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Conservation of energetic balance as the strategic way for adaptation to cold climate in homothermal animals

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Russian ecologist N.I. Kalabukhov (1946, 1950) developed the study on the conservation of an organism's energetic balance as a base of adaptation. He wrote that an organism or the whole population can conserve the energy balance at changing environmental conditions by regulation of the energy increasing or decreasing. During the last 50 years the author studied the adaptation of warm-blooded animals to conditions of extremely cold climate of Yakutia universally recognized as the cold pole of the planet part inhabited with people. It was learned that all birds and mammals here, from small mouse-like rodents and passerine birds till the most large hoofed mammals and large Gallinaceous, birds of prey and watery birds, all they have behavioral, ecologic-physical and morphological economization mechanisms of energetic resources in cold time of the year, and heat emission in hot summer days. In the report we show the concrete data on adaptive behavior, intensity of metabolic processes, physiologic-biochemistry regulation mechanisms of metabolism levels, morphologic particularities of respiratory organs, circulation of the blood, skin and hair/feather cover what contribute to the warm conservation or heat emission of the organism. The year dynamics of cold-adapted animal species were studied. The special attention is paid to research of winter hibernation and hypobiotic states of birds and mammals.

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