

---

# Preface

Initially, hormones were measured by biological methods, either internally or externally. Internally, within the patient, for example, estrogens could be monitored by examination of vaginal cytology and androgens by the onset of hirsutism. External bioassays involve(d) either whole laboratory animals or specific tissues or cells in incubation or culture to provide suitable endpoints for response. In general, bioassays, although often exquisitely specific are, with notable exceptions, either expensive or time-consuming or not sensitive enough to measure hormones in body fluids.

Hormones, particularly steroids and their metabolites, have been measured chemically, particularly in urine, for the past 60 years. Such methods have proved to be valuable diagnostic tools and methods are described in this book using high-performance liquid chromatography and gas chromatography–mass spectrometry, procedures that give high specificity and sensitivity. It was, however, only with the development of immunoassays by Berson and Yalow, and by Ekins, that methods sensitive enough to measure levels of hormone circulating in blood were possible. Further sensitivity was achieved with the introduction of monoclonal antibodies and the development of immunometric assays. Early immunoassay methods used radioactive labels that were unsuited to automation. Automation was achieved when enzyme, fluorescent, and chemiluminescent labels were introduced and today the majority of hormone assays are available on automated immunoassay analyzers. Although convenient, these assays are often expensive and can suffer from nonspecific effects.

The high precision and sensitivity of today's assays enable hormones to be measured at very low concentrations in a variety of such biological fluids as serum, cerebrospinal fluid, and saliva. Not only have studies revealed seasonal variations more clearly but also, by measuring frequent samples throughout the day, the episodic secretion of a number of peptides. The more sensitive assays have also allowed the measurement of hormone levels in children and in hormone-deficient states. Therefore, not only have the assays extended our knowledge of the biochemistry and physiology of hormones, but they have also opened up new knowledge that aids in the diagnosis and treatment of disease.

In the present reviews of methods of hormone assay, a wider view of a hormone than envisaged by Bayliss's and Starling's definition has been taken, with the word hormone being applied to any specific chemical messenger or its metabolites in blood and other body fluids. We have used SI units throughout the book for consistency. Where no international standard is available we have used the most common unitage quoted in the literature.

It has not been possible to cover all the hormones, but many of the techniques described in *Hormone Assays in Biological Fluids* are transferable to those hormones

that are absent. Where reference ranges are quoted, these are only given for guidance. It is always recommended that the assayist should establish the reference range for the method used and the population being investigated. The first chapters give an overview of the methods commonly used in the measurement of hormones. These are followed by chapters on specific hormone groups. The emphasis has been on noncommercial assays so that readers can set up their own methods. In some cases commercial assays are described for comparative purposes. As already mentioned, most assays are available as commercial kits and many are automated. However, some of the advantages of in-house assays are that they are often less expensive, may be tailored to give a working range suitable for the specimens to be measured, and can be modified to reduce interference effects and provide more precise, more sensitive, and more accurate results. We believe there is still an important place for developing one's own assays.

***Michael J. Wheeler***  
***J. S. Morley Hutchinson***

Hormone Assays in Biological Fluids

Wheeler, M.J.; Fraser, W.D.; Hutchinson, J.S.M. (Eds.)

2006, IX, 258 p., Hardcover

ISBN: 978-1-58829-005-2

A product of Humana Press