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Circadian clock genes regulates hair cycles and regeneration by regulating stem cells

Abstract:

This project is focused on understanding the mechanisms of epithelial regeneration derived tissues such as teeth and hair. Hair follicles undergo continuous cycles of growth, involution and rest. This process, referred to as the hair growth cycle, has a periodicity of weeks to months and it is essential for hair renewal and regeneration. At the same time, hair follicles harbor a functional circadian clock that regulates gene expression with a periodicity of approximately twenty four hours. In our study we found that in Knockout mice of Per1 and Per2 genes (which are major regulators of the circadian clock) severe delays in hair growth cycle exist. We postulate that the circadian clock regulates hair cycle and regeneration by potentially regulating stem cells behavior. This data, therefore, indicates that circadian clock genes play a role in the regulation of the hair growth cycle by controlling stem cells features. Abnormal function of the circadian clock results in impaired hair regeneration.