World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:12, No:11, 2018

Nanoparticles of Hyaluronic Acid for Radiation Induced Lung Damages

Authors : Anna Lierova, Jitka Kasparova, Marcela Jelicova, Lucie Korecka, Zuzana Bilkova, Zuzana Sinkorova

Abstract : Hyaluronic acid (HA) is a simple linear, unbranched polysaccharide with a lot of exceptional physiological and chemical properties such as high biocompatibility and biodegradability, strong hydration and viscoelasticity that depend on the size of the molecule. It plays the important role in a variety of molecular events as tissue hydration, mechanical protection of tissues and as well as during inflammation, leukocyte migration, and extracellular matrix remodeling. Also, HA-based biomaterials, including HA scaffolds, hydrogels, thin membranes, matrix grafts or nanoparticles are widely use in various biomedical applications. Our goal is to determine the radioprotective effect of hyaluronic acid nanoparticles (HA NPs). We are investigating effect of ionizing radiation on stability of HA NPs, in vitro relative toxicity of nanoscale as well as effect on cell lines and specific surface receptors and their response to ionizing radiation. An exposure to ionizing radiation (IR) can irreversibly damage various cell types and may thus have implications for the level of the whole tissue. Characteristic manifestations are formation of over-granulated tissue, remodeling of extracellular matrix (ECM) and abortive wound healing. Damages are caused by either direct interaction with DNA and IR proteins or indirectly by radicals formed during radiolysis of water Accumulation and turnover of ECM are a hallmark of radiation induces lung injury, characterized by inflammation, repair or remodeling health pulmonary tissue. HA is a major component of ECM in lung and plays an important role in regulating tissue injury, accelerating tissue repair, and controlling disease outcomes. Due to that, HA NPs were applied to in vivo model (C57Bl/6J mice) before total body or partial thorax irradiation. This part of our research is targeting on effect of exogenous HA on the development and/or mitigating acute radiation syndrome and radiation induced lung injuries.

Keywords : hyaluronic acid, ionizing radiation, nanoparticles, radiation induces lung damages
Conference Title : ICR 2018 : International Conference on Radiobiology
Conference Location : London, United Kingdom
Conference Dates : November 19-20, 2018