

Isolation of *nor*-Adrenaline from the Adrenal Gland

SUNE BERGSTROM, U. S. v. EULER AND
ULLA HAMBERG

*Department of Physiological Chemistry, University of Lund, Lund, Sweden, and
Department of Physiology, Karolinska Institutet, Stockholm, Sweden*

In recent years it has been demonstrated that a factor with the physiological properties of synthetic *L-nor*-adrenaline¹ occurs as a regular constituent of adrenergic nerves² and apparently plays an important role as chemical nerve transmitter³.

With biological and colorimetric tests it has been demonstrated to occur in various organs and tissues², adrenal medulla⁴⁻⁶ and medullary tumors⁷. However, so far *nor*-adrenaline never seems to have been isolated and identified from natural sources⁸.

We now wish to report the isolation of *L-nor*-adrenaline from cattle adrenals where it occurs together with *L*-adrenaline in the approx. proportions 1 : 4. The mixture of these bases was isolated from the crude protein free extract with the aid of ion exchangers⁹.

The bases were then separated with counter-current distribution between 0.02 *N* HCl and phenol. After extraction of the phenol with ether pure *L-nor*-adrenaline was isolated as the crystalline base by addition of ammonia.

$C_8H_{11}O_3N$ (169.18)

Calc. C 56.79 H 6.56 N 8.28

Found » 56.37, 56.22 » 6.40 6.46 » 7.93

The ultraviolet absorption spectra and the x-ray powder diffraction patterns of the isolated product and of a synthetic specimen were identical¹⁰.

When compared with the colorimetric method of Euler and Hamberg¹¹ and in biological tests (cat's blood pressure, hen's rectal caecum) the samples were also found identical.

A full report will be published in *Acta Physiol. Scand.*

1. Tainter, M. L., Tullar, B. F., and Luduena F. P. *Science* **107** (1948) 39.
2. Euler, U. S. v. *Acta Physiol. Scand.* **16** (1948) 63.
3. Cannon, W. B., and Rosenblueth, A. *Am. J. Physiol.* **104** (1933) 557.
4. Holtz, P., and Schumann, H. J. *Naturwissenschaften* **35** (1948) 159.
5. Bülbring, E., and Burn, J. H. *Nature* **163** (1949) 363.
6. Euler, U. S. v., and Hamberg, U. *Nature* **163** (1949) 642.
7. Holton, P. *Nature* **163** (1949) 217.
8. In a private communication to one of us (U.S. v. E.) Dr. M. L. Tainter has informed us that Dr. B. F. Tullar has isolated *L-nor*-adrenaline from commercial adrenalin preparations.
9. Bergström, S. To be published.
10. We are indebted to Dr. E. Stenhagen for the x-ray diffractions measurements.
11. Euler, U. S. v., and Hamberg, U. *Acta Physiol. Scand.* In press.

Received May 22, 1949.

New Books

Encyclopedia of Chemical Technology.
Volume 1: A — Anthrimides. Editors:
Raymond E. Kirk and Donald
F. Othmer. Assistant editors: Janet
D. Scott and Anthony Standen.
Interscience, New York 1947. 982 pp.
\$20 per volume.

The scope of this Encyclopedia is described in the preface: »It is neither a dictionary nor a handbook, nor is it a series of technological monographs... for the benefit of advanced specialists... Rather it is designed to present the entire field of chemical technology for profes-