

## Pulsed Signal Therapy

While there is a handbook of Biological Effects of Electromagnetic Fields (9), and a countless number of scientists working in the field of Electrobiolgy (including the medical and therapeutic applications), who have published hundreds of papers in the past few years, we offer one more recent and generally accepted cell response concept (in summary form) to the action of Pulsed Electromagnetic Fields (PEMF) in living tissue (in vivo).

### ***Ion Cyclotron Resonance Concept***

This was first explained by Liboff in 1984<sup>[i]</sup>, who described an ion cyclotron resonance model that suggested an increase in transport of ions such as calcium, magnesium, potassium in the individual cells, if specific magnetic fields were applied. Since 1984, Liboff, McLeod and Smith have published a number of papers, both experimental and theoretical, that support this model. <sup>[ii]</sup> <sup>[iii]</sup> <sup>[iv]</sup> <sup>[v]</sup> <sup>[vi]</sup> <sup>[vii]</sup> <sup>[viii]</sup> <sup>[ix]</sup> <sup>[x]</sup> <sup>[xi]</sup> <sup>[xii]</sup> <sup>[xiii]</sup>. Researchers in other laboratories have since reported cell responses using cyclotron resonance conditions for specific ions. (iv, x)

The Ion Cyclotron Resonance Concept explains that the efficiently transferred energy between the magnetic (time varying) field which embraces the cell and the particular ion which is revolving around the lines of (magnetic) flux. If resonance occurs, it would be expected to see modification of the biological processes of the cell upon application of the externally applied, time varying magnetic field since the calcium ion, for example, is a necessary precursor to almost every biological action (ii).

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- <sup>[xiii]</sup> Smith SD, McLeod BR, and Liboff AR. Control of embryonic chick bone growth.