CC/NUMBER 43
OCTOBER 27, 1980

This Week's Citation Classic

Odell W D, Wilber J F & Paul W E. Radioimmunoassay of thyrotropin in human serum. J. clin. Endocrinol. *Metab.* **25**:1179-88, 1965. [Endocrinol. Branch, National Cancer Institute, Bethesda, MD]

A radioimmunoassay capable of quantifying human thyrotropin (hTSH) in serum was developed. Very scarce, highly purified hTSH was used to immunize two rabbits; each developed high titer antisera. Separation of bound from free hormone was by differential alcoholsaline solubility —antibody bound hTSH was precipitated; free hTSH remained in solution. Data on 101 patients with varied thyroid function were reported (euthyroid, pregnant, hypopituitary, hyperthyroid, and myxedematous). Several patients had repeated measurements of serum TSH during treatment with antithyroid drugs or thyroxine. [The *SCI*® indicates that this paper has been cited over 340 times since 1965.]

William D. Odell
College of Medicine
Department of Internal Medicine
University of Utah Medical Center
Salt Lake City, UT 84112

July 8, 1980

"This was the first description of a radioimmunoassay for TSH which was applicable to human serum or plasma. An earlier publication had described immunological studies of human and bovine BH.[1] Although it was possible then to quantify hTSH in buffer, serum or plasma interfered with the assay. This earlier work was performed at the National Cancer Institute (NCI). Peter Condliffe purified the hTSH and made it available to us (Robert Utiger and myself) for our studies. Following this, Utiger left the NCI to join the faculty at Washington University. I was then senior investigator at NCI, and was joined by my first postdoctoral fellow (Jack Wilber) and W. Paul to develop the hTSH assay for clinical use, as reported in this paper and "Radioimmunoassay of human thyrotropin in serum."[2] We investigated many methods for separating bound and free, finally selecting a simple chemical method based on the unusual solubility of hTSH in 5% NaCI, 55% ETOH. This solubility characteristic was made known to us by personal comment of Robert Bates at NIAMD. We then under-took extensive clinical studies at the NCI using this assay system. Independently, at Washington University, Utiger also developed an assay capable of quantifying hTSH in serum and reported that also at a later date.[3]All these studies used antisera originally obtained from two animals immunized by myself and Utiger in 1962-63. We used this assay method in additional studies related to physiology and pathophysiology of thyrotropin secretion in man.[4,5]

"In addition to frequent citation because it is the first report of an assay applicable to serum, the alcohol-saline separation method is cheap and simple and has been extensively used in many countries where expense of subsequently described methods (e.g., double antibody) was a limiting factor. The alcohol-saline method works for several glycoprotein hormones."

1. **Utiger R D, Odell W D & Condliffe P G.** Immunologic studies of purified human and bovine thyroiropin. *Endocrinology* **73**:359-65, 1963.
2. **Odell W D, Wilber J F & Paul W E.** Radioimmunoassay of human thyroiropin in serum. *Metabolism* **14**:465-7, 1965.
3. **Utiger R D.** Immunoassay of human plasma TSH. (Cassano C & Andreoli M, eds.) Current topics in thyroid research. New York: Academic Press, 1965. p. 513-26.
4. **Odell W D, Utiger R D, Wilber J F & Condliffe P G.** Estimation of the secretion rale of thyroiropin in man. *J. Clin. Invest.* **46**:953-9, 1967.
5. **Odell W D, Wilber J F & Utiger R D.** Studies of thyroiropin physiology by means of radioimmunoassay. *Recent Progr.* Hormone Res. **23**:47-78, 1967.