

HYDROGELS FOR LOCALIZED RADIOTHERAPY

[Azab, Abdel Kareem, Azab, Feda, de la Puente Garcia, Maria del Pilar](#)

[Richards, Jennifer](#)

T-013626

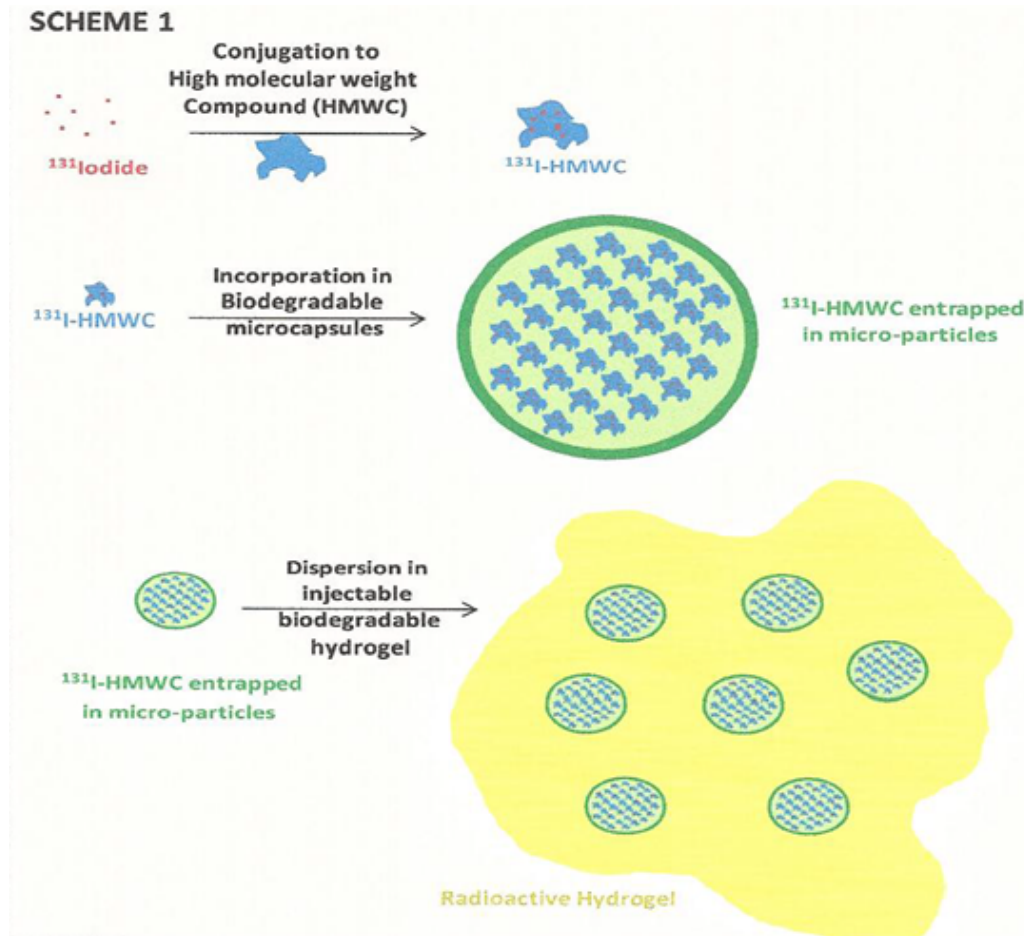
Background

External Beam Radiotherapy (EBR) is commonly used after surgical removal of a tumor (in e.g. a breast-conserving surgery) to control or kill malignant cells. The lack of selectivity due to irradiation of whole or partial organs from outside the body, however, is potentially damaging to the healthy surrounding tissue. This can be minimized by using brachytherapy instead in which radioactive implants are placed inside the body in- or close to the treatment area. Brachytherapy is used to effectively treat a wide range of cancers including prostate, cervical, breast, lung, colorectal, and brain cancer. Despite being an effective and successful alternative for EBR in the treatment of many cancers, brachytherapy has shortcomings. The procedure is significantly costlier than EBR and may require surgical placement and, after treatment, removal of implants. Like EBR, the radiation in brachytherapy is not continuous and may therefore require multiple return visits to the hospital. Researchers at Washington University in St. Louis, have addressed these shortcomings and developed an improved brachytherapy.

Technology Summary

A research team led by Dr. Abdel Kareem Azab has developed a radioactive semi-solid hydrogel in the treatment of localized tumors as an adjuvant therapy after surgery. This gel is produced by incorporation of radioactive compounds in biodegradable microcapsules and their subsequent dispersion in a biodegradable hydrogel. The resulting gel can be injected in or nearby the tumor, thereby eliminating the need for surgery to place an implant. The hydrogel is designed and shown to preclude leakage of radioactive material. The localized continuous radiation abates return visits to the hospital and the biodegradable nature of the hydrogel eliminates surgical removal of an implant after treatment. These advantages in combination with the low production costs of the radioactive hydrogel make it a promising alternative to both EBR and current brachytherapy devices. Additionally, this therapy is a very attractive alternative for the treatment of cancers near the nose, ears, eyelids, and lips that very often need reconstructions on facial disfigurement caused by surgeries.

SCHEME 1



Key Advantages:

- Injectable hydrogel eliminates need for surgical placement of implant
- Continuous localized irradiation reduces repeat radiotherapy visits
- Virtually no radioactive leakage
- Biodegradable hydrogel eliminates need for surgical removal of implant
- Animal data
- Low hydrogel production cost creates high profit potential

Patent:

Pending