

**Kemal S. Türker, BDS, PhD**

Professor of Physiology, Koc University School of Medicine, Istanbul, Turkey

---

## **A new method to study functional neuronal networks in human neuromuscular system**

The aim of this talk is to discuss several methods of estimating functional neuronal networks in human neuromuscular system and present our new method that overcomes embedded errors in the classical methodologies.

The following items will be covered (references **1-3** for details):

- Advantages and disadvantages of animal and human experiments for estimating functional mapping of the nervous system.
- Probability-based analyses for indirectly estimating functional networks of the human nervous system:
  - Essentials on the surface electromyography: advantages and disadvantages of surface electromyography for studying functional synaptic connection of the human nervous system;
  - Essentials on the single motor unit recording: advantages and disadvantages of single motor units for studying functional map of the human nervous system;
  - Errors in the probability-based analyses and a new method to resolve the error problems
- Frequency-based analyses for indirectly estimating functional map of the human nervous system:
  - Testing and directly proving a methodological theory using brain slice experiments;
  - Re-investigation of pathways in human nervous system and discovering and resolving the errors of the previous methods of investigation.

### **REFERENCES:**

1. TÜRKER, K.S. and POWERS, R.K. (1999) Effects of large excitatory and inhibitory inputs on motoneuron discharge rate and probability. **Journal of Neurophysiology**, 82:829-840.
2. TÜRKER, K.S. and POWERS, R.K. (2003) Estimation of postsynaptic potentials in rat hypoglossal motoneurons; Insights for human work. **Journal of Physiology**, 551:419-431.
3. TÜRKER, K.S. and POWERS, R.K. (2005) Black box revisited: A technique for estimating postsynaptic potentials in neurones. **Trends in Neuroscience**, 28:379-386.