

## ASSAYS FOR MEASURING AND QUANTIFYING DNA DAMAGE

### SUMMARY

The National Cancer Institute seeks partners interested in licensing or co-development of assays for determining the levels of gamma-H2AX/H2AX to measure and quantify DNA damage.

### REFERENCE NUMBER

E-276-2014

### PRODUCT TYPE

- Diagnostics

### KEYWORDS

- DNA damage
- ionizing radiation
- chemotherapeutic agents
- and environmental agents

### COLLABORATION OPPORTUNITY

This invention is available for licensing and co-development.

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### DESCRIPTION OF TECHNOLOGY

Exposure to ionizing radiation or agents that induce DNA double-stranded breaks (DSBs), which is one of the most damaging types of lesions in DNA, can result in damage to cells and/or tissues. This can lead to illness (i.e., Acute Radiation Syndrome, Cancer) or death. Identifying the amount of exposure to a DNA DSB-causing agent can be useful in determining the need for further testing, avoidance or modification of certain medical procedures, and/or types of medical treatments.

Strand breaks can be identified and quantified *in situ* by detecting phosphorylated histone protein  $\gamma$ -H2AX (gamma-H2AX) foci formed at DSBs. The National Cancer Institute's [Developmental Therapeutics Branch](#) have developed an assay for simultaneously quantifying the amount of  $\gamma$ -H2AX and total H2AX. The ratio of  $\gamma$ -H2AX/H2AX provides reliable data that is independent of cell number, cell viability, cell lysis efficiency, and laboratory operator variability. The assay is both sensitive and specific, having a 100-fold quantitative range with sensitivity of 5 pM for  $\gamma$ -H2AX and 50 pM for H2AX.

## POTENTIAL COMMERCIAL APPLICATIONS

Assay for measuring the DNA damage caused by ionizing radiation such as X-rays, environmental agents such as UV light, mutagenic chemicals, and cigarette smoke, and chemotherapeutic agents such as bleomycin and topotecan.

## COMPETITIVE ADVANTAGES

- High sensitivity and specificity - 100 fold quantitative range with sensitivity of 5 pM for  $\gamma$ -H2AX and 50 pM for H2AX
- Can be performed on different types of samples ranging from cells, blood, and tissues

## INVENTOR(S)

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## DEVELOPMENT STAGE

- Pre-clinical (in vivo)

## PATENT STATUS

- U.S. Filed: US Application # 62/110,764

## THERAPEUTIC AREA

- Cancer/Neoplasm