

## "Vitamin B12 Deficiency-Subacute Combined Degeneration: Old and New Facts"



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**Date:** January 23rd, 2015

**Time:** 12pm - 1pm

**Venue:** AHC IV 101

**Biography:** Edward J. Fine, MD, FAAN is Board-Certified in Neurology with Extra Qualifications in Clinical Neurophysiology and is the Director of the Clinical Neurophysiology Training Program at the University at Buffalo. He specializes in neuromuscular disorders and epilepsy. Dr. Fine was a Roessler Scholar and a graduate of The Ohio State University Medical School. In the US Navy Medical Corps, he served as Medical Officer to Destroyer Squadron 12 and in the Naval Hospital at Newport, RI, rising to rank of Commander. Dr. Fine continued his training at the Albany Medical Center, Brown University Medical School, and at the University of Medicine and Dentistry of New Jersey. He further trained in Clinical Neurophysiology under Mark Hallett, MD. Prior to joining the University at Buffalo in 1983, he served on the faculty at Rutgers Medical School and as the Director of Neurological Services at the Robert Wood Johnson Rehabilitation Institute. Dr. Fine has written 125 peer reviewed articles, book chapters and abstracts. He has an academic interest in the history of the neurosciences, serving as President of the International Society of the History of the Neurosciences in 2004 and on the Editorial board of the *Journal of the History of the Neurosciences* since 2003. He is the current Chair of the Section of the History of Neurology Section, AAN.

### Abstract

I will review the 97-year span between Austin Flint, Sr.'s proposal in 1851 that pernicious anemia was related to gastric mucosal atrophy to Lester Smith and E.L. Rickes' isolation of brilliant red crystals of vitamin B12 in 1948 that had potent anti-anemia effects. I will discuss the overlooked discoveries of Carl Wernicke (1878) of combined degeneration of posterior and lateral columns of the spinal cord.

Russell, Batten, and Collier (RBC) in 1900 described neurological deterioration in PA: stiffness in lower extremities with loss of position sense and increased tendon reflexes, followed by inability to walk and Babinski's toe extension sign and the 3rd stage of sudden flaccid paralysis, tendon reflex loss, loosening of sphincters, coma and death. Autopsies revealed axon loss and demyelination in peripheral nerves, and demyelination in posterior and lateral spinal columns. RBC coined the term "subacute combined degeneration".

I will discuss how a patient's recovery led Minot, Murphy and Whipple to successful treatment for PA and SCD that lead to their Nobel Prize. Castle demonstrated that 3 factors were needed to effect cure: gastric < pH 3, extrinsic factor from liver, and intrinsic factor from stomachs of cows or healthy humans. Dorothy Hodgkin determined that vitamin B12 contained 4 porphyrin-like rings surrounding a cobalt atom.

I will show that my and other investigators neurophysiological studies confirm the pathology that RBC described in their seminal paper in Brain. I will discuss how methylmalonic acid and homocysteine levels guide treatment of patients with borderline vitamin B12 levels, mechanism of metformin on vitamin B12 receptors, and absorption of natural source B12 vs. synthetic vitamin B12. I will recall that Dr. Flint's prescient comment relates to auto-immune processes that cause gastritis and impaired vitamin B12 absorption.

### Co-sponsor information.

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