

세미나 초록

발표주제	Generation of Hair-Bearing Skin Organoids from Human Pluripotent Stem Cells
발표내용	<p>The skin is an external barrier, thermoregulator and stimuli sensor protects the body from the outside world. The large-scale generation of human skin with these appendages would be beneficial, but is challenging. In this seminar, I will describe a detailed protocol for generating hair-bearing skin tissue entirely from a homogeneous population of human pluripotent stem cells in a three-dimensional <i>in vitro</i> culture system. The human pluripotent stem cell (hPSC)-derived skin organoids can recapitulate many features of full-thickness human fetal skin and be xenografted on nude mice. Defined culture conditions are used over a 2-week period to induce differentiation of pluripotent stem cells to surface ectoderm and cranial neural crest cells, which give rise to the epidermis and dermis, respectively, in each organoid unit. After 60 d of incubation, the skin organoids produce hair follicles. By day ~130, the skin organoids reach full complexity and contain stratified skin layers, pigmented hair follicles, sebaceous glands, Merkel cells and sensory neurons, recapitulating the cell composition and architecture of fetal skin tissue at week 18 of gestation. Skin organoids can be maintained in culture using this protocol for up to 150 d, enabling the organoids to be used to investigate basic skin biology, model disease and, further, reconstruct or regenerate skin tissue. The skin organoids can be used for a wide range of skin-focused research from basic developmental biology to translational projects like the early development of human skin, hair follicles and diverse sensory neurons, and drug screening targeting hair growth. Also, skin organoids can be used for disease modeling like skin cancers, infections, chemicals, not to mention that we can use patient-derived iPSCs to model genetic disorders. Lastly, skin organoids could be a cell source for skin reconstruction and wound healing processes.</p>