LIFESPANS

1. **Do you know the expression *lifespan (or life span)*? The following words and collocations of the word *span* can help you:**

   within the span of two decades
   wingspan
   span of hands, arms, wings, aircraft, bridge, responsibility
   a bridge spanning the river
   his interests span almost everything

2. **Name species with the longest and shortest lifespans.**

3. **Organize the cards into several groups considering the longevity.**
   Moles, mice, birds, tortoise, whales, deep-sea clam, bats, porcupines, rockfish (ropušnice), mayfly, solitary wasps, termites, lions, tigers, humans

4. **What factors affect lifespans? Why do different organisms have different lifespans?**

5. **Reorganize the cards with regard to the**

   - energy investment
   - high risk of predation or accidental death
   - heavy reproductive effort
   - early rapid reproduction
   - communal life
   - slow metabolism
   - fecundity
   - evolutionary factors
   - body size
   - rapid age of ageing
   - put all the resources to reproduction
   - high mortality risk
   - early maturation
   - solitary life
   - fast(-paced) metabolism
   - reproductive rate
   - ecological factors
   - predation

6. **Compare the pairs of animals with regard to their lifespans.**

   birds x mice
   solitary wasps x termites
   porcupines x shrews

7. **Discuss with your partner factors affecting lifespans of the species listed in the grid. Then listen to the BBC recording and add the information you hear.**

8. **Language**
   a. Synonyms of *lifespan,* e*arth-bound*
   b. Antonym of *communal life*
   c. Difference between *fecundity* and *fertility*
   d. Translate:

   délka života
   rychlý metabolismus
   pomalý metabolismus
   schopnost létat
   suchozemští živočichové
   vodní živočichové
   uniknout dravcům
   communal life

SPECIES	I HAVE LEARNT
mice	
moles	
birds	
bats	
whales	
deep-sea clams (quahogs)	
tortoises	
porcupines	
rock fish	
wasps	
termites [termaits]	
tigers	
lions	
humans	

Based on: http://www.bbc.co.uk/radio4/science/lifespans.shtml

9. Rodents for comparative aging studies: from mice to beavers

a. Why have rodents been chosen for the comparative studies?
b. Key words of the abstract/article: Aging, Comparative studies, Rodents, Telomerase.
c. Scan the text and explain the purpose of the study.

Abstract

After humans, mice are the best-studied mammalian species in terms of their biology and genetics.

Gerontological research has used mice and rats extensively to generate short- and long-lived mutants, study caloric restriction and more. Mice and rats are valuable model organisms thanks to their small size, short lifespans and fast reproduction. ***However, when the goal is to further extend the already long human lifespan, studying fast aging species may not provide all the answers. Remarkably, in addition to the fast-aging species, the order Rodentia contains multiple long-lived species with lifespans exceeding 20 years (naked mole-rat, beavers, porcupines, and some squirrels). This diversity opens great opportunities for comparative aging studies. Here we discuss the evolution of lifespan in rodents, review the biology of slow-aging rodents, and show an example of how the use of a comparative approach revealed that telomerase activity coevolved with body mass in rodents.

Keywords: Aging, Comparative studies, Rodents, Telomerase

There are drastic differences among rodent species in the level of predation to which they are subject. Short-lived muroid/murid (myšovitý) rodents are subject to vystavený čemu heavy predation, while long-lived rodents such as porcupine, beaver, or naked mole-rat have few or no predators. Long-lived rodents are protected from predators through various means. Tree squirrels and flying squirrels live high above the ground. Porcupines are large, and are covered with quills (ostny). Beavers are also large and spend most of their life in or near the water in cleverly constructed protective lodges. Naked mole-rats live in deep underground burrows and collectively defend against snakes. Longer lifespans in rodent species with special defences are consistent with the classical theory for evolution of senescence, which states that long lifespans evolve when extrinsic (vnější) mortality is low (Medawar 1952; Williams 1957; Kirkwood and Austad 2000). Extremely long-lived rodent species occur in several distantly related phylogenetic groups (Fig. 1), including mole-rats, porcupines, beavers, and squirrels, indicating that slow aging has independently evolved multiple times in rodents (Austad 2005). This makes rodents especially valuable for aging research because it may allow identification of molecular and physiological traits that co-evolve with slow aging in convergent species.
Mole rats are far less exposed to predators than are surface-dwelling rodents (*earth-bound/terrestrial animals/fauna)*. The only threat comes from snakes that can penetrate their deep burrows. Social mole-rats use cooperative defense against snakes, which may further reduce their mortality relative to (související s) solitary mole-rats.

Rodents also differ dramatically in their body mass. Among the smallest rodent species, mice have an average body mass of 10–30 g, while the largest rodent, the capybara, weighs up to 65,000 g (Nowak 1999). This diversity is very useful for comparative aging studies since many traits, such as lifespan, metabolic rate, cellular senescence, and telomerase activity

show dependence on body mass (Austad and Fischer 1991; Lorenzini et al. 2005; Seluanov et al. 2007). Rodents include species with all possible combinations of lifespan and body mass:

species with large body mass and average lifespan (……), large body mass and long lifespan (……),, small body mass and short lifespan (……), and small body mass and long lifespan (……).

mole-rats, capybara, mouse, beaver and porcupine

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2527635/ Accessed Nov.20, 2018