

1054-54-157

**Mayura Patankar\*** (mpata001@student.ucr.edu), University of California at Riverside, Department of Mathematics, Surge 272, 900 University Avenue, Riverside, CA 92521, and **Mohamed Ait Nouh** (maitnouh@math.ucr.edu), University of California at Riverside, Department of Mathematics, Surge 272, 900 University Avenue, Riverside, CA 92521. *When DNA meets Knot Theory*. Preliminary report.

It is known that the DNA is represented by a 4-plat or a composite of 4-plats. Some problems of DNA such that modeling topoisomerase action, turns out to be equivalent to solving “tangle equations”

$$N(U + \frac{f_1}{g_1}) = K_1 \text{ and } N(U + \frac{f_2}{g_2}) = K_2$$

$\frac{f_2}{g_2}$  is the unknown rational tangle, that has to be found as a function of the given rational tangles  $U, \frac{f_1}{g_1}$  and the 4-plats knots  $K_1$  and  $K_2$ .

We are interested in the case where  $K_1$  and  $K_2$  are smooth slice knots. We proved, for example, that the second homology class  $(2, 3) \in CP^2 \# CP^2$  can not be represented by a smooth sphere, answering a question raised by Terry Lawson in his paper “The minimal genus problem”, Expo. Math. 15 (1997), 385 – 431. This surprising application to dimension four encouraged us to look backward. We are investigating application of dimension four to some DNA problems such as topoisomerase and Recombinases and Mu transposome, which are known to be related to cancer and the human immunodeficiency virus (HIV). (Received September 12, 2009)