Biodegradable wafer

One of the therapeutic options for Glioblastoma multiforme includes placing biodegradable wafers releasing BCNU (Gliadel®) into the tumor bed at the time of surgical removal of the tumor. Due to the significant benefit this polymer technology has had clinically, Shapira-Furman et al., from Johns Hopkins Hospital have prepared wafers releasing Temozolomide (TMZ), TMZ delivered via polymer wafer could be used as a complementary treatment with or as an alternative to Gliadel®. TMZ is an alkylating agent which is water soluble. To remain comparable with the preclinical studies that led to Gliadel® the same size of wafers were formulated with TMZ. Wafers were loaded with 50% w/w TMZ in poly(lactic acid-glycolic acid) (PLGA) and showed reliable release of high dose TMZ for a period of 4 weeks. To achieve this 30-day release of the highly water soluble drug, they developed an encapsulation method, where the drug powder was first coated with the polymer to form core-shell particles in which the coating shell served as a rate controlling membrane for the drug particles. Wafers were also made with a co-loading of TMZ and BCNU. All wafers were tested in vivo by treating an intracranial 9L gliosarcoma model in F344 rats. Rats that were either untreated or treated with blank wafer died within 11 days while the median survival for rats treated with systemic TMZ was 18 days. The group that received the BCNU alone wafer had a median survival of 15 days, the group that received the TMZ wafer alone had a median survival of 19 days, and the group treated with the BCNU-TMZ wafer had a median survival of 28 days with 25% of the animals living long term (p < .0038 vs. Control; p < .001 vs. Blank Polymer). These findings demonstrate the potential of this newly designed wafer for treating GBM. Moreover, this concept, can pave the way for other drug combinations that may improve the clinical application of numerous agents to treat solid tumors 1).