

## NOVEL BIOMARKER FOR ASSESSING DNA DAMAGE

Professor Ashok Venkitaraman and his team have identified the earliest known marker for DNA damage. Phosphorylation of residue Thr51 of protein HP1 $\beta$  occurs within minutes of the onset of DNA damage. The team have a robust, specific polyclonal antibody to the phosphorylated form of this protein and have demonstrated that it is an effective biomarker for DNA damage.

### Potential Uses

- Identify and assess DNA damage in tissues
- Cancer associated biomarker
- Measure responsiveness to DNA damaging therapy and allow subsequent selection of the most efficacious therapy (e.g. chemotherapeutic agent) for treatment of cancer in an individual

For further information please contact:

Dr Andrew Walsh

✉ [andrew.walsh@enterprise.cam.ac.uk](mailto:andrew.walsh@enterprise.cam.ac.uk)

☎ +44 (0)1223 760339

Cambridge Enterprise Limited, University of Cambridge  
Hauser Forum, 3 Charles Babbage Road, Cambridge, CB3 0GT, UK  
[www.enterprise.cam.ac.uk](http://www.enterprise.cam.ac.uk)

Case Ref: Ven-2161-08

## Background

There are relatively few well-established biomarkers that are routinely used to detect DNA damage. Many proteins that have the potential to be biomarkers fail in subsequent tests because they are not specific enough and/or do not show elevated expression early enough in DNA damage.

Phosphorylated H2AX has been used as an early biomarker of chromosomal breakage. Prof. Ashok Venkitaraman at the University of Cambridge and his colleagues at the Medical Research Council (MRC) have now identified that phosphorylation of HP1 $\beta$  at Thr51 is a key step in the recruitment and phosphorylation of H2AX and hence is the earliest detectable response to DNA damage in the cell.

## Technology

DNA damage is associated with diseases such as cancer, so a marker for such damage has a range of applications, including:

- assessing DNA damage in cells relative to normal tissue, providing an early indication of damage
- detecting an increased chance of tumorigenesis
- measuring the effectiveness of an efficacious cancer therapy regimen that results in damage to the cell's DNA

- detecting and diagnosing cancer cells

The inventors have generated a polyclonal antibody to HP1 $\beta$ T51p using a phosphopeptide of the core chromodomain sequence. Experiments have demonstrated that the antibody;

- works well in standard immunohistochemistry
- is specific for the phosphorylated HP1 $\beta$  antigen
- works in tissue specimens for pathology, under conditions of fixation and staining that are routinely applied to clinical samples
- recognises DNA damage in tissue

These experiments demonstrate that the phosphorylation of HP1 $\beta$  is a strong candidate for a DNA damage biomarker. A HP1 $\beta$ T51p specific monoclonal antibody is under development.

## Reference

Ayoub, N. *et al.* HP1-beta mobilization promotes chromatin changes that initiate the DNA damage response. (2008). *Nature*. 453:682-6.

## Commercialisation

We are seeking commercial partners for licensing collaboration and development of this technology. This technology is protected by the US patent application 61/123008 filed on 4 April 2008.

