TR-17. IMMUNOTARGETED-MOLECULAR-ROBOTIC-NANOSURGERY (ITMRN) ERADICATES GBM STEM-CELLS WITH RADIOFREQUENCY DIELECTRIC HEATING (RFDH) MEDIATED VIA SILVER-IMMUNONANOBOTS LINKED WITH anti-CD133 MAb

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INTRODUCTION: GBM stem cells are resistant to conventional treatment forming recurrent-tumors via angiogenesis. Thus, they are considered primary targets for novel therapeutic strategies for GBM. METHODS: We obtain relapsed chemo-radioresistant GBM stem cells overexpressing CD133 from which we develop a GBM model that we treat with immunotargeted pegylated silver nanobots (PEG-AgNPs) which are covalently conjugated to anti-CD133 MAb for targeting Brain-Cancer-Stem-Cells (BCSCs) after receptor-mediated-endocytosis. Then, we treat them with radiofrequency-dielectric-heating (RFDH) as a novel postsurgical-adjuvant-treatment. RESULTS: Post-treatment, the silver nanobots AgNPs release Ag+ ions which disrupt mitochondrial-respiratory-chain (MRC) blocking ATP-synthesis by production of ROS which damage the DNA of CSCs leading to cell-cycle arrest at G2/M phase and type-I PCD of stage-D2 or apoptosis. The capacitive nonionizing radiofrequency-dielectric-heating of 13.56MHz exerts hyperthermic cytotoxicity increasing the intracellular-Temperature of BCSCs up to 50 degrees Celsius leading to the necrosis of Brain-Cancer-Stem-Cells (BCSCs). CONCLUSION: This immunotargeted molecular robotic nanosurgical approach may be used as an adjuvant treatment against GBM which is resistant to conventional chemo/radiation therapy by eradicating its cancer-stem-cells.