A Description of Metabolomics in 1966

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A Gas–Liquid-Chromatographic Procedure for Separating a Wide Range of Metabolites occurring in Urine or Tissue Extracts

By C. E. DALGLIESH, E. C. HORNING, M. G. HORNING,
K. L. KNOX and K. YARGER
Institute for Lipid Research and Department of Biochemistry, Baylor University College of Medicine, Houston, Texas, U.S.A.

Moreover, when the column can be connected with a mass spectrometer there results a highly sophisticated diagnostic tool. A substance present in microgram or submicrogram quantities in a complex mixture can be both estimated quantitatively by chromatography and structurally characterized by mass spectrometry. In those cases where it is not possible to deduce the detailed structure from the mass spectrum, one can still readily deduce such features as the accurate molecular weight, and whether or not the chromatographic peak is homogeneous. The deduction of structures from mass spectra will, of course, become much easier as the mass spectra of known metabolites in urine or tissue are established and interpreted, and this aspect is being pursued in this Institute.

The ability to separate, identify and measure, on the same chromatogram, such diverse substances as tricarboxylic acid-cycle intermediates, steroids and metabolites of biological amines (the same column, with different derivatives, can be used for the biological amines themselves; Capella & Horning, 1966) can be of great experimental value.

These parameters can all vary in different ways in response to different types of stress. No single separative procedure can satisfy all needs. But the present procedure in our experience offers the possibility of examining metabolic patterns, and following the changes in these patterns in response to drugs, environmental change or other stimuli, on a broader scale than has previously been practicable.