

spectrum.(15).Apoptotic effects on human epidermoid cancer cells have also been induced by static electromagnetic fields of 1.95 GHz frequency(16).

In the present study antiproliferative and apoptotic effects have been achieved by exposing sarcoma cells to a static electromagnetic field of low energy waves and frequencies between 10 KHz to 120 KHz. This field is far lower in frequency and power than the upper limits of permitted exposure, being thus, safe for use in animals and humans (17).

From the literature, it is evident that the effect of EMFs are dependent on immediate interactions that affects the electronic spin of the atoms or molecules with uncoupled electrons in their external orbital, enhancing electron spin coupling and thus may help neutralization of free radicals, especially those produced by the activation of arachidonic acid cascades (14,16,18,19,20,21). It is also known that EMFs induce free radicals production that may act as activators of signal transduction pathways (10,19,20).

According to the above it is possible that the effects of these electromagnetic fields could be similar to the effects of antioxidants and free radical scavengers on sarcoma cell lines.

The high percentage of the exposed tumor cells found in apoptosis (45%) in comparison to that of the unexposed , control cells (2%), could be explained as the result of the EMFs effects on cellular membranes activating signal transduction pathways leading to apoptic gene activation (5,7,16,22) or inactivation of anti-apoptotic genes(15). The low percentage of the cells found in synthesis and in mitosis (9 and 2% respectively) compared to that of the control cells (38 and 19% respectively) indicates that RF EMFs can act as cell cycle inhibitors , possibly to the effects of magnetic fields on DNA-synthesis (23,24,25). There is also evidence that