Your metabolism changes as you age, just not when you think

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(HealthDay)—Everyone knows that your metabolism peaks in your

teenage years, when you're fit and active and feeling your oats.

And everyone knows that a person's metabolism slows down in middle age, as bodies start to expand and sag, and become less energetic.

But that's all wrong, it now appears—fake news about how humans age that's gained the currency of truth over the years.

Your metabolism actually is at its highest when you're 1 year old, according to a major new study that completely shakes up what was known about energy expenditure over a person's lifespan.

It then gradually declines through your childhood and teen years, until it reaches a surprisingly consistent level that people maintain throughout adulthood until they reach senior status, researchers report in the Aug. 13 issue of the journal *Science*.

"Energy expenditure is really stable throughout adulthood, from 20 to 60 years old," said lead researcher Herman Pontzer, an associate professor of evolutionary anthropology at Duke University in Durham, N.C. "People often want to blame obesity issues on metabolic rates—'Oh, I have a slow metabolism.' This says no, actually, at least on a population level from a broad view, your metabolism is really stable throughout adulthood."

The usual milestones assigned to a person's development—puberty, middle age, menopause—don't line up with how humans' basic metabolism actually performs, said Rozalyn Anderson, a professor of geriatrics at the University of Wisconsin, Madison, School of Medicine and Public Health.

"It is surprising," Anderson said. "Everybody would have expected to see something change around middle age, 35 to 45. We all know at that time

point we get middle-age spread, everything slows down a little bit. But based on this, it seems those may be kind of lifestyle things. It's certainly not innate metabolism changing."

For this study, Pontzer and an international team of scientists analyzed the average calories burned by about 6,600 people as they went about their daily lives in 29 countries around the world. The people varied in age from 8 days to 95 years.

Most metabolism studies measure how much energy the body uses to perform basic vital functions like breathing, digesting food or pumping blood, but that only accounts for about 50% to 70% of the calories humans burn daily, the researchers said in background notes.

They don't take into account the energy people spend moving about—cleaning the house, walking the dog, working out, even just fidgeting.

These studies also don't account for the added energy humans burn simply by being larger as adults than they are as kids, Pontzer said.

"As people get bigger, they burn more energy," he said. "Of course you do, because if you have more cells, there's more of you, then you need more calories."

To account for all of this, the researchers relied on the "doubly labeled water" method for tracking energy expenditure, which has been considered the gold standard for metabolic studies since the 1980s.

People drink water in which the hydrogen and oxygen atoms in the water molecules have been replaced with naturally occurring "heavy" forms. Urine tests then show how quickly they are flushed out, providing an accurate estimate of daily energy expenditure in normal daily life.

Pooling metabolic data from multiple labs into a single database gave researchers a chance to take a broader look at how the way people burn calories changes as they age.

It turns out newborns come into the world with a metabolism similar to that of an adult, Pontzer noted.

"When babies are born, their bodies are as active as you'd expect them to be if they were tiny adults," he said.

Soon after birth, metabolism starts to rage as babies begin to grow, tripling their birth rate by age 1. "Your cells kick into gear and your energy expenditure rockets up to about 50% higher than we'd expect for your body size, at 1 year old," Pontzer said.

That makes sense, given what we've learned about childhood development, he added.

"You're not just growing in size. Your brain is making new connections between brain cells, to help you learn. Your immune system is maturing," Pontzer said. "You're not only adding new cells, but those cells are active in a different way than they are with adults."

After the initial energy surge of infancy, your metabolism slows by about 3% each year until you reach your 20s, where it levels off into a new normal that will be maintained throughout adulthood.

Even though teenage growth spurts occur, the researchers didn't see any increase in the daily calorie needs of adolescents after they took body size into account.

And then at age 60, your metabolism starts to decline as your organs and cells become less and less active, Pontzer said. The slowdown is gradual,

only about 0.7% a year, but it adds up.

"Your energy expenditure is 25% less than we'd expect for your body size by the time you're in your 90s," Pontzer said.

Anderson said she was particularly surprised that men and women didn't differ at all, "showing pretty much the same pattern across age."

Even during pregnancy, a woman's calorie needs didn't increase after factoring in the weight she gains as the fetus grows within her, the findings showed.

These findings could wind up transforming the fields of pediatrics and geriatrics, Anderson said. For example, future studies should take into account the different rates at which children's bodies burn through food and medicines.

"I think we've all known for a while that kids are not just small grown-ups, but this really shows that they're very different," she said. "I think that's going to be important in terms of pediatric guidelines and diet recommendations and, in particular, drug treatments in children and adolescents, because their metabolic setting is so different. They're just very different entities."

These results also show that people have a stronger role in shaping their own body size throughout adulthood, Pontzer and Anderson said. Watching what you eat and exercising regularly can have a strong impact on your weight, particularly as you enter middle age and your habits change.

"Everybody thought, 'Oh, the metabolism changes and that's why these things happen,'" Anderson said. "But I think we have to have a bit of a closer look and see whether it's not patterns of behavior that change in

middle age, and not the intrinsic metabolism."

More information: The Mayo Clinic has more about metabolism.

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