

Effects of Laser Therapy

Primary

- Photons emitted by the laser reach the mitochondria and cell membranes of low lying cells such as fibroblasts
- Energy is absorbed by chromophores and is converted to chemical kinetic energy within the cell
- Primary effects are *very predictable* and are produced only by phototherapy.

Secondary

- Lead to the amplification of the primary actions.
- Cascade of metabolic effects results in various physiological changes at the cellular level such as changes in cell membrane permeability.
- Calcium is released from the mitochondria triggering changes in intracellular calcium levels which stimulates cell metabolism and the regulation of signaling pathways responsible for significant events required for wound repair such as cell migration, RNA and DNA synthesis, cell mitosis, protein secretion and cell proliferation.

Tertiary

- Induced at a distance from the cells in which the secondary events occur.
- Energized cells communicate with each other and with nonirradiated cells through increased levels of cytokines or growth factors.
- Results in intercellular communication and an increase in the immune response with the activation of T-lymphocytes, macrophages and number of mast cells.
- Increase in the synthesis of endorphins and decrease in bradykinin results in pain relief.
- Tertiary effects are the *least predictable* because they rely on intercellular interactions and a number of environmental variables.