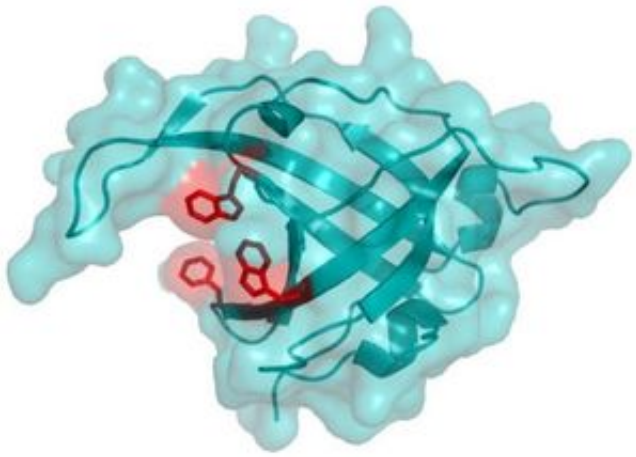
New discovery linked to DNA repair and cancer

May 1 2008



The newly discovered human hSSB1 protein is thought to resemble the structure of the SSB protein pictured here (DNA binding area is shown in red).

Scientists have discovered a new protein in humans that plays an important role in repairing DNA damage that could lead to cancer.

Professor Malcolm White of the University of St Andrews led the discovery alongside an international team from the Queensland Institute for Medical Research in Brisbane, Australia. The study is reported online by *Nature.*

Professor White and Dr Kum Kum Khanna in Brisbane discovered the protein, named hSSB1, when searching the human genome for ancient

classes of proteins. They found a small gene, which had previously gone unnoticed, encoding a novel DNA binding protein that bore a strong resemblance to proteins from a group of microbes called Archaea.

The human hSSB1 gene was cloned and the protein analysed. hSSB1 binds to the single stranded form of the genetic material DNA, which is formed when DNA is damaged in the cell. The protein is thought to work by signalling to other proteins that damage has occurred, leading to important cellular responses. Cells deficient in hSSB1 become hypersensitive to DNA damage and die rapidly.

"When we discovered this gene we thought it might be important for DNA repair and genome stability, but we were amazed by just how important it seems to be," said Professor White, of the Centre for Biomolecular Sciences at St Andrews. "We identified the gene as a direct result of some basic research on DNA repair in micro-organisms. This emphasises the importance of supporting fundamental research."

Dr Derek Richard, formerly of St Andrews and now a researcher at the QIMR, added "The next challenge is to find out how it signals that DNA is damaged, and determine if it plays a role in the development of cancer or in patients' responses to chemotherapy and radiotherapy."

Source: University of St Andrews