

Coupling Hair Follicle Cycles to Produce Traveling Waves

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The hair follicle is a regenerative organ which oscillates among periods of growth, apoptosis, and dormancy. Although these cycles usually occur independently, they are clearly regulated by external factors and have been observed to synchronize in certain mutant rodents. Two common biochemical oscillator models were used to approximate the hair follicle cycle, the activator/ inhibitor model and the substrate /depletion model. The coupling function was calculated for several different modes of coupling to produce simulations of the one and two dimensional networking of hair follicles. Within these networks, the variation of relevant parameters produced traveling waves for both models and revealed interesting patterns based on the type and intensity of follicle communication. Ideally, this data will provide insight into the type of networking that really occurs in the mutant rodents.