

МАТЕРИАЛЫ КОНФЕРЕНЦИИ
И ШКОЛЫLEVEL OF METABOLISM, DURATION OF ACTIVITY
AND BODY TEMPERATURE IN THE EVOLUTION
OF PRINCIPAL GROUPS OF MAMMALS AND BIRDS:
INFLUENCE OF THE TIME OF THEIR DIVERGENCE© 2020 г. V. M. Gavrilov^{1,*} and T. B. Golubeva¹¹ Lomonosov Moscow State University, Moscow, Russia

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We analyzed the correlations of basal metabolic rate (BMR), with body temperature and sleep duration and activity of endothermic animals, in the mammalian subclasses Monotremata, Marsupialia and Eutheria, and distinguished three groups of birds: Paleognathae, Neognathae-Non-Passeriformes and Neognathae-Passeriformes, which differ origin time in evolution. Using the indicator variables method, the equations were brought to a general exponent and the dimensionless ratio of the metabolic level in the group was obtained: if the BMR of Passeriformes with the highest BMR is taken as 1.00, the BMR level of Monotremata will be 0.21, Marsupialia – 0.38, Paleognathae – 0.51, Eutheria – 0.52, and Neognathae-Non-Passeriformes – 0.71 (Fig. 1). The

terrestrial lifestyle of Eutheria and flightless Paleognathae is ensured by an almost equal level of BMR. The duration of activity was determined by subtracting the average sleep period for the group from 24 hours. The longer the activity in the group of animals, the higher their basal metabolic rate. The average body temperature of groups of endothermic animals increases with increasing levels of BMR. BMR levels, duration of daily activity, and body temperature of animals of the taxa under consideration negatively correlate with its evolutionary age: the later the group separated from the main treasures, the higher the metabolic rate, the longer the period of activity, and the more developed the central nervous system. As soon as the develop-

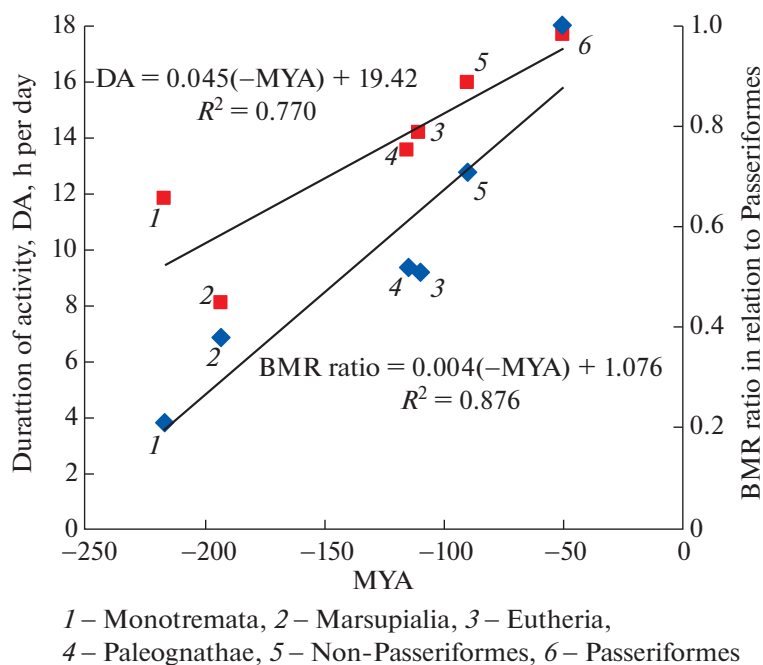


Fig. 1. Dimensionless BMR (BMR ratio in relation to Passeridormes), activity duration (DA) and divergence time (million years ago, MYA) of different groups of endotherms

ment of blood circulation and respiration systems allowed the formation of such a BMR level at which it became possible to maintain body temperature at 37°C at rest, explosive radiation of mammals and birds occurred. At that time, angiosperms and related insects appeared, which became a new source of food resources for endotherms, which contributed to their

ecological expansion. Mammals and birds replaced the reptiles from the main niches, mastered various habitats, and quickly entered large size classes. This was also facilitated by a gradual decrease in temperature on Earth.

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