

Technologies for hair reconstruction and their applicability for pharmaceutical researches

○Takashi Matsuzaki (Dept. Biol. Sci., Fac. Life Environ. Sci., Shimane Univ.)

Hair follicles are the organ to produce hair shafts and have unique features such as periodically regenerating their structure whole life long and probably containing three kinds of stem cells for different lineages. Regeneration of hair and hair follicles must be regulated by precise control mechanisms since they have unexpectedly complicated but regular structures. For these reasons, it is not yet successful to reconstruct hair follicles artificially by association of cultured cells. Both follicular epithelial stem cells and dermal papilla cells are most important for regeneration of hair follicles. Although dermal papilla cells lost their hair forming ability during long-term cultivation, the ability could be maintained or retrieved by several methods. There are some approaches to reconstruct hair follicles using cultured dermal papilla cells. Among those approaches, the patch assay would be useful for hair researches because it allows us to obtain a lot of reconstructed hair follicles with almost uniform in size by a simple and easy procedure. As an example, I will show reconstruction of hair follicles from dissociated embryonic skin cells and some applications of this method such as production of chimeric follicles with GFP-labeled culture cells and gene transfer into the follicular cells using retroviral vectors. In addition, several assay systems to measure the effects of chemicals or materials on hair growth or regression will be presented, which are based on cultured cells, isolated follicles or the skin of live mice. Novel findings on hair cycles are also mentioned for better understanding of the targets of pharmaceutical hair researches.