Speedy Snake Evolution

A new study shows that as snakes diverged from lizards some 125 million years ago, they experienced <u>a huge burst of adaptation</u> where they acquired a dazzling (terrifying?) array of traits and characteristics. Researchers created a map of snake traits based on the genomes of 1,000 species of squamates (the order of reptiles that includes snakes and lizards). They found that snakes appear to have evolved up to about three times faster than lizards.

What they found: Some of the traits snakes evolved include chemoreceptive structures that help them pinpoint their prey using scent and heat, and flexible jaws that help them swallow oversized meals. Some snakes have evolved deadly venom to hunt larger prey. (Am I the only one who just shuddered?)

What the experts say: "Snakes are successful because of a synergism of multiple adaptions [such as] elongated bodies, constriction, venom, flexible skulls," says Michael Lee, an evolutionary biologist at Flinders University in Australia. "Many legless lizards have one or two of these snake features but haven't been nearly as successful."



3-D Star Nurseries

Astrophysicists are using 3-D printing to create <u>models of the clouds</u> where stars are born. Nia Imara, an artist and an astrophysicist at the University of California, Santa Cruz, works with colleagues to create 3-D printed models of the gas and dust that swirl in stellar nurseries. The researchers use computer simulations of physical conditions of known molecular clouds– their gravity or magnetic fields, for instance–as the blueprint. They then use a 3-D printer to layer 2,500 sheets of resin into a real cloud model.

Why this matters: Astronomers know that stars are born in molecular clouds, but they don't know the details of how that process unfolds inside the clouds. Afterall, clouds are three dimensional, and even the best infrared images from the James Webb Space telescope are flat. "We often can't decipher the real shape of a structure within a cloud, because we are seeing it projected onto a flat plane," writes Imara.

What the experts say: "I think of our 3-D prints as interactive maps," Imara says. "They show us where to look to identify the structures that play key roles in star formation." One type of structure is filaments, which are noodlelike clumps of dense gas that weave through molecular clouds. Imara and her colleagues hope to determine exactly what role filaments play in star formation.

More:

This Astrophysicist Makes Stellar Nurseries That Fit in the Palm of Your Hand | <u>5 min video</u>



Astrophysicist Nia Imara holds a 3-D molecular cloud in her hand. Molecular clouds (left) are the birthplaces of stars. Credit: Tulika Bose, Kelso Harper, Jason Drakeford/Scientific American

FINALLY, an article about the 4-7-8 breathing method and a link to a medical summary.

How to Practice 4-7-8 Breathing

You can practice 4-7-8 breathing anywhere and at any time. When you're first learning, try to practice at least twice a day, but you can do it as often as you want. Only do it for four cycles in a row in the beginning. After you get used to it, you can work up to eight cycles. You may feel lightheaded at first, but this will pass.

- 1. Find a comfortable place to sit with your back straight.
- 2. Place your tongue against the back of your top teeth and keep it there.
- 3. Exhale completely through your mouth around your tongue, making a whoosh sound. Purse your lips if it helps.
- 4. Close your lips and inhale through your nose for a count of four.
- 5. Hold your breath for a count of seven.
- 6. Exhale completely through your mouth making a whoosh sound for a count of eight.
- 7. This completes one cycle. Repeat for three more cycles.

Do 4-7-8 breathing anytime you feel stressed. It will become more powerful as you use it. Practice doing it before you respond to an upsetting situation and whenever you're having trouble getting to sleep.

Benefits of Deep, Slow Breathing

Mindful breathing practices such as 4-7-8 breathing can produce what Harvard cardiologist Dr. Herbert Benson called the relaxation response. You have a natural <u>stress response</u> that's designed to help you deal with dangerous situations. This fight-or-flight response can help you survive but can take a toll on your health when it's overused for <u>everyday stresses</u>.

This stress response suppresses your <u>immune system</u> and can cause other health problems, including <u>high blood pressure</u>, <u>depression</u>, and <u>anxiety</u>. The relaxation response interrupts this stress response with a profound sense of rest. Other benefits may include:

• Related: Treatment-Resistant Depression: Racial Disparities

Reduced anxiety. A study of college students showed that practicing pranayama reduced test anxiety in students. Another study of senior citizens showed decreased anxiety after two months of deep breathing exercises.

Lower blood pressure. Slow deep breathing for five minutes has been shown to reduce blood pressure and <u>heart rate</u> in people who practice it.

Improved sleep. One of the negative side effects of stress can be trouble <u>sleeping</u>. It can be almost impossible to fall asleep when your body is caught up in the stress response. Practicing deep, slow breathing techniques such as 4-7-8 breathing can trigger your body's relaxation response and help you get to sleep.

Less pain. A study of 16 healthy people found that those who practiced relaxed deep breathing experienced less <u>pain</u> than those who practiced deep breathing that required a lot of sustained attention. Both groups experienced less tension, anger, and depression.

Improved concentration. A 2017 study examined the effect of eight weeks of deep, slow, abdominal breathing on <u>attention</u>, emotions, and stress levels. After training, the people in the deep breathing group performed better on tests of attention and had fewer negative emotions.

How Deep, Slow Breathing Affects Your Body

The sort of deep breathing practiced as part of the 4-7-8 breathing technique helps calm your body by activating your parasympathetic nervous system. Your body's automatic functions, such as your heartbeat and digestion, are controlled by your autonomic <u>nervous system</u>. This system has two parts, the sympathetic nervous system and the parasympathetic nervous system.

The sympathetic nervous system controls your body's stress response. The parasympathetic nervous system controls your body's rest and relaxation response. When you activate one of these, you suppress the other. This is why deep breathing is so effective at causing the relaxation response.

The 4-7-8 breathing technique is one method of deep breathing that you can use to reap all of these benefits. However, the particular method you use doesn't matter. If the 4-7-8 method doesn't work well for you, you can try another. You should experience the <u>relaxation response</u> with any breathing method that is slow and deep.