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London: Scientists have purified the protein produced by the breast cancer susceptibility gene BRCA2 and used it to study the oncogene's role in DNA repair.

The research by two teams of scientists at the University of California, Davis, could pave way for understanding, diagnosing and helps treating familial breast cancer.

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Stephen Kowalczykowski's group has purified the protein from human cells while another group led by Professor Wolf-Dietrich Heyer used genetic engineering techniques to manufacture the human protein in yeast.

BRCA2 protein acts as a mediator, helping another protein, RAD51, to associate with a single strand of DNA and stimulating its activity.

 The RAD51/DNA complex then looks for the matching strand of DNA from the other chromosome to make an exact repair, but if the repair system doesn't work, the cell resorts to other, more error-prone methods.

But if that damage is not repaired, errors start to accumulate, Kowalczykowski said. Those errors can eventually lead to cancer.

One application of the purified protein would be to make antibodies to BRCA2 that could be used in test kits as a supplement to existing genetic tests, Kowalczykowski said.

The other would be to use the system to screen for drugs that activate or inhibit the interaction between BRCA2, RAD51 and DNA. It can also be used to study how different mutations affect the gene's function.

"We're just starting to scratch the surface and understand more of the mechanisms and interaction with other factors," Nature quoted Kowalczykowski as saying.

The results are published online in the journals Nature, and Nature Structural and Molecular Biology.

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