1004-57-237 **Dorothy Buck*** (d.buck@imperial.ac.uk) and **Cynthia Verjovsky Marcotte**. *Classification of Tangle Solutions for a Generic Integrase, A Protein that Changes DNA Topology.*

A generic integrase protein, when acting on circular DNA, often changes the DNA topology by transforming unknotted circles into a spectrum of torus knots and links. Two systems of tangle equations—corresponding to two possible orientations of two DNA subsequences—arise when modelling this transformation.

With no *a priori* assumptions on the constituent tangles, we utilize Dehn surgery arguments to completely classify the tangle solutions for each of the two systems. A key step is to combine work of our previous paper with recent results of Kronheimer, Mrowka, Ozsváth and Szabó, and work of Ernst to show a certain prime tangle must in fact be a generalized Montesinos tangle.

These tangle solutions are divided into three classes, common to both systems, plus a fourth class for one system that contains the sole generalized Montesinos tangle. We discuss the possible biological implications of our classification, and of this novel solution. (Received January 25, 2005)