1060-74-107 **Kai-Bin Fu*** (kafu@pvamu.edu), Department of Mathematics, Prairie View A&M University, Prairie View, TX 77446. *A new constitutive framework for biological materials with elastic behavior.* Preliminary report.

To fully understand mechanisms of any biological material, we need to understand its mechanics. Although there are numerous attempts to model the constitutive relation from the nanoscale , it is extremely difficult to verify the results due to the complexity of biological tissues. Their mathematical foundations are rather weak. Ultimately the ultra-structural mechanisms for tissue behavior are most important, yet phenomenological relations are crucial toward understanding the material as a whole. We start with continuum mechanics framework for materials with elastic mechanical behavior, which has rigorous mathematical support.

Existing constitutive theories for high-strain materials, such as those of Rivlin and Fung, are not suitable for the determination of constitutive relation via bi-axial experiments because of the choice of kinematical variables. It is no wonder little work has been done to analyze the mathematical features of those models. A new constitutive framework has been proposed. When we gain more confidence from its applications and mathematical features, we can apply it to the study of biomembrane. (Received March 24, 2010)