



# Svetlana Masgutova Educational Institute

The Masgutova Neurosensorimotor Reflex Integration - MNRI® Method

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## Sir Charles Sherrington, English Neurophysiologist, 1857-1952

Charles Sherrington made a wide variety of key findings related to reflexes and local reflex circuitry. He described the reflex as the smallest unit of nervous system action from which more complex, coordinated reflex actions develop. He also demonstrated that single reflexes combine to create compound reflex actions, which in turn combine to create reflex patterns.

Sherrington had a particular interest in the spinal cord and its function. He studied spinal animals and found that reflex responses start with sensory system stimuli. These stimuli travel via the network of nerves to the spinal cord, and then back to the muscles which then respond to the stimuli. These studies also demonstrated that when the spinal cord is severed or a nerve detached from muscle, the reflex fails to respond. In this way, Sherrington determined that simple reflexes are governed by the spinal cord. Building on his understanding of nervous system function, Sherrington introduced the concept of synapses, a term he coined, as a physiological entity, and detailed how they enable interaction of nerve cells. He also described the relationship between afferent (inward) and efferent (outgoing) nervous pathways in the central nervous system and discovered the mechanisms of motor coordination, including the concept of proprioception where he demonstrated that upright posture, maintained by gravity, is independent of cerebral function and skin sensation.

Importantly, even though Sherrington's focus was on the complex action within the nervous system, he theorized that higher brain function and nervous system action coordinates the various body parts and organs into a unified individual. In this way, Sherrington viewed movement and bodily function as an intricate orchestration of a system of reflexes, triggered by nerve impulses, centrally influenced by the spinal column and brain, and activated by the sensory system.

In his 1906 book, *The Integrative Action of the Nervous System*, Sherrington wrote "Reflexes interact with each other. The reflex response to a stimulus which is severely threatening to the well-being, or even to the life, of an animal, whilst commanding its own response, simultaneously switches off any other interfering reflexes that are less important in survival and that utilize the same muscle." Sherrington's work scientifically demonstrated the basic relationship that exists between spinal cord and brain of the central nervous system and the sensory and motor neurons of the peripheral nervous system, and the integrated fashion in which the two work together to engage external motor action as outlined below:

## HUMAN NERVOUS SYSTEM

### CENTRAL NERVOUS SYSTEM

#### BRAIN & SPINAL CORD

Mediates & directs body's external activity using inter-neural pathways to take in & send out information.

Receives external sensory input notification ← ← ← ← Takes in external sensory input

Determines necessary external action/inaction

Sends directive to engage external motor response → → → Engages external motor response

### PERIPHERAL NERVOUS SYSTEM

#### SENSORY & MOTOR NERVES

Integrate with the Central Nervous System to manage the body's external response system.