Posters & Graphics

FIRST PLACE WINNER

Adaptations of the Owl's Cervical & Cephalic Arteries in Relation to Extreme Neck Rotation

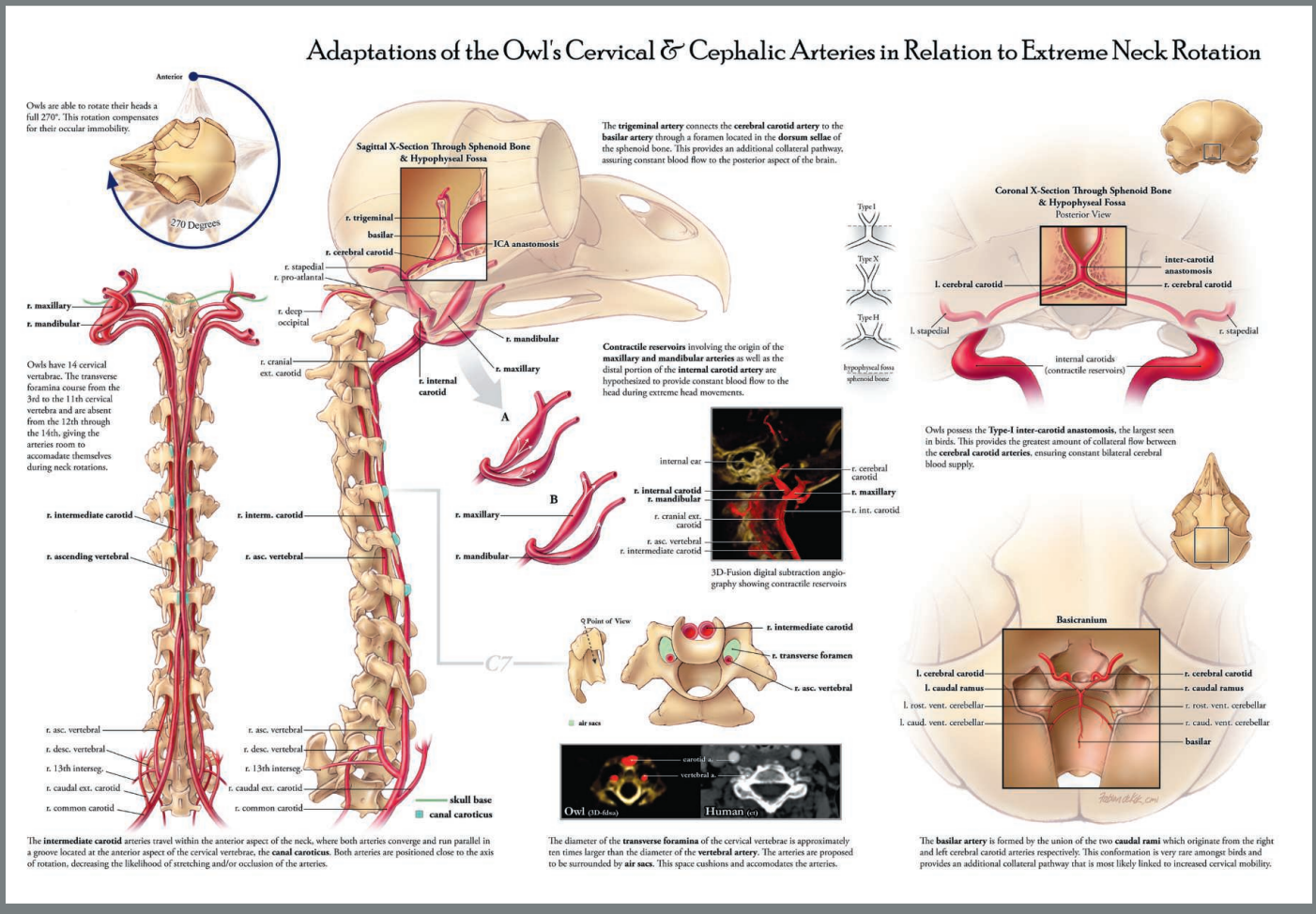
Fabian de Kok-Mercado, Michael Habib, Tim Phelps, Lydia Gregg, and Philippe Gailloud, Johns Hopkins University School of Medicine

Most animals would suffer a stroke or worse if they tried the owl's most famous party trick. Instead of moving their large, tubular eyes in their sockets, owls swivel their heads 270°. This poster explains the likely mechanism for the eerie ability.

Owls were a "no-brainer" when Fabian de Kok-Mercado was searching for a new and unusual topic for his master's thesis in medical illustration at Johns Hopkins University in Baltimore, Maryland, in 2012, he says. After noticing a gap in the literature on owls' carotid and vertebral arteries, he and several colleagues obtained 12 dead birds from educational centers in Michigan and Missouri. Then they created three-dimensional images of the owls' blood vessels and bones with a CT scanner and injected the birds with radiopaque dye and liquefied red plastic to preserve their arteries before dissecting them.

On close examination, the owls revealed surprising secrets, de Kok-Mercado says. For example, the owls' transverse foramina—holes in the vertebrae that the vertebral arteries thread through on their way up the spine to the brain—are much bigger than the arteries themselves, allowing room for movement as the birds' heads twist. In contrast, human vertebral arteries sit snugly inside their foramina, he says. The researchers found swellings in the birds' arteries that likely act as reservoirs for pooling blood when the head is turned, he says, as well as "back-up" arteries that could help supply the brain when other arteries are pinched.

The poster is primarily intended to help veterinarians care for injured birds, but the judges felt it will reward anyone who looks closely. "On the first pass, someone might wonder what the big deal is. But on a second pass, you'll get pulled in," says judge Thomas Wagner. Owls can rotate their heads to a freakish degree; "this illustration answers the question 'How does that really work?' "



HONORABLE MENTION

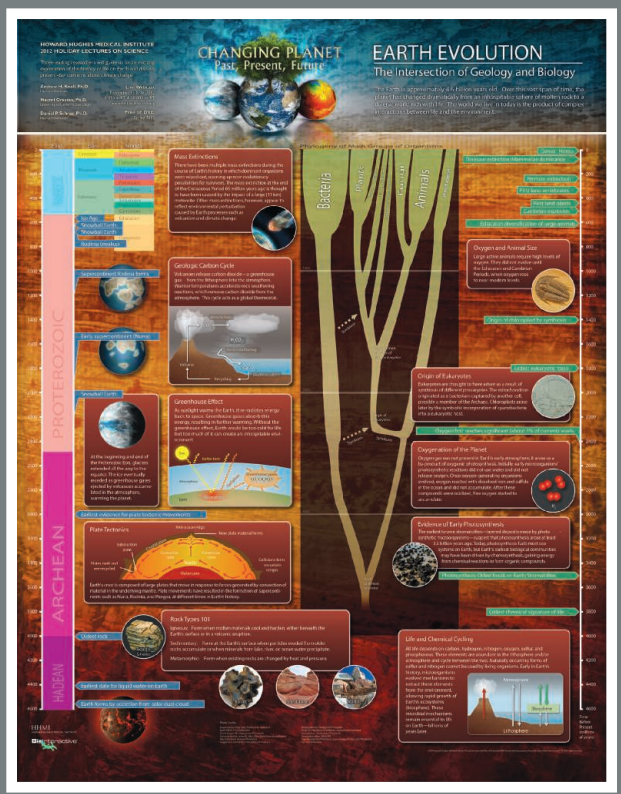
Earth Evolution: The Intersection of Geology and Biology

Mark Nielsen, Satoshi Amagai, HHMI; Bill Pietsch, Davey Thomas, Astronaut 3 Media Group; and Andy Knoll, Harvard University

If you think Pangaea was a supercontinent a long time ago and dinosaurs are ancient history, prepare for a dose of deep time. All 4.6 billion years of Earth's history are squeezed onto this poster. The whole history of land vertebrates from dinosaurs to humans is barely visible in the top right corner. Because of its relatively young age and minor role in planetary evolution, Pangaea didn't even make the cut. Far more prominent is the evolution of photosynthetic bacteria, which enabled the evolution of many new types of metabolism, including our own by generating oxygen.

The poster draws connections between biological and geological processes in Earth's history, such as mass extinctions, plate tectonics, and the greenhouse effect, says Mark Nielsen, a scientific education fellow at the Howard Hughes Medical Institute in Chevy Chase, Maryland, who helped design the graphic.

"A lot of things happened" in the wide swath of Earth's history that isn't included on traditional posters, he says. For example, whereas many classic visualizations of life on Earth begin just 540 million years ago, when large animals became abundant, Earth Evolution tells a much longer story, stretching back 3.8 billion years to the earliest evidence of life.



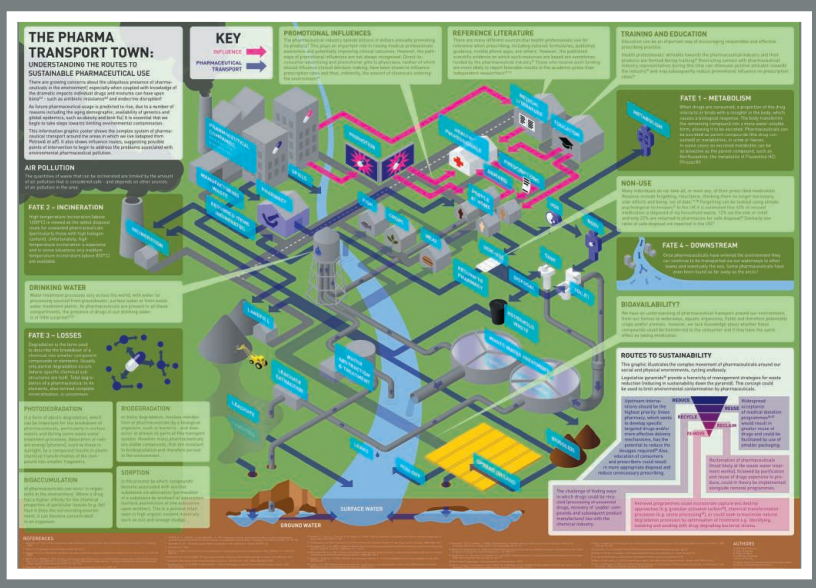
PEOPLE'S CHOICE

The Pharma Transport Town: Understanding the Routes to Sustainable Pharmaceutical Use

Will Stahl-Timmins, Mathew White, Michael Depledge, and Lora Fleming, University of Exeter Medical School; Clare Redshaw, Plymouth University

What started as a series of linked text boxes grew into a town. While sketching ideas for this poster, which shows the fate of drugs after people consume them or throw them away, information designer Will Stahl-Timmins of the European Centre for Environment and Human Health found his drawings "spiraling out of control."

By his second attempt, he says, "I realized that it was starting to look like a city." Stahl-Timmins decided to make the focal point of the graphic a river, and build a town around it. Working with an environmental chemist and an environmental psychologist, he added content on social factors, such as education, that affect drug usage and disposal, and showed gaps in knowledge such as how active pharmaceuticals may be when consumed unknowingly in food or water.



One goal of the poster is to create a tool for policymakers, he says. So far, so good—at a recent meeting with scientists and legislators discussing the issue, he says the poster ended up covered in sticky notes.

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