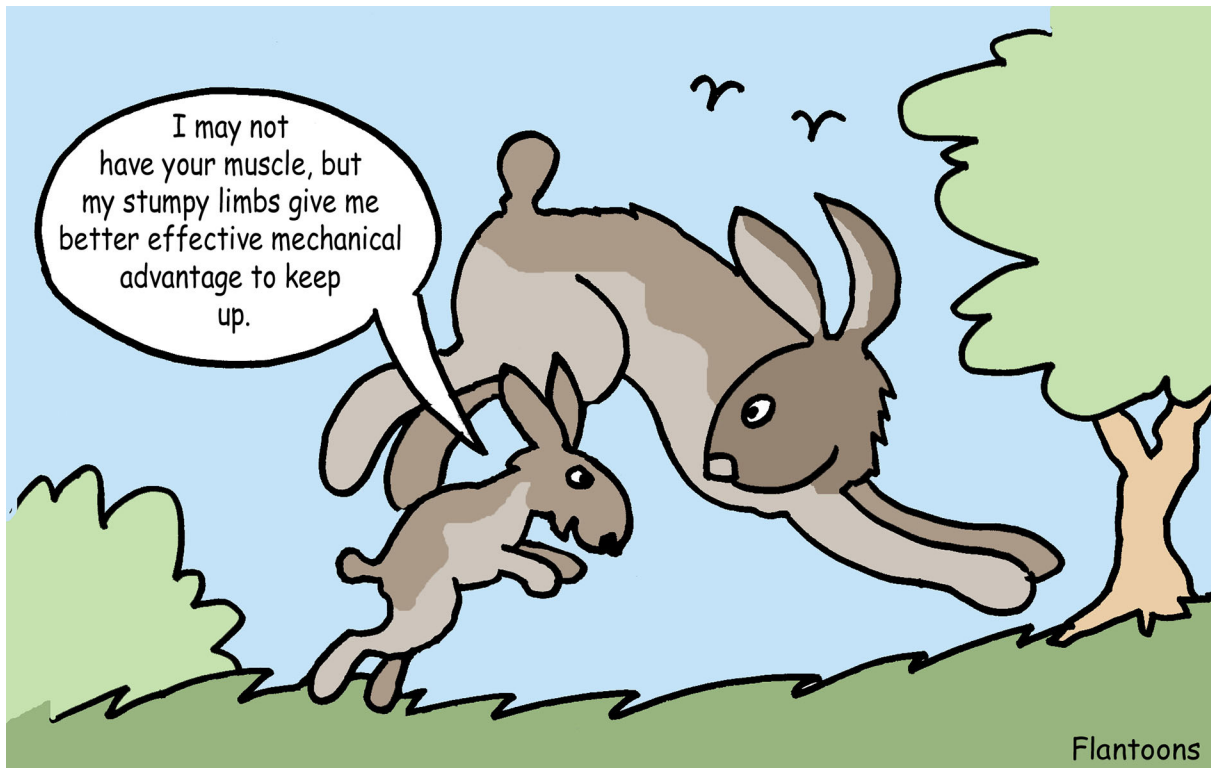


INSIDE JEB

Stocky limbs help wild youngsters get ahead



Flantoons

Being young is great, you've got the whole of your life ahead of you. But that's the problem: one false move and the game could be up. 'Immature animals must survive in the same environments as adults despite smaller body size, weaker muscles and other growth-related limitations', says Jesse Young, from Northeast Ohio Medical University, USA. So how do youngsters overcome the odds stacked against them? Knowing that short limbs can exaggerate the force exerted at the tips as they push down on the ground – with shorter levers amplifying forces more at the point where they press down than longer spindlier levers – Jesse Young and collaborators Michael Butcher, from Youngstown State University, USA, Gregory Smith, from Kent State University at Stark, USA, and

their teams wondered whether the relatively stocky limbs of youngsters could amplify the forces that they exert sufficiently to give them an advantage that would allow them to evade and survive the perils of youth.

After collecting 61 wild eastern cottontail rabbits (*Sylvilagus floridanus*) over a period of 3 years from public parks and nature reserves around Ohio where only the fastest survive, the team weighed the animals to determine whether they were adults or youngsters. Then they filmed the animals hopping across a force plate – to measure the forces exerted on the ground – while recording the manoeuvre, and used the measured forces to calculate how the animals' limbs amplified the forces they exerted on the ground at different stages of

life. Impressively, the smaller and younger the rabbits, the shorter their limbs relative to their size and the greater the force amplification they were able to produce. The team suggests that the youngsters' mechanical advantage allows them to accelerate getaways more for their size than older but stronger rabbits, in addition to conserving energy during daily activities, to grow up big and strong as fast as possible.

10.1242/jeb.211284

Foster, A. D., Butcher, M. T., Smith, G. A., Russo, G. A., Thalluri, R. and Young, J. W. (2019). Ontogeny of effective mechanical advantage in eastern cottontail rabbits (*Sylvilagus floridanus*). *J. Exp. Biol.* **222**, jeb205237. doi:10.1242/jeb.205237

Kathryn Knight
kathryn.knight@biologists.com