

# VETERINARY MEDICINE TODAY

## Laser Therapy – Part IV

Now that we have a brief understanding of what laser light is and how it is produced, this month I want to spend some time discussing how laser light affects abnormal tissue; after all, this is the reason why we are so excited about this new technology.

As the laser photons penetrate deep within the tissues, they stimulate cell membranes and internal cellular structures, such as the mitochondria, of unhealthy individual cells. The mitochondria are the “factories” that produce energy for the cell. They contain a substance (chromophores) that absorb the photons and in turn increase the production of ATP (Kreb’s Cycle), which normalizes cellular function, decreases pain and has a profound affect on healing, through increased production of DNA and RNA. The laser photons are also absorbed by the membranes of the cells, which has an important effect on controlling pain and decreasing swelling. These photons are not absorbed by the chromophores or membranes of healthy cells and therefore do not have any effect on them.

The therapeutic laser has many benefits far beyond our current understanding; in this article, I will list ten scientifically documented biological effects on abnormal tissue. Although an individual article could be written focusing on the physiology of each item, I will spare you the details and briefly discuss each. These include:

1. Pain Relief - Activates acupuncture points, reduces the activity of trigger points, relaxes the musculature, stimulates the release of *B* endorphins and stabilizes the cell membranes of nerve cells.
2. Reduction of Inflammation – Increases microcirculation through vasodilatation, improves lymphatic flow and decreases edema and inhibits the synthesis of inflammatory prostaglandins

3. Acceleration of Tissue Repair and Cell Growth - Increases cellular energy through increased production of ATP, increases cellular mitosis, activates synthesis of collagen and activates production of various types of tissue repair cells, stimulates regeneration of nerves and remodeling of scar tissue.
4. Circulation Improvement – Stimulates the growth of new capillaries (blood vessels) into damaged tissue and increases blood flow through temporary vasodilatation, reducing bruising and edema.
5. Cellular Metabolic Activity Increased – Direct chromophore stimulation results in increased production of ATP and other important cellular enzymes.
6. Reduction of Fibrous (Scar) Tissue – Increases wound healing minimizing scar tissue formation and stimulates remodeling of old scar tissue into normal elastic tissue.
7. Nerve Function Improvement – Increases the regeneration of damaged nerve cells and normalizes impulse transmission through the stimulation of the cell membranes.
8. Wound Healing Accelerated – Increased production of fibroblasts and other tissue cells that aid in the repair of damaged tissue, increased blood supply to bring necessary nutrients and blood cells such as macrophages that “clean-up” damaged tissue debris.
9. Immune System Stimulated – Stimulates production of immunoglobulins and lymphocytes that are responsible for controlling infection.
10. Stimulation of Acupuncture and Trigger Points – The laser photons have a direct photobiostimulation effect on these points which is often referred to as “needleless” acupuncture.

Next month, I will begin a short series discussing some of my own case reports.

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