Biodegradable Hydrogels for Localized Radiotherapy

**Background:** The lack of selectivity of External Beam Radiotherapy (EBR), commonly used after surgical tumor removal to control/kill remaining malignant cells, is potentially damaging to healthy surrounding tissue. This can be minimized by using brachytherapy instead. Radioactive implants placed in- or close to the tumor area effectively treat a wide range of cancers. Despite being an effective alternative for EBR, brachytherapy has shortcomings. The procedure is costlier and may require surgical placement and removal of implants. Like EBR, the radiation in brachytherapy is not continuous and likely requires return visits. Researchers at Washington University in St. Louis have addressed the need for an improved brachytherapy.

**Technology Description:** A team led by Dr. Azab has developed a radioactive semi-solid hydrogel for local tumor treatment 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. Injection in- or near the tumor eliminates 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 and the biodegradable nature of the hydrogel eliminates surgical removal of an implant after treatment. These advantages and the low production costs of the radioactive hydrogel make it a promising alternative to both EBR and brachytherapy devices. This therapy is especially attractive for the treatment of cancers near the nose, ears, eyelids, and lips that often need reconstructions on facial disfigurement caused by surgeries.

**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:** Application US20170209606: Hydrogels for localized radiotherapy

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**Application Space**
Cancer, Therapeutic, Radiotherapy, Biodegradable Hydrogels

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