Abstractions

FIRST AUTHOR

Today two-thirds of US citizens are overweight or obese. For the past 20 years, endocrinologist Michael Schwartz at the University of Washington School of Medicine has been unravelling the molecular and cellular mechanisms behind this trend. On page 289 of this issue, he reviews the brain's role in weight control. Schwartz talks to *Nature* about his work.

Are you an endocrinologist or a neuroscientist?

To be active or competitive in any scientific field, you have to wear a lot of different hats. Obesity research is a multidisciplinary endeavour. People come to it from different backgrounds, but none will be optimal on its own.

How did you become interested in obesity?

When I finished my medical training at Rush Medical College in Chicago in 1987, I decided to become an endocrinologist. I did a fellowship with Daniel Porte at the University of Washington, who was interested in the relationship between insulin signals in the brain and diabetes. He became convinced that body weight is regulated by hormones acting on the brain. I was captivated by the idea that obesity is a problem of regulation rather than willpower.

How has the patient population changed since then?

We see heavier and more medically complicated patients. It is becoming routine to see patients over 227 kilograms in weight.

Has scientific progress kept up with the rise in obesity?

We have made tremendous progress in our scientific understanding of obesity. The delay is in translating this knowledge into clinical practice. It is clear that the integrity of the brain circuits that regulate body weight can be compromised by a nutrient-excess environment. If cells are continuously presented with an excess of glucose or other nutrients, this will cause a dysfunction in many cell types, undermining the sensitivity of brain circuits.

Are you optimistic that the obesity trends can be reversed?

What I envisage in the next ten years is that instead of having two slightly effective drugs there will be ten different types. Each drug may not be all that powerful on its own, but we will be able to use combinations of drugs to target compensatory pathways.

When you take a bite of food, do you think about what is happening in your brain?

Yes of course. After spending so long in this field there is a part of my brain that is always thinking about that. But for me it is more out of intellectual curiosity than concern. ■

MAKING THE PAPER

Zeresenay Alemseged

Perseverance yields the discovery of an infant hominin skeleton.

The Afar basin in northeastern Ethiopia has proved to be a fertile hunting ground for palaeontologists. In 1974, the region yielded the first remains of the genus *Australopithecus* in the shape of Lucy (*A. afarensis*). But the region is not the easiest place to conduct research, as it is caught up in conflicts between local tribes.

Despite the potential risks, Zeresenay Alemseged was determined to dig in the area — and his efforts have been richly rewarded (see page 296). Alemseged, a palaeoanthropologist at the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany, is a native Ethiopian, and he set about winning the support of the Afar locals as guides and guards to help him in his work.

The area Alemseged focused on is known as Dikika, and is some 10 kilometres from where Lucy was discovered. In late 2000, his team was lucky enough to spot a skull sticking out of the sand. It turned out to be a very significant find. It was the intact skull and a partial skeleton of a 3-year-old *A. afarensis* girl: the most complete, earliest specimen ever found, and it promises to supplant the 3.2-million-year-old Lucy for the title of the world's most famous hominin remains.

The sandstone preserved the face and a cast of its skull cavity — allowing researchers a glimpse of her appearance and a measure of brain volume. That first foray also revealed shoulder blades, collar bones, ribs and spinal column, hinting that there was more to unearth.

After depositing the first batch of fossils at the National Museum of Ethiopia, Alemseged returned to Dikika each year. Those subsequent trips yielded a humerus, fingers, both knee caps, the thigh and shinbone from both legs, and an almost complete foot, representing about 50% of the entire skeleton.

Besides annual rains that sweep aside sediment, Alemseged relied on other researchers and assistants to probe the sands. "You simply can't do this alone — you need a multidisciplinary team of scientists," he says.

Between trips, Alemseged separated and categorized the different elements of the skeleton. "For the past five years, I've spent most of my summer days describing the fossil and cleaning it under a microscope with dental instruments, because I decided not to use acid treatments that could destroy it," he says.

His preliminary analyses will surely spark fresh debates over hotly contested issues. For example, was the species a tree climber? The shoulder joint indicates that the arm could have been raised above the shoulder — necessary for climbing. And the discovery of the hyoid, the horseshoe-shaped bone that supports the tongue, is the first evidence for a voice box in *A. afarensis*.

As well as analysing the specimen, Alemseged plans to name the girl to honour all those involved. "Given the conflicts in the region, I'd like to build consensus among the locals for a name that represents peace," he says. ■

KEY COLLABORATIONS

How do you build a simple model of complicated processes? For Ping Chang, a climate scientist at Texas A&M University in College Station, it involved drawing on a diverse group of specialists.

On page 324, the collaborators discuss the link between the Pacific El Niño and the Atlantic Niño. Chang's interest in this relationship was sparked after conversations with scientists at the International Research Institute for Climate and Society at Columbia University in New York. "From their experience working on climate-related issues in Africa, I learnt how important it is to understand and to predict Atlantic Niño," Chang says.

But unravelling how two geographically separate processes affect each other was not easy. Chang turned to graduate student Yue Fang, who built on the success of a climate model from the US National Center for Atmospheric Research (NCAR) in Boulder, Colorado.

Working with Howard Seidel and Link Ji, Fang ironed out some of the potential glitches in the model. Ramalingam Saravanan helped the team to couple the NCAR atmospheric model to a simplified ocean model, allowing them to achieve their goal.

"Saravanan not only contributed intellectually to this work, but also provided assistance in statistical analysis of the data," says Chang. ■