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POSSIBILITIES OF USING THE JAPANESE QUAIL AS A MODEL ANIMAL IN BIOMEDICAL RESEARCH

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The Japanese quail (*Coturnix japonica*) is currently a species used not only for meat and egg production, but also as a model experimental animal due to: small body size, rapid growth and early sexual maturity, short generation interval and relatively high egg production compared to other poultry species, as well as ease of breeding both in farm and laboratory conditions, compared to chickens or turkeys, availability of transgenic lines. The Japanese quail is also used, among others, in biochemical, embryological, microbiological, immunological, physiological and nutritional studies, as well as in studies in the field of molecular genetics and population genetics.

The aim of this literature study was to analyze the possibilities of using the Japanese quail in biomedical research. The previously sequenced nuclear genome of the Japanese quail is 927,657 Mbp, the mitochondrial genome is 16,697 nt, and the GC content is 41.37%. 30,810 genes and 39,088 proteins have been identified in this species.

The diploid number of chromosomes of 78 in both the Japanese quail and the domestic chicken and the fully sequenced genomes of both species (domestic chicken genome GCA_000002315.3; GCA_002798355.1; Japanese quail genome: GCA_001577835.1; GCA_000511605.2) (<https://www.ncbi.nlm.nih.gov>) enable comparative analyses at the cytogenetic/karyotypic and molecular levels.

Both embryos and adult Japanese quail are widely used in studies of vertebrate physiology and human diseases. Thanks to studies conducted on embryos, the processes of myogenesis, vasculogenesis, angiogenesis, skeletal development, wound healing, as well as virology and teratology have been thoroughly studied. It was found that the quail embryo is an excellent model for studies related to fetal alcohol

syndrome. Sixteen-day-old Japanese quail embryos were used to study the effect of microgravity on embryonic development. Adult Japanese quail have been used as a model for many human age-related diseases, both in terms of the immune system, endocrinology, the study of mechanisms underlying the development of vascular changes, atherosclerosis and hypercholesterolemia, and reproductive biology. Studies have also been conducted on photoperiodism, 24-hour control of brain function, levels of sex hormones, and reproductive activity. In addition, the Japanese quail is used in research on the influence of chemical compounds toxicity on reproduction and the effects of environmental pollution on the endocrine system.

The results of biomedical studies indicate that the Japanese quail is a suitable animal model for the following human diseases: amyloidosis, atherosclerosis, chondrodystrophy, diabetes insipidus, dwarfism, albinism, glaucoma, Pompe disease, hyperlipidemia, neuropathy, micropelia, myotonic dystrophy, osteoporosis, trimethylaminuria.



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