

Biomarker signature development: microRNAs for biodosimetry

Summary (1024-character limit)

Alterations in microRNAs (miRNAs), a type of small non-coding RNAs, have been reported in cells/tumors subjected to radiation exposure, implying that miRNAs play an important role in cellular stress response to radiation. NCI researchers evaluated small non-coding RNAs, long non-coding RNAs (lncRNA), and mRNA, as potential non-invasive biomarkers for radiation biodosimetry. The NCI Radiation Oncology Branch seeks parties interested in licensing or co-development of RNA biomarker signature(s) for radiation biodosimetry.

NIH Reference Number

E-066-2015

Product Type

- Diagnostics

Collaboration Opportunity

This invention is available for licensing and co-development.

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Description of Technology

Alterations in microRNAs (miRNAs), a type of small non-coding RNAs, have been reported in cells/tumors subjected to radiation exposure, implying that miRNAs play an important role in cellular stress response to radiation. NCI researchers evaluated small non-coding RNAs, long non-coding RNAs (lncRNA), and mRNA, as potential non-invasive biomarkers for radiation biodosimetry. While the use of miRNAs as radiation biomarkers has been reported, the integrated use of miRNAs, mRNAs and lncRNAs to accurately determine radiation doses is novel and has not been published.

Researchers from the NCI [Radiation Oncology Branch](#) have characterized a unique method of examining miRNA levels along with levels of its target mRNA and lncRNA to determine radiation exposure using whole blood samples from mice exposed to 2, 4, 8, 12 and 15 Gy irradiation. In doing so, the inventors discovered distinct miRNA, mRNA and lncRNA biomarker signatures that inform degree of radiation exposure. Ultimately, integrated analysis of miRNA, mRNAs, and lncRNAs to assess radiation exposure after mass-casualty incidents could provide a valuable tool in identifying biomarkers, and in the

NCI Technology Transfer Center

<https://techtransfer.cancer.gov/pdf/e-066-2015.pdf>

development and appropriate implementation of effective medical countermeasures. This application could potentially also be used to immediately detect, and therefore circumvent or mitigate non-specific injury from cancer radiotherapy treatments.

Potential Commercial Applications

- Diagnostic
- Assay/Research Tool

Competitive Advantages

- Blood-based biomarker assay for circulating miRNAs
- Could be developed as part of point-of-care and high-throughput screening platforms
- Immediate medical care based on amount of radiation exposure is critical for giving appropriate care to affected individuals

Inventor(s)

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Development Stage

- Pre-clinical (in vivo)

Patent Status

- **U.S. Provisional:** U.S. Provisional Patent Application Number 62/244,044, Filed 20 Oct 2015

Therapeutic Area

- Cancer/Neoplasm