Reviewer's report

Title: Effect of rotary magnetic fields on melanoma: tumor inhibition and immune activation

Version: 1 Date: 21 February 2013

Reviewer: Boris Pasche

Reviewer's report:

Overview
The authors challenge mice with the B16-F10 melanoma cell line through tail vein injection to induce lung metastasis. After challenge, the authors treat the mice with ‘ROTARY Magnetic Fields” to induce inhibition of cancer cells and stimulate the immune system. It appears that the immune system is activated in a positive manner (anti-cancer) but the direct inhibition of melanoma cells is not clear. Also, the percentage of mouse survival of sham tumor mice vs. treated tumor mice was not statically significant although, they do see inhibition of melanoma cells.

Positives:
-This group is examining the immune system with respect to a magnetic field’s influence. They are definitely do that with their cytokine/chemokine data.
-Exposure for their system is reported in both Tesla and frequency.
-Their FACS / T-reg data is also very interesting (Upon MF exposure, Tregs decreased in mice that were challenged with melanoma cells)
-Their organ size/weight data is very interesting (Enlarged spleen, after challenge with melanoma cells, will shrink in size/weight upon MF exposure)

Negatives:
-The article is riddled with grammatical and syntax errors, at certain points throughout the article it hinders the readers ability to understand.
-I would like to see another melanoma cell line and a separate cancer line undergo the same exposure. The authors only have one cell line used for both the in vivo and in vitro experiments. The use of other cancer models may possibly indicate specificity to a cancer type, immune system, or none of the above.
-I would also like to see more histology slides (even if placed in the supplements) of other tissue types to see if proliferation was altered. Also, some H&E slides would be helpful, especially of the spleen.

While I understand that the authors are describing the current literature related to Magnetic Fields and its influence on cancer, it could be better written and organized. Their writing, in the introduction, is constantly jumping back and forth
from positive to negative effects of magnetic fields. The authors give examples of effects from ELF-EMF to mobile and cordless phones that are clearly not in the same range and do not make it a point to discuss this difference or at least make a mention of it. In addition, the authors make little to no mention or description of ‘Rotary Magnetic Fields’; this is KEY if you want to explain where your system fits i.e. is it similar to RF EMF or ELF-EMF. Why mention ELF-EMF and RF-EMF at all if your system is not first explained in order to be able to make comparisons. Hence, I believe it would help this article to expand its introduction with a little more information on ROTARY MF and Melanoma, which they also give little to no information.

The paper has some very interesting data, specifically the immune activation and modulation of T cells, but the writing can be very distracting.