1125-35-810 **Huijing Du*** (hdu5@unl.edu), 304 Avery Hall, University of Nebraska, Lincoln, Lincoln, NE 68588. *Multiscale modeling for epidermis layer formation and homeostasis.*

The skin epidermis is a stratified epithelium composed of multiple layers of epithelial cells with distinct boundaries separating each other. In epidermis, different cells including stem cells form stratified layers with appropriate size and proportions. How the epidermis develops from a single layer of stem cells to form a complex multilayered structure of several different cell types remains elusive. We construct stochastic, three-dimensional, and multiscale models consisting of a lineage of four cell types. The simulations show a balance between proliferation and differentiation during lineage progression is crucial for the development and maintenance of epithelial tissue. It also found that selective cell adhesion of different cell types is critical to the boundary sharpening between layers and to the highly ordered structure. The long-range morphogen gradients provides additional feedback regulations on the robustness of overall layer formation. Our model is built upon a previous experimental finding that revealed the role of Ovol transcriptional factors in regulating epidermal specification, proliferation and differentiation. Direct comparison of experimental phenotypes and simulation perturbations was carried out, showing consistence with each other. (Received September 12, 2016)