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Bird and mammalian lactate dehydrogenase isoenzymes

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Lactate dehydrogenase (EC 1.1.1.27, LDH) is an enzyme widely distributed in cells of living systems. It is involved in carbohydrate metabolism catalyzing the interconversion of lactate and pyruvate with nicotinamide adenine dinucleotide as coenzyme both in the cytoplasm as well as in mitochondria. LDH exists in several isoenzymatic forms that differs each other in their kinetic characteristics (Km, kcat), physicochemical properties (different net charge), response to the inhibition by substrate (pyruvate), and immunological response. Their different net charge predetermines their different migration rate in the electric field that is used in separating of these enzymes in research as well as in diagnostic practice. Five somatic LDH isoenzymes are detected in serum and tissues of vertebrates with heart, skeletal muscle and liver being the LDH richest organs. A buffer system of the pH values 8.6 to 8.8 is commonly used for the separation of these isoenzymes enabling to distinguish five LDH molecules in mammals. In the case of bird LDHs, the observation of all five isoforms under this pH condition is very difficult as they produce only one rather diffuse enzymatic zone. Isoelectric focusing technique in the pH range of 3 to 9 was shown to be a convenient method for bird LDH isoenzyme separation producing a good and clear resolution of all five LDH fractions in chicken (adult as well as embryonic), turkey, pheasant, and pigeon. Different pI values of LDHs of bird and mammalian origin with the similar catalytic properties probably reflect the different phylogenesis of bird and mammalian LDH molecules.

Biography

Dagmar Heinová has completed her PhD at the age of 30 years from the University of Veterinary Medicine in Košice, Slovak Republic. She is an Associate Professor in Biochemistry with the special focus in enzymology. She is a tutor of Clinical Biochemistry at the University and supervisor of students final thesis. In the area of lactate dehydrogenase isoenzymes studies, she published seven papers. She also developed a colorimetric method for determination of pepsin activity which was published and patented.

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