Radiotherapeutic bandage shows potential as treatment for skin cancer

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A radiotherapeutic bandage is being evaluated by researchers for efficacy against squamous cell carcinoma (SCC) in an animal model. These results could confirm the viability of a new and improved strategy for the radiotherapeutic treatment of skin cancer in the clinic. This work is being presented Oct. 28 at the 2015 American Association of Pharmaceutical Scientists (AAPS) Annual Meeting and Exposition, the world's largest pharmaceutical sciences meeting, in Orlando, Fla. Oct. 25-29.

Non-melanoma skin cancers (NMSC) are the most common form of malignancy, with most developing on sun-exposed areas of the body such as the face and back of the hands. The two major forms of NMSC are basal cell carcinoma (BCC) and SCC. SCC occur close to the surface of the skin and tend to grow and spread more than BCC. In most cases, surgery is the main treatment to excise the entire tumor. Although key to the complete removal of SCC is the ability to achieve negative surgical margins, radiation therapy often accompanies surgery to ensure that any residual SCC is eliminated.

Radiation therapy is also a primary treatment for inoperable tumors or reoccurring lesions; however, cumbersome equipment, specialized instrumentation and facilities are required. To help healthcare providers achieve more optimized cosmetic and functional outcomes that are minimally invasive for patients, Anthony J. Di Pasqua, Ph.D., assistant professor at the University of North Texas System College of Pharmacy and his team developed a novel radiotherapeutic bandage as a possible

alternative therapy and solution for SCC where surgery is partially successful or cannot be performed.

Bhuvaneswari Koneru, a graduate student and Yi Shi, a postdoctoral research associate incorporated nanoparticles containing inactivated 166Ho into polymers based on a method called electrospinning, which uses an electrical charge to create thin fibers from a liquid and make the bandages. Immediately prior to therapy, they activated the 166Ho-containing polymers allowing the bandages to become radioactive, achieving a level of radioactivity similar to conventional radiation. The bandages were placed on mice with SCC for one hour, and the animal's resulting tumor sizes were measured for up to 15 days in all treatment and control groups to determine efficacy.

"Radiation has a tendency to be a systemic, yet aggressive treatment for patients," said Di Pasqua. According to Koneru, "These bandages can be individually tailored for easy application on tumor lesions of all shapes and sizes, and manufactured on a large scale."

On the 15th day after treatment, three out of 10 mice in the radioactive bandage treatment group had complete tumor elimination while the other seven in the same group had significantly smaller volumes compared to the control groups. In addition, the tumor volume ratio (TVR) of the radioactive bandage treatment group was 3.3 ± 4.5, while the TVR of the non-radioactive bandage treatment and no treatment control groups were 33.2 ± 14.7 and 26.9 ± 12.6, respectively.

In a follow up analysis, Di Pasqua and colleagues will study this technology in a larger animal model to determine the clinical relevance of the radiotherapeutic bandage. They also intend to explore strategies that further optimize the dose of radiation needed for efficacy.

More information: W4085 - Radiotherapeutic Bandage for the

Treatment of Skin Cancer will be presented during the Wednesday Morning Poster Session from 8:30 a.m. - noon on Oct. 28 in OCCC - Exhibit Hall WB1-WB2.

Provided by American Association of Pharmaceutical Scientists

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