1037-92-10 **John A Adam*** (jadam@odu.edu), Department of Mathematics & Statistics, Old Dominion University, Norfolk, VA 23529. *Mathematical Models for Wound Healing on a Hemi-spherical Calvarium (Skull): The Critical Size Defect.*

Two related models are studied for wound healing on a spherical surface. The first model is based on a reaction-diffusion equation describing the process of healing as the inward growth of new cells from a circular wound on a spherical surface. By interpreting the healing process as a "pseudowave" propagating across the spherical surface a heuristic account of the "speed" of healing is possible, and the corresponding healing time is characterized. Of particular importance in relation to animal models is the existence (or not) of a critical size defect; this is discussed as a consequence of the stability of the steady states of the system to non-uniform spatial (or angular) perturbations. Explicit criteria are derived under which a CSD exists in terms of the skull radius and wound radius. The second model invokes a weighted spatial average cell density which permits the presence of both a short-range activation term (as in the first model) and a long-range inhibition term. Under these circumstances, within a suitable parameter range, the phenomenon of aggregation may occur in addition to the behavior predicted by the first model. It is suggested that such aggregation is manifested in the case of keloid scarring, which can occur as a result of wound healing in tissue. (Received November 05, 2007)