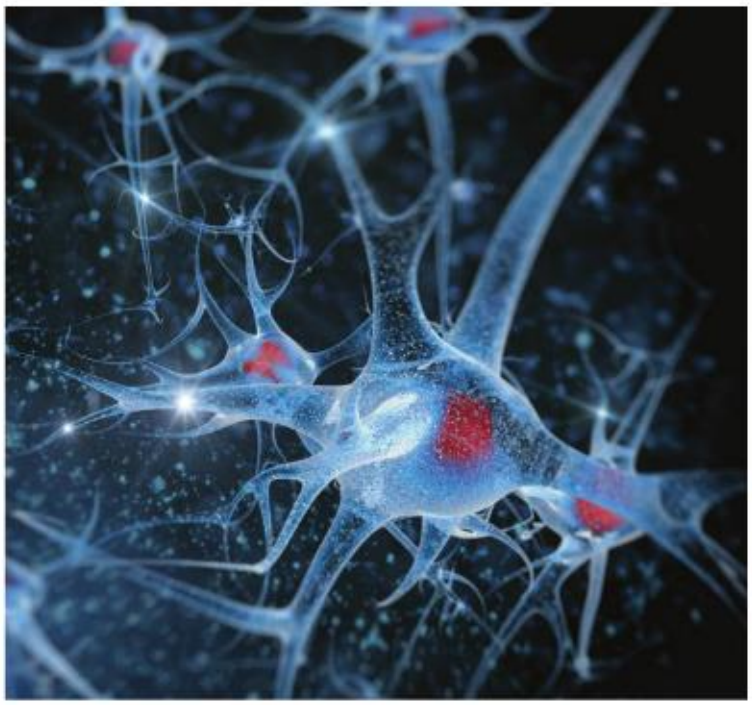
Massage as a Functional Neuromodulation Intervention

BY ALEJANDRO ELORRIAGA CLARACO, MD (SPAIN),
DIRECTOR MCMASTER CONTEMPORARY ACUPUNCTURE PROGRAM

Neurons are arguably the most interesting cells of the body for Manual Medicine Practitioners. Their remarkable properties include: 1. *Neuromodulation* = the ability to modify their own activity *functionally,* and 2. *Neuroplasticity* = the ability to change *structurally* in response to repeated stimuli.

Functional neuromodulation refers to the physiology of the multiple "built-in" neural circuits that participate in the integration and modulation of neural signals at every level of the nervous system. These responses involve both "top down" and "bottom up" circuits. Understanding of these neural pathways and their neurophysiology (see drawing on opposite page) support the thesis that "massage therapy interventions" are fundamentally "functional neuromodulation interventions". Briefly, during "massage therapy interventions" different receptor fields in the somatic tissues are stimulated by mechanical and thermal signals generated by the hands of the therapist. As a result, and depending on the type of nerve fiber stimulated, different **neuropeptides** (such as substance P, endorphins and oxytocin) and **neurotransmitters** (such as glutamate, GABA, and dopamine) are secreted along specific neural circuits involved in the functional neuromodulation of nociception in the central nervous system. The end result: 1. a significant number of nociceptive signals are prevented from ever reaching the brain, which helps with our wellbeing and 2. functionality of the somatic neuromotor and the sympathetic vasomotor systems is preserved, by several mechanisms, including the elimination of nociceptive interferences.



During massage therapy interventions, different neuromodulatory circuits are engaged depending on the innervation of the tissues and on the quality of the inputs used. Most massage therapy interventions have the potential to engage the whole variety of skin, fascial, and musculoskeletal somatic sensory fibers, carrying both exteroceptive information (pain, touch, temperature) and proprioceptive information (position sense, joint movement, muscle length, rate of change of muscle length, muscle stretch, tendon tension, ligament tension). For instance, techniques involving tissue distraction will stimulate sensory receptors such as Pacinian corpuscles, Ruffini organs, and small myelinated free nerve endings in the fascia, while gentle but more vigorous work around the joints will involve the stimulation of thick myelinated fibers (type I and II) involved in proprioception and kinesthesia.

Many practitioners still think about massage therapy interventions as primarily "mechanical" in nature (and they are right from the input standpoint), however, as discussed, most of the beneficial effects of massage can be explained by the functional neuromodulation model. This model also explains the beneficial effects observed in response to needling techniques, electrostimulation, and even movement!

As a summary: according to contemporary neurophysiology, we can state that "massage is a functional neuromodulatory intervention" because it activates functional neuromodulatory neural circuits, promoting modulation and integration of segmental, intersegmental and supraspinal sensory-motor-sympathetic signals, resulting in less discomfort and better quality of movement for the recipients of massage therapy interventions.