Various cancers and tumors are treated with surgical removal of the cancer, followed by chemotherapy or radiotherapy. Conventional radiation therapy can result in off-target toxicity. As such, methods which localize the radioisotopes to the target tissue are needed to minimize unnecessary damage to the patient. This technology outlines the modification of common gelatin-based materials to target radiotherapies. The use of an FDA-approved gelatin matrix as a carrier for avidin enables targeting of a biotinylated drug or radioisotope. Successful application of this technology may improve the specificity and efficacy of radiotherapy treatment, leading to longer survival rates.

Functionalized gelatin matrix for targeted, low toxicity postoperative radiotherapeutic treatment of cancer

While surgical intervention is effective in removing the majority of solid tumors, it is common for unwanted cancerous cells to remain resident in the surrounding tissue. Subsequent treatment of these cells employs chemotherapy and radiation, general therapies often toxic to the patient at large. The technology presented here offers an alternative by enabling targeted radiotherapy. This technology, a gelatin matrix mixed with avidin, can be directly injected into a patient or easily applied to the cancer site during surgery. Biotin-functionalized radioisotopes are then introduced to the patient, which home to the avidin with high specificity. Although radioisotope therapies exist, there are no targeted alpha particle-emitting radioisotopes currently on the market.

In vitro testing has demonstrated that the avidin-gelatin bond withstands repeated serum washes, ensuring continued efficacy over time and making repeated radiotherapy treatments possible if necessary.

Lead Inventor:
Robert Taub, Ph.D.

Applications:
- Prevention of tumor recurrence after surgical removal of cancer
- Improved localization of therapeutic agents postoperatively to a site determined during surgery
• Targeted delivery of alpha- or beta-emitting radioisotopes
• Targeted delivery of chemotherapeutic agents
• Treatment of orphan diseases such as mesothelioma, Meigs Syndrome, sarcoma, appendiceal carcinoma, and pseudomyxoma peritonei

Advantages:

• Targeted approach to radiotherapy results in lower toxicity to patients
• Postoperative radiotherapy can be done repeatedly
• Avidin binds to biotin very strongly, so minimal biotinylated radioisotopes are needed for effective treatment

Patent Information:

Patent Pending (WO/2015/112636)

Tech Ventures Reference: IR CU14144, IR CU14300, IR CU15047, IR CU15066

Inventors

Robert N. Taub