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[Electric Hats Against Cancer](#)

Electric fields affect tumors

Scientists have suspected for years that electric fields cause cancer. But new investigations show that in fact they could stop or even kill it. Low-intensity, intermediate-frequency electric fields were useful in fighting off an aggressive brain cancer called glioblastoma multiforme (GBM). The electric field strategy would eliminate tumors without invasive brain surgery and induce a more than double survival time in preliminary investigations. The method exploits a step in the cell division process (as cancer is just an uncontrolled cell division): a molecular motor named the microtubule spindle involved in segregating chromosomes into the two resulting cells. Similar to a set of strings, the spindle is composed of electrically polar macromolecules which react to electric fields. Scientists had discovered that a 200-kHz field impairs the spindle's macromolecules, stopping cells' division, a fact that finally leads to their death. The research team from NovoCure Limited, a biotech company from Haifa, Israel and other Israeli and European institutes made its clinical trial with 10 GBM patients which did not respond to standard therapies. Each patient received a lightweight, battery-operated device which generates 200-kHz fields. (Power lines form fields of roughly 60 Hz.) Four sets of insulated electrodes were glued on the scalp, concentrated on the field on the tumor, and the device was carried 24 hours a day for 18 months or until the disease got worse. In 8 patients, the electric fields raised life expectancy, based on comparison with results of historical studies of GBM trials. The average survival time for the patients treated with electric fields was 62 weeks compared to just 29-weeks in the case of over 800 patients encountered at a similar disease stage and treated with chemotherapy. The tumors were impeded to grow in four patients and diminished in the other four. "In one case, a patient's tumor completely disappeared and the patient has remained tumor-free for 2.5 years after the trial; going into the study she had an expected survival time of about 6 months," said physician Eilon Kirson of NovoCure. As for the rest of the two patients, tumors had no effect. "The device is ideal for those with GBM because it only acts on the brain and lacks chemotherapy's systemic side effects," said Eric Wong, a neuro-oncologist at Beth Israel Deaconess Medical Center in Boston, Massachusetts, not involved in this research. "Because tumor cells in the brain frequently divide, normal brain cells would remain unaffected by the electric fields," reported the team. "However, electric field brain stimulation has produced seizures in laboratory rats, a phenomenon known as kindling, so I would be concerned most with whether there would be seizures [in humans]. Still, no increased rates of seizures were seen in the 10 patients." said Wong. If this therapy works, electric field therapy could also be used against breast cancer and non-small-cell lung cancer.