

Amino Acids and Peptides in Infant Urine

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The figures given in the literature for the normal excretion of amino acids in urine vary a lot, and refer mostly to urine from adults^{1,2}. The following is a preliminary report of an investigation of the amino acid and peptide composition in urines from infants including prematures.

Method. Two dimensional paper chromatography. First solvent: butanol, acetic acid, water. Second solvent: phenol, water, ammonia. Desalted urine (during this process all taurine is lost) corresponding to 400 or 600 μ g of total nitrogen was put on each paper.

Samples of urine from 40 infants, age 3 weeks to one year, have been analysed. Thirty-two spots occurred relatively frequently. Eighteen spots, arranged according to falling approximate amino acid content, have been identified as glycine, histidine + arginine (only small amounts), alanine, glutamine, serine, tyrosine, glutamic acid, threonine, asparagine, lysine, valine + tryptophane + methionine, cystine, α -amino-*n*-buturic acid, aspartic acid, phenylalanine, isoleucine + leucine, proline, hydroxyproline.

Three frequently occurring spots show the same positions on the chromatogram as have been reported in the literature³⁻⁵ for β -amino isobutyric acid, γ -amino *n*-buturic acid and α -amino adipic acid. Two other but fainter spots show the same positions as a synthetic mixture of 1- and 3-methylhistidine.

Of the remaining 9 spots two, that seem to be peptides, are of special interest. They give the same typically yellow colour with ninhydrin as proline, but differ markedly in their positions on the chromatogram. R_{proline} values in butanol/phenol: 0.85/0.80, 0.81/1.00.

The first of these substances, which sometimes occurs in relatively great amounts, was purified, and after hydrolysis contained proline, glycine, alanine and glutamic acid, the colour of the proline and glycine spots being stronger than that of the others. The nature of the remaining unidentified spots is under investigation.

As a rule the amino acid and peptide patterns from different individuals are rather constant, variations however being observed. Proline and hydroxyproline have only been found in urine from premature babies. The

composition of food (human milk — cow's milk) seems not to have any influence on the amino acid and peptide excretion; at any rate no difference can be detected in the chromatograms.

Ten urines from adults have also been analysed. The two yellow spots have not so far been found in any urine from adults.

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Metabolite Analogues Containing a Geminal Dimethyl Group

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In the course of an investigation originally devoted to the synthesis of compounds with auxin (plant growth hormone) activity it was observed that synthetic auxins of the arylacetic, aryloxyacetic and 3-indoleacetic acid type were quite generally converted into antiauxins (auxin antagonists) by the introduction of a *gem*-dimethyl group at the methylene carbon atom. This fact encouraged us to prepare similar "branched" analogues of some animal metabolites such as certain amino acids, hormones and vitamins in order to study whether this structural alteration of the metabolites might produce interesting changes in the physiological activities of the compounds. So far these studies have resulted in synthetic methods for the preparation of analogues of aspartic acid, phenylalanine, tyrosine, thyroxine, histamine, pantothenic acid, and tryptamine, and the physiology and pharmacology of these compounds is now being studied in various institutes. Investigations now in progress are devoted to the analogues of aliphatic amino acids with the ultimate goal of preparing folic acid analogues containing "branched" amino acid moieties. The synthetic methods for these types of compounds as well as the test results obtained so far will be discussed.