Researchers uncover process involved in DNA repair

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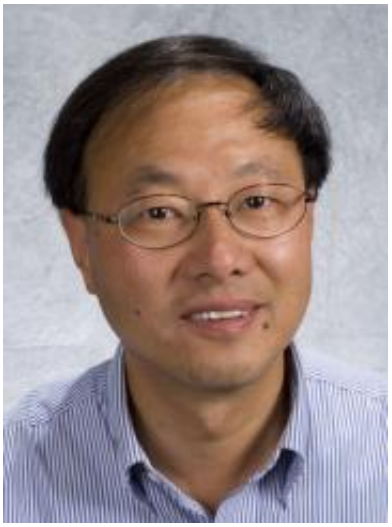

Chris Le

(PhysOrg.com) -- Every day people are exposed to chemical and physical agents that damage DNA. If it isn't repaired properly, this damage can lead to mutations that in some circumstances can lead to the development of cancer or death of the exposed cell. But in most cases, the damaged DNA is repaired and all is well.

There is a lot of work being done on DNA damage and repair, and University of Alberta researchers are the first to discover the process that is involved in recognizing and repairing damage in DNA.

"There are so many different kinds of damage that can be caused by given substances, so the damage will have a different chemical structure ," said Chris Le, one of the researchers from the Faculty of Medicine & Dentistry. "Yet the molecules in the cells that are DNA repair-enzymes can find them and then they can differentiate them from normal, healthy DNA."

Le and his team, including Michael Weinfeld and Hailin Wang, used a new technology to monitor the early steps in the repair of the damage. They found that the proteins that initially recognize the damage amplify the distortion of the DNA around the damaged site by bending the DNA and separating the strands of the double helix. This makes it easier for the next protein to recognize and cut out the damaged portion of the DNA. The cells then patch up the empty space using the healthy half of the DNA as a model to repair the cell to its original state.

"It is a very exciting discovery because it contributes to the fundamental understanding of the mechanisms of DNA repair," said Le. "This is a big area of research; we're not alone. There are many people doing the research and, of course, everyone wants to contribute to this understanding of how DNA is repaired."

This is the first step in a long road, but it could mean big things. Much work went into this study, which was published in the June edition of the Proceedings of the National Academy of Sciences, before they could even look at the DNA repair mechanisms. The U of A team developed an advanced bio-analytical technique that enables dynamic monitoring of bio-molecular interactions.

"It could be commercialized and could be used by other people in research," said Le.

Provided by University of Alberta (news : web)