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CHRONICLES

Notable and Anniversary Dates in Biochemistry for 2009

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150th anniversary of the discovery of formaldehyde (A. M. Butlerov, 1859).

125th anniversary of *Chemische Dynamik* (by J. van't Hoff, 1884).

100th anniversary of the discovery of lipoid nature of adrenal cortex secretion (A. A. Bogomolets, 1909).

100th anniversary of the discovery of lysozyme in hen protein (P. N. Lashchenkov, 1909).

100th anniversary of the concepts of gene, genotype, and phenotype proposed for the hereditary factors discovered by G. Mendel (W. Johannsen, 1909).

75th anniversary of isolation in pure form and study of the yellow body hormone—progesterone (A. Butenandt, 1934).

75th anniversary of the first isolation from liver and spleen of the pure form of iron-containing protein, ferritin, the main iron reservoir in animals (V. Laufberger, 1934).

75th anniversary of preparation of a yellow respiratory enzyme (flavoprotein) involved in tissue respiration in living organisms (H. Theorell, 1934).

75th anniversary of the concept of "chain reactions" (N. N. Semenov, 1934).

75th anniversary of the All-Union Society of Physiologists, Biochemists, and Pharmacologists (1934).

50th anniversary of foundation of the All-Russian Biochemical Society (1959).

January 28 – 125th anniversary of the birth of Yakov Oskarovich Parnas (1884-1949, born in Mokryany village, Galicia, now Drogobych district of Lvov Region), Russian biochemist, Academician of the USSR Academy of Sciences and Academy of Medical Sciences, winner of State Award (1942). Director of the Institute of Medical Chemistry at Lvov University (1920-1941), Institute of Biochemistry of the USSR Academy of Medical Sciences (1944-1948). He founded and headed the Laboratory of Physiological Chemistry of the USSR Academy of Medical Sciences (1943-1949). Made a contribution to the study of tissue carbohydrate metabolism, including phosphorylation of creatine (the Parnas reaction) and enzymatic processes underlying muscle contraction (EMP scheme of glycolysis developed in collaboration with G. Embden and O. Meyerhof). In 1936 he discovered the process of glycogen cleavage with the involvement of phosphoric acid, dubbed "phosphorolysis" (in collaboration with T. Baranowski). Theoretically analyzed the mechanisms of glycolysis and alcohol fermentation. He was one of the pioneers in the country who employed the isotopic method in biochemistry. Member of the German Academy of Naturalists "Leopoldina", corresponding member of Polish Academy of Sciences, Honorary Doctor of Sorbonne and Athens Universities. Fell victim to Stalin's repressions; was arrested in 1949 and in a few days died of diabetes attack in prison. Bibliography and literature: *Great Medical Encyclopedia* and *Great Soviet Encyclopedia*, 3rd editions.

February 19 – 150th anniversary of the birth of S. Arrhenius (1859-1927), Swedish scientist, physicist-chemist, the author of the theory of electrolytic dissociation (1887). He won the Nobel Prize (1903) for creation and application of this theory in biochemistry, physiology, and geochemistry. A series of studies dealt with application of physicochemical laws to biological processes and biological chemistry. In 1889, he proposed a theory of activation of molecules and established a mathematical dependence between reaction rate and temperature. Bibliography and literature: *Great Medical Encyclopedia*, 3rd edition; (1890) *Modern Theory of Composition of Electrolytic Solutions* [Russian translation], St. Petersburg.

February 23 – 125th anniversary of the birth of K. Funk (1884-1967), Polish biochemist. He worked in London, Warsaw, Paris, and USA. Was one of the founders of vitaminology. Scientific works dwelled with the problems of nutritional biochemistry, vitaminology, and biochemistry of hormones. He isolated from yeast a preparation that cured beriberi (endemic neuritis) and found it to contain a pyrimidine ring and an amino group. Basing on the presence of the amino group, he proposed in 1911 the term "vitamins" supposing that all these vitally important nutrition factors are amines. He developed the hypothesis that scurvy, pellagra, rickets, and some other diseases are caused by deficiency of vitamins in an organism and proposed for them the term "avitaminosis". His work *Vitamins* (1914) was published several times and translated into many languages including Russian. Bibliography and literature: *Great Medical Encyclopedia* and *Great Soviet Encyclopedia*, 3rd editions.

March 19 – 100th anniversary of the birth of J. L. Brachet (1909-1998), Belgian biochemist and embryologist. He is known for his studies in chemical embryology, histochemistry, and chemistry of nucleic acids. He developed a method of histochemical detection of ribonucleic acid using the enzyme ribonuclease (the Brachet method, 1940-1941). He was one of the first who pointed to the involvement of nucleic acids, particularly RNA, in protein biosynthesis (1942). Some works of J. Brachet et al. dwelled on accumulation and change of nucleic acids in the course of embryonic development and with the role of cell nucleus and cytoplasmic granules in protein synthesis. He was the author of a series of monographs and theoretical reviews in the field of chemical embryology, cell biochemistry, and the role of nucleic acids in biological processes. Bibliography and literature: *Great Medical Encyclopedia*, 3rd edition.

April 1 – 125th anniversary of the birth of B. C. P. Jansen (1884-1962), Netherlands biochemist, member of the Netherlands Academy of Sciences, Honorary Doctor of Sorbonne (Paris). He contributed to investigation of the role of vitamin B_1 in the etiology of beriberi and to development of dietetics. He isolated vitamin B_1 in crystal form in 1926 (in collaboration with W. F. Donath). Bibliography: *Contribution to the Knowledge of Cholic Acid* (1912) Amsterdam; *Early nutritional researches on beriberi leading to the discovery of vitamin* B_1 (1956) *Nutr. Abstr. Rev.*, **26**, No. 1, 1-14. Literature: Eys, J. (1970) B. C. P. Jansen, a Biographical Sketch (1884-1962), *J. Nutr.*, **100**, No. 5, 485-490.

April 12 – 125th anniversary of the birth of O. F. Meyerhof (1884-1951), German biochemist, member of the London Royal Society (1937) and US National Academy of Science (1949). The main researches dealt with the biochemistry of muscle contraction. Described the connection of anaerobic degradation and aerobic synthesis of carbohydrates of working and resting muscle (the Pasteur–Meyerhof cycle). He won the Nobel Prize in 1922 (jointly with A. Hill) for the discovery of correlation between oxygen consumption and lactic acid exchange in muscles. From 1940, he worked at University of Pennsylvania (USA). Honorary member of a number of foreign academies and societies. Bibliography and literature: *Great Medical Encyclopedia*, 3rd edition.

May 15 – 150th anniversary of the birth of P. Curie (1859-1906), French physicist, member of the French Academy of Science (1905). He laid a foundation of radioactivity science (together with his wife, M. Sklodovskaya-Curie). Winner of the Nobel Prize in Physics in 1903 (together with M. Sklodovskaya-Curie and A. Becquerel) for the discovery of radium (1898) and contribution to the study of radioactivity. The name of the Curie was given to radiation therapy (medical treatment by radioactive isotopes, Curie-therapy) and to an artificially obtained (1944) radioactive chemical element—curium. Bibliography and literature: *Great Medical Encyclopedia* and *Great Soviet Encyclopedia*, 3rd editions.

May 21 – 75th anniversary of the birth of B. Samuelsson (1934), Swedish biochemist. When studying cholesterol metabolism and the products of arachidonic acid transformation, he discovered and characterized important components such as prostaglandins, thromboxanes, and leukotrienes. He studied the production of prostaglandins in living organisms. Winner of the Nobel Prize (1982) in Physiology and Medicine "for discoveries concerning prostaglandins and related biologically active substances" (jointly with S. Bergstrom and J. Wein). Literature: *S. Bergstrom and B. Samuelsson* (1983) *Nature*, No. 1, 96-102; Cholakov, V. (1987) *Nobel Prizes. Scientists and Discoveries*, Mir, Moscow, pp. 266-267; *The Nobel Prize Winners: Encyclopedia (M-Ya)* (1992) Progress, Moscow, pp. 354-356.

June 14 – 85th anniversary of the birth of J. Black (1924), British pharmacologist, member of the Royal Society. He became famous for his study of the mechanisms of action of histamine and adrenoreceptors. He made a substantial contribution to the

study of blockers of histamine receptors of stomach, which he named as H_2 receptors (the 1970s). His studies resulted in creation of anaprilin and cimetidin. He won the Nobel Prize in Physiology and Medicine (1988, jointly with G. Elion and G. Hitchings) for development of the new principles of creation and application of a number of drugs. Literature: *Nobel Prizes of 1988* (1989) *Nature*, No. 1, 104-106; *Les Prix Nobel en 1988* (1989) Stockholm, pp. 233-260; *International Who's Who* (1990) New York.

July 1 – 80th anniversary of the birth of G. M. Edelman (1929), American biochemist, member of the US National Academy of Science (from 1965), Professor of Rockefeller University (1966). Together with R. Porter developed the chemical method of cleavage of antibody molecules to separate fragments. Showed (1959) that these molecules consist of the two types of peptide chains (heavy and light) and that such structure of antibodies is universal. Decoded the molecule structure of one of the immunoglobulins and proposed a hypothesis of tertiary structure of the active center of antibodies (1962). Developed the method of fluorescence spectroscopy of macromolecules. In 1972, won the Nobel Prize in Physiology and Medicine "for discoveries concerning the chemical structure of antibodies" (jointly with R. Porter). Bibliography: *Some new views of the cell surface* (1976) *J. Biochem*. (Tokyo), **79**. Literature: *The Nobel Prize Winners: Encyclopedia (M-Ya)* (1992) Progress, Moscow; *Great Medical Encyclopedia*, 3rd edition; *Science* (1972) October 27.

July 9 – 25th anniversary of the death of Vladimir Aleksandrovich Engelhardt (1894-1984, born in Moscow), Russian biochemist, Academician of the USSR Academy of Sciences and Academy of Medical Sciences. State Prize Laureate (1943, 1979). Took part in establishment (1959) of the Institute of Radiation and Physicochemical Biology of the USSR Academy of Sciences (from 1964, Research Institute of Molecular Biology of the Academy of Sciences), which he headed till the end of his life (1959-1984). He was one of the originators of domestic molecular biology and biophysical chemistry. Fundamental studies focused on the problems of enzyme immunochemistry, phosphorus-containing compounds, their association with aerobic and anaerobic cell energy metabolism, and their role in the functions of living organisms. Was the first who suggested the idea of the presence of coupling (on the level of a cell) between ADP phosphorylation and respiration and later experimentally proved the existence of oxidative phosphorylation, i.e. the process of aerobic ATP re-synthesis coupled with cell respiration. Together with M. N. Lyubimova, he established that myosin possesses the properties of ATPase. The initiator and active participant of the international research project on the study of molecular bases of reverse transcriptase. He was a founder of a scientific school. Bibliography: *Great Medical Encyclopedia*, 2nd and 3rd editions; *Great Soviet Encyclopedia*, 3rd edition; *Cognition of Life Phenomena* (1984) Nauka, Moscow, p. 303. Literature: *Great Medical Encyclopedia*, 2nd and 3rd editions; *Great Soviet Encyclopedia*, 3rd edition; *In Memory of V. A. Engelhardt* (1984) *Biokhimiya*, No. 12, 1923-1926; (1984) *Izvestiya AN SSSR, Ser. Biol.*, No. 6, 954-955; *60 Years of the Russian Academy of Medical Sciences* (2004) Moscow, p. 429.

July 23 – 150th anniversary of the birth of Vladimir Ivanovich Palladin (1859-1922, born in Moscow), Russian botanist and biochemist, academician of St. Petersburg Academy of Sciences. Father of A. V. Palladin (1885-1972), biochemist, academician of the Russian Academy of Sciences and Russian Academy of Medical Sciences. Pupil of K. A. Timiryazev and I. N. Gorozhankin. One of the authors of the theory of plant respiration as a whole set of enzymatic processes performed by the oxidase and dehydrogenase system. His works were a basis of the modern theory of biological oxidation. Some works dealt with the processes of formation and coordination of enzyme action. He was a founder of the national school of plant physiologists and biochemists. Bibliography and literature: *Great Medical Encyclopedia*, 2nd and 3rd editions.

August 2 – 75th anniversary of the birthday of Yuriy Anatolyevich Ovchinnikov (1934-1988, born in Moscow), Russian chemist, Academician of the Russian Academy of Sciences. From 1970, he was director of the M. M. Shemyakin Institute of Bioorganic Chemistry. His main scientific works dealt with the study of physicochemical bases of the functioning of biological membranes, the structure and pathways of the synthesis of different physiologically active substances, correlations between their structures, mechanisms of action, and functions in an organism. Established the structure and performed the synthesis of a number of natural depsipeptides, developed the method of polypeptide synthesis on a polymer carrier in solution, performed the synthesis of a series of ionophores and decoded the molecular mechanism of their biological effect. Established the principles of formation of preferential peptide

conformations in solution and identified the conformations of molecules of valinomycin, eniatin, anthamanide, gramicidin C, etc. Developed the mass-spectrometric method of detection of the sequence of amino acid residues in peptide molecules and defined (jointly with A. E. Braunshtein) the primary structure of the enzyme aspartate aminotransferase, bacteriorhodopsin, and some other proteins. Identified the primary structure of α-subunit of DNA-dependent RNA polymerase of *Escherichia coli* and the sequence of amino acid residues in ribosomal proteins of colibacillus. In works on membrane ionophores, he formulated the general principles of selective binding of metal ions by organic molecules. These principles underlay the construction of synthetic complexes used in medicine. Bibliography: *Great Medical Encyclopedia* and *Great Soviet Encyclopedia*, 3rd editions.

August 30 – 125th anniversary of the birth of Theodor Svedberg (1884-1971), Swedish physical chemist, member of the Swedish Academy of Sciences. The main works dealt with physical chemistry of colloids and polymers. He made a contribution to the study of colloid systems (Nobel Prize in Chemistry, 1926). Developed methods of preparing colloidal solutions of inorganic substances. Constructed and built the first ultracentrifuges (1922) for observation of migration of macromolecules in solution under the effect of strong centrifugal forces and for detection of admixtures. Its name is associated with the construction of the first ultracentrifuge and elaboration of some problems of the theory of sedimentation that are of great significance for medical science. The name of Svedberg was given to the unit of measurement of sedimentation coefficient and to the equation used for molecular weight calculation by sedimentation and diffusion coefficients. Bibliography and literature: *Great Medical Encyclopedia* and *Great Soviet Encyclopedia*, 3rd editions.

August 30 – 100th anniversary of the birth of Vladimir Sergeevich Shapot (1909-1989, born in St. Petersburg), Russian biochemist, Corresponding Member of the USSR Academy of Medical Sciences. In 1953-1960, he was the head of the Chair of Biochemistry at Vitebsk Medical Institute. In 1960-1987, he headed of the Chair of Tumor Biochemistry at the Institute of Carcinogenesis, Oncology Research Center. In collaboration with V. A. Engelhardt (1935) discovered the phenomenon of uncoupling of respiration and oxidative phosphorylation by chemical agents. He made a contribution to the development of theoretical bases of modern oncology. His researches were devoted to the problems of tumor and organism interrelations on different systemic levels, the chemistry of nucleic acids and nucleoproteids. He discovered a specific ribonuclease catalyzing the cleavage of RNA of a small subunit of ribosomes, proposed the model of molecular mechanism of the cytoplasm involvement in regulation of gene activity, and suggested a hypothesis that many biochemical peculiarities of malignant cells determine variations in the ratios of isoforms of the key enzymes. Bibliography and literature: *Great Medical Encyclopedia*, 3rd edition; *Vladimir Sergeyevich Shapot* (1985) *Eksp. Onkol.*, **7**, No. 2, 77; *Sixty Years of the Russian Academy of Medical Sciences* [in Russian] (2004) Moscow, p. 483.

December 4 – 100th anniversary of the birth of Solomon Abramovich Neyfakh (1909-1992, born in Vitebsk), Russian biochemist-geneticist, Corresponding Member of the Russian Academy of Medical Sciences. Veteran of the Great Patriotic War. The founder of the Laboratory of Biochemical Genetics at the Institute of Experimental Medicine (Leningrad) and its head from 1963. The main works dealt with problems of enzymatic and membrane mechanisms and genetic heterogeneity of human genetic diseases, in particular, hepatolenticular degeneration and the search of pathways of radical therapy of genetic defects by the methods of gene engineering, the study of molecular organization of mitochondrial genome, the structure and properties of informational RNA and protein-synthesizing system of mitochondria, and regulation of cell energy metabolism. Together with his coworkers revealed the molecular bases of disturbance of glycolysis control in cancer cells. Discovered the mitochondrial protein kinasin—regulator of glycolysis. Was a WHO expert in genetic diseases. Bibliography: *Great Medical Encyclopedia*, 3rd edition; Monakhov, N. K., et al. (1979) S. A. Neyfakh, *Tsitologiya*, No. 11, 1374-1376; Neyfakh, S. A. (1980) *Genetika*, No. 5, 924-926; *Sixty Years of the Russian Academy of Medical Sciences* [in Russian] (2004) Moscow, p. 464.

December 14 – 100th anniversary of the birth of E. L. Tatum (1909-1975), American biochemist and geneticist, member of the US National Academy of Science (1952). Together with J. Lederberg (1946) described the method of transfer of genetic material from one bacterial cell to another (bacterial conjugation). He won the Nobel Prize for fundamental works in the field of study of the mechanism of vital processes (1958, jointly with G. Beadle and J. Lederberg). Bibliography and literature: *Great Medical Encyclopedia*, 3rd edition.

The 70th anniversary of the birth of Sidney Altman (1939), American biochemist. In the middle of the 1970s, an unusual enzyme, ribonuclease P, which specifically cleaved polynucleotide fragment from the 5′-end region of tRNA precursor, was found in colibacillus at his laboratory. Along with the protein molecule, RNase P contained one molecule of RNA consisting of 377 nucleotide residues. Later, a new ribozyme was found that possessed all classical properties inherent, as had been thought previously, in proteins only. In 1989, he won the Nobel Prize in chemistry (jointly with Th. R. Cech) "for the discovery of catalytic properties of ribonucleic acids". Bibliography: *Nature* (1990) No. 1, 94-96.