Junctional instability overrides intrinsic quiescence of bulge stem cells

Avinanda Banerjee

Skin Research Institute of Singapore (SRIS), Singapore

Abstract

Vinculin, a mechano-transducer associated with both adherens junctions (AJ) and focal adhesions (FA), plays a central role in force transmission through cell-cell and cell-substratum contacts. We generated the conditional knockout (KO) of vinculin in murine skin which results in the loss of bulge stem cell (BuSC) quiescence, and promotes continual cycling of the hair follicles. Surprisingly, we find that the AJs in vinculin KO cells are mechanically weak and impaired in force generation despite increased junctional expression of E-cadherin and a-catenin. Mechanistically, we demonstrate that vinculin functions by keeping a-catenin in a stretched/open conformation, which in turn regulates the retention of YAP1, another potent mechano-transducer and regulator of cell proliferation, at the AJs. Altogether, our data provides definitive mechanistic insights into the hitherto unexplored regulatory link between the mechanical stability of cell junctions and contact inhibition-mediated maintenance of BuSC quiescence.

Biography

Avinanda Banerjee has worked on Effects of lamin a protein mutation associated with dilated cardiomyopathy in her PhD (2016) from Saha Institute of Nuclear physics, India. During her postdoctoral training she has joined Dr. Srikala Raghavans lab at Institute For Stem Cell Science and Regenerative Medicine, India to work on the 'Role of adhesion molecules for maintaining Stem cell homeostasis'. Currently, she is a research fellow at Agency for Science, Technology and Research, Singapore under Dr. Srikala Raghavan to work on 'Role of adhesion molecules and LINC complexes in cellular mechano-transduction' and 'angiogenic potentia of novel biological materials for burn wound skin graft'. She has published 5 research articles in international journals.

Citation: Avinanda Banerjee, Junctional instability overrides intrinsic quiescence of bulge stem cells, Stem Cell Congress 2021, 15th World Congress on Tissue Engineering, Regenerative Medicine and Stem Cell Research| November 18-19, 2021, 01