Inflammation Induction and Tissue Repair

Tech ID: 22814 / UC Case 2011-226-0

BACKGROUND

Inflammation is an important response for resisting infection and repairing damage. Under circumstances such as cancer or infectious diseases, stimulation of the inflammatory response is therapeutic. It is unclear why the existing adjuvant therapies tend to be more effective in the treatment of some disease, such as breast and colon cancer, than others. This invention identifies additional ways to stimulate the immune response and induce inflammation in order to accelerate repair of disease-related tissue injury.

TECHNOLOGY DESCRIPTION

UCSD researchers have found that non-coding U1 small nuclear RNAs (snRNA) play an important role in the inflammation process. In an irradiated mouse model, endogenous non-coding U1 snRNA becomes altered and is recognized by the Toll-like Receptor 3 (TLR3). Together with TLR3, U1 RNA can then induce the NF-kappa B inflammatory cascade. The induction can be replicated by injecting the mice with radiated U1 RNA. The role of TLR3 is essential since the U1 RNA-mediated induction of inflammation does not occur in mice lacking TLR3 expression. Furthermore, the newly generated fractions from the radiated U1 RNA that are less than 100 nucleotides are potent stimuli of TNF-alpha.

APPLICATIONS

The non-coding U1 snRNA potentially can be used to induce tissue necrosis in certain types of cancers and may have therapeutic applications in infectious diseases. Conversely, anti RNAs could be synthesized to block the inflammatory effects of U1 snRNA, or TLR3 antagonists could be used to attenuate inflammation from some forms of tissue necrosis injury such as radiation.

STATE OF DEVELOPMENT

The ability of radiated U1 snRNA to elicit the inflammatory cascade through its interaction with TLR3 has been demonstrated in mice.

INTELLECTUAL PROPERTY INFO

UCSD seeks commercial partners for development of this invention, and the invention is available for licensing.

RELATED MATERIALS

- Bernard JJ, Cowing-Zitron C, Nakatsuji T, Muehleisen B, Muto J, Borkowski AW, Martinez L, Greidinger EL, Yu BD, Gallo RL. Ultraviolet radiation damages self non-coding RNA and is detected by TLR3. Nat Med. 2012 Jul 8. doi: 10.1038/nm.2861. [Epub ahead of print] - 07/08/2012
- “What Happens When We Sunburn: Red Is RNA Damage to Skin Cells”, ScienceDaily, July 8, 2012. - 07/08/2012
- “Cause of sunburn's painful inflammation discovered by UCSD researchers”, North County Times, July 8, 2012. - 07/08/2012

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,303,258	04/05/2016	2011-226

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OTHER INFORMATION

KEYWORDS

Inflammation induction, tissue repair, adjuvant, cancer, infection

CATEGORIZED AS

- Medical
  - Disease: Dermatology

RELATED CASES

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