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OPINION

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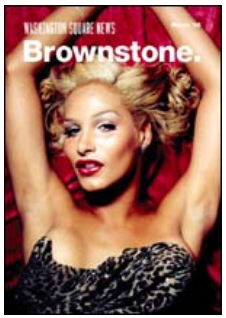

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Study explores DNA repair

Results could affect cancer, aging research

by Iliya Tabakov
Contributing Writer

Courant Institute professor Tamar Schlick co-authored the DNA study. PHOTO: Sammy Goldfien /WSN

An NYU-developed computer application that tracks molecules in DNA structures will help lead to a greater understanding of aging and cancer, according to a new study to be published in coming weeks.

The study examines DNA synthesis and repair, and explains why molecule aberrations, which lead to cancers, are infrequent.

"The subject of DNA repair not only goes to the heart of preserving the integrity of our genome but also has widespread repercussions in a variety of cancers, neurological aberrations and the process of aging," said Ravi Radhakrishnan, a post-doctoral chemistry assistant at the Courant Institute of Mathematical Sciences, in an e-mail.

Radhakrishnan co-authored the study with Tamar Schlick, a professor of chemistry, math and computer science at Courant Institute.

DNA molecules consist of a three-part subunit called a nucleotide. A correct sequence of the chemicals that make up nucleotides ensures proper functioning of the cells. When cells divide improperly, new cells contain the wrong nucleotide combinations, which lead to genetic mutations and cell malfunction.

The nucleotides in the study were tracked with Transition Path Sampling, a

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computing method that allows a visual representation of the molecule arrangement.

"These [molecule] measurements cannot be determined from experiments," Schlick wrote in an e-mail. "Our paper reports the first application of this method for a biomolecule, and this can open the door to many other applications that are of critical interest in biology."

The research paper states that if a correct nucleotide is introduced, polymerase beta, a type of protein, will ensure that the nucleotide is bonded to the DNA molecule. If an incorrect nucleotide is present, then the protein will not complete the process of bonding, preventing mutations.

The almost yearlong research will be published in The Proceedings of the National Academy of Sciences. •

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