

## **CYTOTRON - RFQMR Project - An assessment of 12 months in end stage malignancy.**

**Tissue Engineering-** the field of altering, modifying, controlled reproduction and controlled degeneration of biological tissue has gone a long way. Using Tissue engineering techniques, today it is possible to regenerate dying tissues and organs inside the body, grow new blood vessels, heal wounds or fix an adamant fracture, grow new cartilage or even teach a few lessons to cancerous cells that go into a multiplication spree.

Rotational Field Nuclear Quantum Magnetic Resonance (RFQMR) is a new method to alter the cytokinetics or cell division and proliferation process in biological tissues. It is established that trans membrane potential (TMP) is one of the known cellular signaling pathways. TMP pathways also regulate synthesis of various proteins at the appropriate time in the living cells. It works on the hypotheses that by altering the spin lattice of the hydrogen atoms in the molecular structure of the cell wall and the DNA inside, one can alter many parameters like, pH, local ossification, protein synthesis etc.. all of which plays an important role in the command and control of mitotic process or cell division.

RFQMR is achieved using a device called "Cytotron", indigenously developed and Patented by the Centre for Advanced Research and Development (CARD), the Cytotron produces resonance modulated RF in the presence of strong switch mode magnetic field (SMMF) delivered from 288 RFQMR guns and near field antennae, that are precisely focused (LASER guided) on the target or region of interest.

The clinical trial on RFQMR started in January 2004, with an Intention of inducing cell division in the cartilage cells, that otherwise is hibernating in people suffering from a condition called Osteoarthritis (by Stimulating synthesis of HSP group of proteins). The phase I trial on regeneration of cartilage was completed in July 2004, and was published hi December 2004 with amazing results. In March 2004, we Investigated the possibility of altering the TMP pathway to synthesis P53 group of pro-apoptotic protein that could give us a great deal of knowledge from a few people suffering from end stage Cancer. The results were so encouraging that a controlled clinical trial was initiated to assess the efficacy of RFQMR in the treatment of end stage malignancy. The project is ongoing and the results so far have been exciting.

Nuclear Magnetic Resonance (NMR) exposure is known to sensitize tumor cells to apoptosis (L. Ghibelli et al., NMR exposure sensitizes tumor cells to apoptosis; Journal Apoptosis: vol. 11, No.3, 2006: 359-365)

Cancers treated between July 2004 to June 2005 is shown below.

Cancer type	Total number	Life Expectancy when recruited	Surviving Patients as of date	Pain Relief and symptom free	Back to normal Activity
Lungs	4	4 to 6 weeks	3	3	3
Liver	3	2 to 3 weeks	1	2	0
Pancreas	4	2 to 3 weeks	2	4	2
Brain	6	3 to 4 weeks	4	6	2
Ovary	5	4 to 8 weeks	5	5	5
NHL	2	3 to 4 weeks	1	1	1
Neck	2	2 to 3 weeks	0	2	0
Tongue	1	3 to 4 weeks	1	1	0
Nasal	1	6 to 8 weeks	1	1	1
Mouth	1	2 to 3 weeks	0	0	0
Stomach	3	2 to 3 weeks	0	0	0
Colorectal	2	6 to 8 weeks	1	2	1
Esophagus	4	3 to 5 weeks	1	4	1
Total	38		20	31	16

In total, 38 patients who had finished all options of known medical treatment for cancer, and in terminal stages, sent home for palliative care by the treating hospital or doctor was recruited for this trial. As seen above, out of the 38 patients exposed to RFQMR, 20 are still alive (53%), with no progress in the tumor status (tumor size, MR/CT characteristics). Two biopsy shows no evidence of malignancy. Since these patients are of end stage in-operable condition, even to remove a small section of tissue for biopsy could cause a danger of bleeding. Wherever possible we are trying to collect histopamic evidence. Out of the treated patients, 53 % are still alive, who otherwise had a high probability of facing death within the period stated above. 31 of the 38 treated patients were out of all powerful pain killers including morphine, an indication that palliative effect of RFQMR can be rated as the highest among any known modality today as 81 % of the treated patients were free of pain and symptoms, though there was a tumor site, and type dependant variation, this needs to be studied further. However, overall outcome is encouraging with 42% of the treated patients sent back to their normal activity and occupation, though they were classified as terminally ill before the treatment. Six of the patients, who expired, died of sudden cardiac death (may be due to cardiotoxicity of the chemotherapy, these patients had received.), five patients died before they could complete the treatment and one committed suicide by hanging.

In our opinion and knowledge, hi future, RFQMR can prove effective as a **non-invasive solution** in the treatment of most degenerative disease like

Osteoarthritis, relieving pain and disability due to trauma, temporo-mandibular joint disease, tinnitus, periodontal disease, carpal tunnel syndrome, osteoporosis, tendonitis and convalescence following surgical repair of ligaments, fresh bone fractures in elderly, aseptic necrosis, fibromyalgia, sciatica, post-polio syndrome, migraine, metatarsalgia, immune deficiency disorders, drug resistant epilepsy, diabetic neuropathy, herniated disk repair, problem wound healing, Stimulation of Angiogenic Growth Factor and promoting Coronary and peripheral pro-angiogenesis. in acute burns, bullet injury in diabetic etc., are some possibilities in the area of tissue regeneration engineering, while there is a great promise in the tissue degenerative engineering, Cancer should be the prime focus here.

Whatever the hypothesis, RFQMR seems to be as effective as the current stem cell research in tissue regeneration engineering. Looking at this promising field of research, the application can be of great national benefit as the technology is the most cost effective when applied in various degenerative disease states.

Diabetes is a wide spread disorder, in most countries. A degenerative disease of the pancreatic beta cells. Theoretically RFQMR can be used to target the beta cells in to enhance controlled mitotic activity, similar to what we achieved in Cartilage tissue. What are the implications? In India, we have approximately 30% of its urban population above 40 years of age and 20% of the rural adult population of the same age group suffer from Diabetes.

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