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K A Montgomery* (K.Montgomery@utah.edu), 155 South 1400 East, Room 233, Salt Lake City, UT 84109. *A bifurcation analysis of pattern formation in the developing ear.* Preliminary report.

Hair cells are cells in the inner ear that translate sound-induced mechanical motion into an electrical signal that is recorded by the auditory nerve. In some species, hair cells are arranged in a very regular hexagonal pattern with supporting cells surrounding each hair cell. During development, both hair cells and supporting cells differentiate from a single type of predecessor cell. Interestingly, the initial arrangement of the predecessor cells is not at all regular. While it is known that the interaction of delta and notch receptors at the surface of the cells drives differentiation, the mechanism that causes the formation of regular hexagon patterns is unknown. A model describing signaling between the predecessor cells is analyzed with the cells arranged on both regular and slightly perturbed hexagonal and square lattices. The relationship between cell differentiation and changes in adhesive forces between the cells is discussed. Finally a bifurcation analysis showing the evolution of stable and unstable patterns on each lattice provides insight into the forces driving the formation of the hexagonal patterns. (Received September 26, 2006)