1018-92-36 **David Lee Blackman*** (gribear@mac.com), 307W 2nd. St., Phoenix, OR 97535-7733.

Cooperative Binding Enzyme/Substrate Systems; Chaos/Catastrophe Analysis, Existence of Bifurcation Fold Catastrophe. Applied to Hemoglobin/Oxygen Neuroreceptors/Neurotransmitter and Microtubulin/Taxol.

Starting with the equation for cooperative binding, a system for tracking the nonzero fixed points is derived. For a given value of the Hill coefficient and the half saturation a unique value for the attracting and repelling fixed points. The value of K, corresponding to the fold catastrophe is derived for a given value of p.The trajectory of these fixed points with variable K, half saturation, exhibits a set of curves each with a fold catastrophe. Each protein/substrate system has a unique p and a unique bifurcation point, (s,K), that is a fold catastrophe. In accordance with theory such a fold catastrophe should be followed by a saturation shift to the only attracting fixed point left the origin. From linear regression data and Euler extrapolation on hemoglobin there is some evidence that this hypothesis is true. The theoretical result indicate that as p =>? there is a plateau of stability where binding is assumed to be tight because the slope on the upper attractor => zero. This condition resembles an equilibrium situation. For Neuroreceptors the binding is tight reflected in the low concentration of neurotransmitters necessary for effect. (Received February 08, 2006)