One of the often stated rationales for using music to manage pain is its ability to stimulate endorphins. A brief clarification may help you to understand and be able to communicate about endorphins.
What are endorphins?

• Endorphins are neurochemicals that act by modifying the way in which nerve cells respond to transmitters.

• Endorphin (Endo-orphin) means “endogenous morphine” or “morphine like substance originating from within the body”.

Kinds of endorphins

• There are 20 different kinds of endorphins.

• The three most common are beta-endorphins, enkephalins and dynorphins.

• Endorphin and enkephalin are the body’s natural painkillers. When a person is injured, pain impulses travel up the spinal cord to the brain. The brain then releases endorphins and enkephalins. Enkephalins block pain signals in the spinal cord. Endorphins are thought to block pain principally at the brain stem. Both are morphine-like substances whose functions are similar to those of opium-based drugs.

• Today, the word "endorphin" is used generically to describe both groups of painkillers. These naturally occurring opiates include enkephalins (methionine and leucine), endorphins (alpha, beta, gamma, and delta) and a growing number of synthetic (artificial) compounds.
Where do they come from?

- Beta-endorphins are produced in the pituitary gland.
- Enkephalins and dynorphins are both produced in the nervous system.
Enkephalins are neurotransmitters which work to suppress pain. The goal of pain suppression is to allow the body to cope with pain while remaining focused, rather than permitting the perception of pain to flood the system and cause panic, distress, or confusion. These neurotransmitters are polypeptides, meaning that they consist of very short chains of amino acids. Two different enkephalins have been identified: met-enkephalin and leu-enkephalin. An enkephalin is a pentapeptide involved in regulating nociception in the body. The enkephalins are termed endogenous ligands, or specifically endorphins, as they are internally derived and bind to the body's opioid receptors. Discovered in 1975.
Interesting fact about their discovery

- Endorphins were discovered after scientists found that the pain reliever morphine already fit a certain nerve cell structure in the brain.
- This meant the brain was already producing a pain killer of its own which was later discovered and named “endogenous morphine”.
Facts about endorphins

Endorphins are endogenous opioid polypeptide compounds. They are produced by the pituitary gland and the hypothalamus in vertebrates during exercise, excitement, pain, consumption of spicy food and orgasm, and they resemble the opiates in their abilities to produce analgesia and a feeling of well-being. Endorphins work as "natural pain relievers."

The term "endorphin" implies a pharmacological activity (analogous to the activity of the corticosteroid category of biochemicals) as opposed to a specific chemical formulation.
Endorphins

It consists of two parts: endo- and -orphin; these are short forms of the words endogenous and morphine, intended to mean "a morphine-like substance originating from within the body."

The term endorphin rush has been adopted in popular speech to refer to feelings of exhilaration brought on by pain, danger, or other forms of stress, supposedly due to the influence of endorphins. When a nerve impulse reaches the spinal cord, endorphins are released which prevent nerve cells from releasing more pain signals. Immediately after injury, endorphins allow animals to feel a sense of power and control over ...
What do endorphins do?

- Relieve pain
- Enhance immune system
- Reduce stress levels
- Postpone aging process
- Modulate appetite
- Lowers blood pressure
- Influences calm or euphoric state of mind
Natural pain killer

- Damage detecting sensory neurons relay messages of pain to the spinal cord.
- When a nerve impulse reaches the spinal cord, endorphins are released; this prevents nerve cells from sending pain signals (substance P) to the brain.
Boost immune system

- When endorphins are secreted, they also activate Natural Killer cells (NK cells) which take responsibility for the immune system by killing defective cells.
- NK cells also have ability to modify cancer cells.

Natural Killer (NK) cell image (Credit: SUNY Upstate Medical University)
What causes endorphin release?

- Pain
- Stress
- Foods such as chocolate and chili peppers
- Overexposure to sunlight
- Exercise
- Laughter
- Music
Pain and stress are the two most common factors leading to the release of endorphins.

It is believed that under extreme stress, or pain, endorphins work over time and can be credited with such things as the “adrenaline rush”, “runners high”, and “second wind”.

Music can often serve as a ‘sonic caffeine’ which can activate mental and physical states.
Eating spicy foods

- Capsaicin, the active chemical in red chili peppers, has been shown to stimulate endorphin release.
- A topical capsaicin cream has been used as a treatment for certain types of chronic pain.

Do you think that listening to “Red Hot Chili Peppers” will help you release endorphins?
Endorphins in therapy

Endorphins ability to alleviate pain, enhance the immune system, reduce stress, relax mind/body and lower blood pressure make it a vital tool in many kinds of therapy including music and laughter therapy.
Endorphin release is

- Safe
- Without side effect
- Non-addictive
- Relaxing
- Free (in most cases)
- An awesome natural high
Dr. Mitchell L. Gaynor, director of medical oncology and integrative medicine at New York Hospital's cancer-prevention center, and author of the book *Sounds of Healing* writes. “It (*sound & music*) also trims complications after heart attack, calms anxiety, slows breathing and increases production of endorphins, the body's natural painkillers. Consider: 80% of stimuli that reach our brains come in through our ears”.
Music and Endorphins

Endorphins: Strong painkillers. (article)
http://tobeinformed.com/health-articles/endorphins--strong-painkillers-your-subconscious-may-be.html

How to release endorphins.
http://www.ehow.com/how_2063616_release-endorphins.html

Music, Emotion and the Brain. (article)
http://serendip.brynmawr.edu/bb/neuro/neuro04/web2/gvaidya.html

What makes singing fun. (article)

http://www.pbs.org/wgbh/aso/databank/entries/dh75en.html