During Flower Development in Arabidopsis thaliana
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Abstract:	Arabidopsis offers advantage in studying various developmental mechanisms in plants. Herein we are studying two different projects. We used pollen as a system to understand the oxidative stress mechanism in one of the project. The other project is focused on stem cell specification in developing flower primordia. Environmental stress has profound impact on plant the growth and development. Plants respond to environment by activating various stress responses which leads to increased reactive oxygen species (ROS) production. Nature has its own antioxidant mechanisms for ROS scavenging. The high altitude plants have better evolutionary adaptation for antioxidant enzymes to resist various climate changes. The present study is focused on pollen level stress characteristics of Cu/Zn superoxide dismutase (Cu/Zn-SOD) isolated from Potentilla atrosanguinea and ascorbate peroxidase (APX) isolated from Rheum australe at high altitudes of Indian Himalayas. Pollen germination and tube length at high temperature for SOD, APX and SOD'APX double transgene plants were studied to understand how the pollen cells respond to temperature stress in the presence of ROS scavenging enzymes. My findings suggests that APX overexpressing plant pollen grains are able to germinate efficiently than wild type. Spatiotemporal regulation of gene expression is the key phenomenon in multicellular organisms to specify fate of distinct cell types. This regulation of gene expression is achieved by various mechanisms such as regulation of transcription, cell signaling etc. Shoot apical meristem of Arabidopsis thaliana harbor a set of stem cells from which the various cell types of plant arise. How stem cells differentiate into different cell types of the shoot and how organs form from these differentiated cells is still far from our understanding. To investigate the events leading to specification of stem cells we studied the flower organ primordia development as a model. The niche establishes first in the growing primordia this follows the specification of stem cells in the epidermal layer of flower meristem. When the carpel primordia form in the centre of the flower, stem cell fate terminates. Thus the present study gives a spatiotemporal understanding of stem cell specification in the developing flower primordia. Furthermore, on the lines of live-cell imaging, gene expression studies can be carried out to understand the regulatory mechanisms underlying fate specification and termination of stem cells in the dynamic environment of flower primordia formation.