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RECENTLY PUBLISHED RESEARCH OF THE ACADEMY OF MEDICAL SCIENCES, USSR

"Effect of Protracted Malnutrition (Predominantly Carbohydrate) on Accumulation of Ascorbic Acid in Organs," L. M. Bremener, B. A. Lavrov, Acad Med Sci Moscow

"Byull Eksper Biol i Med" Vol 23, 1947, pp 43-5

In guinea pigs on scorbutogenic diet for 15-18 days, followed by an essentially carbohydrate diet, growth is sharply retarded. After 61 days the animals were divided into 2 groups, one of which was given a sharply reduced amount of hay, the other receiving about 30 g daily; the latter group showed gradual loss of scurvy symptoms, while in the 1st subgroup this occurred in but 11 of 18 animals. Vitamin C levels on autopsy in liver, kidneys, and suprarenals were substantially below normal, comparable with initial scurvy levels.

"Action of Adenosinetriphosphate on Blood Vessels," A.G. Pugachev, Acad Med Sci Moscow

"Byull Eksper Biol i Med" Vol 23, 1947, pp 35-7

Experiments with isolated frog leg and rabbit ear in perfusion with solutions of adenosinetriphosphate at $2:10^5$-$2.5:10^6$ gave blood vessel contraction, more intensive with higher ATP concentrations, or expansion at $2:10^5$-$1:10^6$.

"Influence of Acetic, Acetoacetic, and β-hydroxybutyric

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Acids on the Synthesis of Amino Acids in Liver and Kidney Slices," S. Kaplanskiy, Zh. Shmerling, Acad Med Sci Moscow

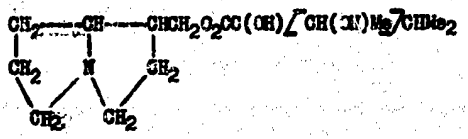
"Biokhimiya" Vol 12, 1947, pp 27-34

An earlier finding that leucine stimulates the synthesis by liver slices of amino acids from pyruvic acid and ammonium salts, is further studied. According to Bloch, the probable metabolic products of leucine are isovaleric, acetoacetic, β-hydroxybutyric, and acetic acids. Of these products, only HOAc has a stimulating effect on the formation of amino acids from pyruvic acid and ammonium salts. An inhibiting effect is produced by acetoacetic and β-hydroxybutyric acids. Another new type of amino acid formation by liver slices has been observed in the presence of acetoacetic and β-hydroxybutyric acids and ammonium salts. The N of this amino acid is not liberated by the Van Slyke reaction in 3 minutes as in the case when pyruvic acid is the substrate, but 30 minutes are required. This indicates the formation not of an α- but of a β-amino acid, most probably β-aminobutyric acid.

"Alkaloids of Trachelanthus Korolkovi. IV. Structure of Trachelantamine," G. P. Men'shikov, Acad Med Sci Moscow

"Zhur Obshch Khim" Vol 17, 1947, pp 343-6

Hydrolysis of trachelantamine gives the previously characterized and identified trachelantamidine (an amino alcohol) and trachelantic acid (I), $C_7H_{14}O_4$, whose structure is shown to be $C_5H_{11}(OH)_2CO_2H$. Two reactions with I are described. It is concluded that I is 2-methyl-3,4-dihydroxy-3-pentanecarboxylic acid and trachelantamine is:



"Synthesis of 1-(4-hydroxy-1-naphthyl)-2-methylaminoethanol and Other Derivatives of the Naphthalene Series," S. L. Sergiyevskaya, I. M. Lipovich, Acad Med Sci Moscow

"Zhur Obshch Khim" Vol 17, 1947, pp 347-54

4-Acetyl-1-naphthol in crude C_5H_5N treated gradually with BzCl yielded benzoate. This in $CHCl_3$ treated slowly with Br yielded crude, and to a lesser amount pure, 4-bromoacetyl-1-naphthyl benzoate, which, treated with $PhCH_2NHMe$ in C_6H_6 at room temperature with stirring, then let stand overnight, gave 4-[(benzylmethylamino)acetyl]-1-naphthyl benzoate as a dark oil, and

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HCl salt. The HCl salt in warm AcOH, heated with HBr on a steam bath, concentrated in vacuo, shaken out with NH_4OH and Et_2O, and the dry Et_2O extract treated with dry HCl, gave 4-[(benzylmethylamino)acetyl]-1-naphthol-HCl. Similar result was obtained on hydrolysis of the crude free base by HBr in AcOH. Equally effective was the hydrolysis by heating on a steam bath with concentrated HCl, as was the use of 20% alcoholic HCl. To 4-[(benzylmethylamino)acetyl]-1-naphthol in EtOH was added 2% Pd on C, and the mixture was hydrogenated at atmospheric pressure and temperature to give 1-(4-hydroxyl-1-naphthyl)-2-(methylamino)ethanol-HCl (I). The HCl salt was hydrogenated with 4% Pd on C at room temperature and atmospheric pressure, but attempts to isolate the resulting isomer of I, either as the free base or HCl salt, failed due to instability of the aqueous solution; the solution gives a brown color with $FeCl_3$; pharmacological evaluation of the solution failed to show any sympathomimetic action. I was less effective than adrenaline or sympathol in supporting heart action; it was also poorly stable in aqueous solutions.

"The Mechanism of Formation of Amino Acids in Surviving Animal Tissues from Pyruvate and Ammonia," M. G. Kritsman, Acad Med Sci Moscow

"Zhurn Biolog Khimii" No 167, 1947, pp 77-100

The synthesis of amino acids by surviving liver (and probably kidney) tissue involves the following reactions: (1) formation of oxalacetate from CO_2 and pyruvate (I) (Wood-Werkman reaction), requiring inorganic P and possibly followed by production of α-ketoglutaric acid through the tricarboxylic acid cycle; (2) formation of aspartic acid (or glutamic acid) from oxalacetic (or α-ketoglutaric) acid, ammonia (II), and an unidentified hydrogen donor; (3) formation of alanine by transamination between I and aspartic (or glutamic) acid. The role of transamination as the final step in alanine synthesis was confirmed by (1) the gradual conversion of aspartic acid into alanine in the course of amino acid formation; (2) the catalytic activity of the dicarboxylic acids in amino acid synthesis; (3) the parallel decrease of the rates of reductive amination and of transamination between aspartic acid and I with dilution or purification of cell-free liver preparations, and the coincident partial reactivation of both processes by a supplement of the coenzyme of aspartic aminopherase. Although postulated by others, the present study apparently offers the first direct proof of an indirect biological amino acid synthesis.

"Labilization of the α-hydrogen of Amino Acids in the Presence of Aminopherase," A. S. Konikova, M. M. Dobbert, A. E. Braunshteyn, Acad Med Sci Moscow

"Nature" No 159, 1947, pp 64-5

Dissociation of α-H was studied on D-labeled l-glutamic and l-aspartic acids, dl-alanine, l-leucine, and glycine in the presence and absence of α-keto acids. Dissociation without keto acids occurs only with glutamic acid, and similar results occur with heat inactivated aminopherase. From data presented the authors conclude that α-H dissociation (a) and transfer of NH_2- (b) are two distinct enzymic steps of transamination. Step (a) is an independent, relatively nonspecific and heat-resistant function of aminopherase, prerequisite for, but not necessarily followed by, (b).

"The Uric Acid Method for the Purification and Concentration of Viruses," V. I. Tovarnitskiy, Acad Med Sci Moscow

"Biokhimiya" Vol 11, 1946, pp 247-52

Weak alkaline solution of K urate is prepared by triturating uric acid with normal KOH, to which is added boiling acid. This is allowed to stand and is filtered from insoluble material. Filtrate is neutralized with normal HCl to a pH 7.8-8.0. Such a solution is saturated at room temperature, and after freezing and thawing, a red insoluble urate is obtained which no longer dissolves when room temperature is again reached. A suspension of the virus is obtained by triturating the tissue in a mortar with the solution of K urate. After centrifuging, the clear suspension of the virus is frozen in the refrigerator overnight. The following day the solution is thawed to room temperature, and the urate precipitate with the adsorbed virus is centrifuged. Elution is carried out with phosphate buffer or acetate buffer. The concentration of the virus is thus increased 150-200 fold.

"Coaminopherase, Codecarboxylase, and Pyridoxal," A. E. Braunshteyn, M. G. Kritsman, Acad Med Sci Moscow

"Nature" No 158, 1946, pp 102-4

Coenzyme system of mammalian aspartic aminopherase is either different from or more complex than phosphopyridoxal; the system is present in the codecarboxylase preparation Gale and Tomlinson. This is confirmed.

"Manometric Estimation of Small Quantities of Aspartic Acid," A. E. Braunshteyn, V. L. Nemchinskaya, G. Ya. Vilenkina, Acad Med Sci Moscow

"Biokhimiya" Vol 11, 1946, pp 501-16

The solution, which contains no less than 0.2-0.3 mg aspartic acid in a volume of 2-5 ml, is methylated according to the method of Dakin, with 0.25-0.60 ml. each of Na_2SO_4 and 33% NaOH. The reaction mixture is neutralized to Congo Red with H_3PO_4, and the fumaric acid then reduced.

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to succinic acid, which is determined in a Warburg apparatus with the aid of succinic dehydrogenase, using the method of Krebs. The method is accurate for the determination of aspartic acid in pure solutions, deproteinized tissue extracts, and protein hydrolysates. Asparagine should be absent.

"A Substance in Brain Which Sensitizes Muscle to Acetylcholine, and a Biological Method for the Determination of Acetylcholine in Nerve Tissue," E. B. Babskiy, P. F. Minayev, Acad Med Sci Moscow

"Byull Eksper Biol i Med" Vol 22, No 4, 1946, pp 5-8

It was found that emulsions of rabbit or guinea pig brains in which the acetylcholine (I) was destroyed increased the action of added I on the rectus abdominis of the frog. Nature of the increase is not known, although it was found that the K ion produced a similar effect. It is suggested that the difficulty in the assay procedure introduced by this factor can be avoided if the total activity of the fresh tissue emulsion is compared with that found after the addition of a known quality of I to the preparation after the complete destruction of the I originally present.

"Specific Alterations of Skin Proteins," V. N. Orekhovich, Acad Med Sci Moscow

"Byull Eksper Biol i Med" Vol 22, No 4, 1946, pp 57-60

Subcutaneous introduction of 50-100 mg of sulfidine (I) made the skin of rats more susceptible to the action of cathepsin in vitro as compared with the skin of untreated animals. Two hundred mg of I had the opposite effect. Dibenzanthracene applied in the same manner increased the digestibility of the skin. No effects were observed as a result of the treatment when the proteolytic enzymes employed were papain or trypsin. It is suggested that the treatments may produce specific configurational alterations in the proteins of the skin.

Alkaloids of Trachelanthus Korolkovi: V. Synthesis of Some Derivatives of Trachelantamidine," E. L. Gurevich, G. P. Men'shikov, Acad Med Sci Moscow

"Zhur Obshch Khimii" Vol 17, 1947, pp 1714-17

A number of derivatives of trachelantamidine (I) were prepared for pharmacological study. Reaction of I in dry $CHCl_3$ boiled with BzCl, cooled, and mixed with Et_2O, gave benzoyltrachelantamidine-HCl; it was optically inactive and is a feeble anesthetic. I and para-$NO_2C_6H_4COCl$ boiled in dry PhMe gave para-nitrobenzoyltrachelantamidine-HCl; this in AcOH treated with Fe filings gave para-aminobenzoyltrachelantamidine diacetate. This treated with K_2CO_3 gave the free base, which in EtOH with 1

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equivalent HCl gave the mono-HCl salt. This is an anesthetic comparable in potency to cocaine and apparently with less irritant properties. Further reactions leading to the production of 6-methoxy-8-(pseudohelicotridyl-amino) quinoline-2HCl are described. This is slightly active as an antimalarial.

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