THE NEW ARMENIAN MEDICAL JOURNAL
Volume19 (2025), Issue 4 p.14-30

DOI: https://doi.org/10.56936/18290825-2025.19v.4-14

POLYAMINES - FACTORS OF AGING AND LONGEVITY REGULATION. MINI-REVIEW.

Makletsova M.G.* , Zelenkova G.A., Zelenkov A.P., Ustyantsev D.A., Vakulenko M.Yu.

Department of Biology and General Pathology, faculty of Bioengineering and Veterinary Medicine,. Don State Technical University (DSTU), Rostov-on-Don, Russia

Received 2.10.2025; Accepted for printing 21.10.2025

Abstract

Polyamines (spermidine and spermine) are unique positively charged molecules that have pleiotropic genetic, biochemical, and physiological activity in all animal and human tissues. Currently, the study of the role of polyamines in aging and longevity processes is becoming particularly important. The purpose of this mini-review was to assess the role of spermidine and spermine in the aging process. To achieve this goal, the following tasks were identified: to determine the relationship between polyamine levels and life expectancy in vertebrates; to assess the metabolic characteristics of polyamines in birds that are associated with their longevity; to evaluate the dynamics of changes in polyamine metabolism in age-related pathologies; and to present the latest literature data on the molecular mechanisms of endogenous spermine's effects. This raises the question: can polyamines be considered a predictor of aging and longevity? How does spermidine or spermine affect longevity?

Aging is a pathophysiological process programmed at the genetic and epigenetic levels, the speed of which is determined by the ratio between damage factors, on the one hand, and body repair factors, on the other. The current lack of a universal theory of aging is the reason for new scientific research aimed at studying the fundamental mechanisms of aging in various animal species. Life expectancy in birds is significantly higher than in mammals when normalized by body size and standardized by the Rubner constant. Polyamines contribute to the longevity of birds due to the peculiarities of their metabolism and their higher levels in the body of birds compared to mammals. Currently, the study of the role of polyamines in the aging process is becoming particularly relevant.

The aim of our work is to develop a hypothesis of the leading role of polyamines in the longevity of birds compared with mammals. The study of the role of polyamines in the aging of various species of living organisms is an integral part of the research on the role of polyamines in the pathogenesis of age-related pathologies.

Keywords: *polyamines, spermidine, spermine, fe expectancy, longevity, age-related pathologies, genetic levels, epigenetic levels.*

Cite This Article as:

Makletsova M.G., Zelenkova G.A., Zelenkov A.P., Ustyantsev D.A., Vakulenko M.Yu. (2025). Polyamines - factors of aging and longevity regulation. Mini-review; The New Armenian Medical Journal, vol.19 (4),14-30; DOI: https://doi.org/10.56936/18290825-2025.19v.4-14

Address for Correspondence:

Marina G. Makletsova
Don State Technical University (DSTU) faculty of Bioengineering and Veterinary Medicine,.Gagarin Square 1, Rostov-on-Don, 344000, Russia
Tel.: 89166553464
E-mail: mgm52@bk.ru