



A Natural High

Endurance aerobic activities (like jogging, cycling, dancing, rowing and the like) have long been seen as reducing stress, relieving anxiety, enhancing mood and decreasing the perception of pain. The high that can sometimes accompany jogging even led to the creation of its own term, “runner's high.”

There are various theories on how this “high” occurs related to the natural release in the body of endorphins, endocannabinoids or leptin. These “natural drugs” activate the same mechanisms in the brain as opioids, cannabis or other drugs. While the research on the “runner’s high” is not definitive, there is solid evidence that exercise, even in smaller doses, can boost your mood, raise your energy level, relieve anxiety and make you feel calm and relaxed. This on top of all the other benefits of physical activity!

Instructional strategies

1. Introduce the expression “runner’s high” and ask students questions like:
 - a. What do you think the expression means?
 - b. Why is it called a high? [Share a wee bit of information about the natural processes that are similar to what happens when people take drugs.]
 - c. Could you say people who run or participate in aerobic activities are taking a drug? If so, is this better than actually taking a drug? Why or why not?
 - d. Could you say people who run or participate in aerobic activities regularly are addicted? If so, is this better than being addicted to a drug? Why or why not?
2. Or, simply invite students to share their experiences about how physical activity makes them feel. Explore both the pain and the ecstasy. You might use questions like:
 - a. How does engaging in robust physical activity make you feel?
 - b. Is the reward worth all the pain? What is the benefit of pushing yourself?
 - c. Why do some people work out regularly? What do they get out of it?
 - d. What types of physical activity do you enjoy? Why?
3. Following either of the discussions above, introduce a unit in which students will explore and experience different types of aerobic activity. Have students keep a journal during this unit, and encourage them to reflect on how they were feeling during and after each activity.
4. A few possible extension activities:
 - a. Invite students to research the benefits of a particular physical activity that interests them. The resources noted below provide excellent, credible starting points.
 - b. Peer-led, fun-focused physical activity opportunities (e.g., intramurals, active recess time if working in a K-8 school) provide learning and leadership opportunities and also help foster social networking across grade levels.

Resources

New brain effects behind "runner's high" – Scientific American article copied from Judy Lavelle, Chemical & Engineering News, October 8, 2015. [Link to article here](#)

Scientists say ‘runner’s high’ is like a marijuana high – a Huffington Post piece that summarizes various published research studies and sheds some light on the various theories about the “runner’s high.” [Link to article here](#)

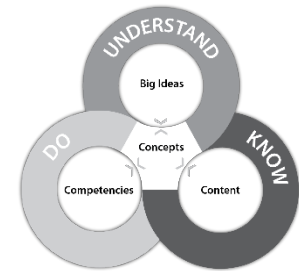
PhysEdGames (physedgames.com) – a great list of fun focused activities for a wide range of ages that is recommended by the Physical Education in BC teachers association. See also [CIRA Ontario](#).

Healthy Families BC (www.healthyfamiliesbc.ca/activity-lifestyles) – has a whole section on “Activity and Lifestyle” with loads of tips, articles and links to other resources, including [Participation](#) and the [Canadian Physical Activity Guidelines and Canadian Sedentary Behaviour Guidelines](#).

Drug literacy

Big ideas

- Drugs can be tremendously helpful and also harmful
- As humans, both individually and as communities, we need to learn how to manage the drugs in our lives
- We can learn how to control drugs by examining human thinking through time, exploring stories from various cultures and listening to each other



Competencies

- Explore and appreciate diversity related to the reasons people use drugs, the impact of drug use and the social attitudes toward various drugs
- Develop social and communication skills in addressing discourse and behaviour related to drugs

For a complete look at the drug literacy competencies, as defined by the Centre for Addictions Research of BC, see: <http://www.uvic.ca/research/centres/cisur/assets/docs/iminds/hs-pp-drug-curriculum.pdf>

Links to Curriculum

First Peoples’ principles of learning

- Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors
- Learning involves recognizing the consequences of one’s actions

Physical and Health Education 8

Big ideas

- Daily participation in different types of physical activity influences our physical literacy and personal health and fitness goals
- Lifelong participation in physical activity has many benefits and is an essential part of a healthy lifestyle
- Healthy choices influence our physical, emotional and mental well-being

Competencies

- Describe how students’ participation in physical activities at school, at home, and in the community can influence their health and fitness
- Identify and apply strategies to pursue personal healthy-living goals
- Describe and assess strategies for promoting mental well-being, for self and others
- Describe and assess strategies for managing problems related to mental well-being and substance use, for others

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OCTOBER 8, 2015 | 2 MIN READ

New Brain Effects behind "Runner's High"

The sensation may not just be about endorphins. A new study points to the same system of the brain involved in a marijuana buzz

BY JUDY LAVELLE & CHEMICAL & ENGINEERING NEWS

The Sciences ▼

After a nice long bout of aerobic exercise, some people experience what's known as a "runner's high": a feeling of euphoria coupled with reduced anxiety and a lessened ability to feel pain. For decades, scientists have associated this phenomenon with an increased level in the blood of β -endorphins, opioid peptides thought to elevate mood.

Now, German researchers have shown the brain's endocannabinoid system—the same one affected by marijuana's Δ^9 -tetrahydrocannabinol (THC)—may also play a role in producing runner's high, at least in mice (*Proc. Natl. Acad. Sci. USA* 2015, DOI: [10.1072/pnas.1514996112](https://doi.org/10.1072/pnas.1514996112)).

The researchers hit upon the endocannabinoid system as possibly being involved because they observed that endorphins can't pass through the blood-brain barrier, says team member Johannes Fuss, who's now at University Medical Center Hamburg-Eppendorf. On the other hand, a lipid-soluble endocannabinoid called anandamide—also found at high levels in people's blood after running—can travel from the blood into the brain, where it can trigger a high. “Yet no one had investigated the effects of endocannabinoids on behavior after running,” Fuss says.

To explore how endocannabinoids are involved, the team familiarized a group of mice with running on an exercise wheel regularly. Then the researchers split the group into two sets of mice: one that would run for five hours and one that would remain sedentary. Soon after their five-hour run, the rodents in the first group displayed far less anxious behavior than the sedentary set when exposed to a so-called dark-light box test. In this test, a mouse's anxiety is measured by the frequency with which the animal darts from well-lit areas into the dark to hide.

Similarly, mice in the running group had a higher tolerance for pain than those in the sedentary group, as measured by their tendency to jump or lick their paws when placed on a hot plate.

Finally, the researchers performed these same experiments on mice that were given endocannabinoid and endorphin antagonists—molecules that block cannabinoid and opioid receptors in the brain, respectively. The endorphin antagonists did not significantly affect results, but mice treated with endocannabinoid antagonists and mice genetically engineered to lack endocannabinoid receptors were still anxious and sensitive to pain despite having run for hours.

The team's findings suggest that endocannabinoids such as anandamide help cause runner's high. "The authors have moved the field forward by providing such a complete view of how this key reward system is involved in allowing exercise to improve psychological state and pain sensitivity," says David A. Raichlen, an expert in human brain evolution and exercise at the University of Arizona.

The researchers write that other key aspects of runner's high, such as euphoria, are too subjective to study in a mouse model.

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Scientists say 'runner's high' is like a marijuana high



By [Ariana Eunjung Cha](#)

October 8, 2015 at 11:10 a.m. EDT



A jogger runs past a yarn bomb installation along a street near downtown Houston on June 22, 2015. (Pat Sullivan/AP)



Gift Article



Share

That happy, invincible feeling you get when you're floating through the air at the peak of a workout?

You've probably heard that it's something called endorphins that your body produced during prolonged exercise. That idea, which has been around since the '80s, is based on the theory that these chemicals interact with receptors in the brain to reduce your perception of pain and some thought they may also give you that euphoric boost.

A new study published this week in the [Proceedings of the National Academy of Sciences](#) challenges that notion and puts forth a different theory: That that "high" it could be due to different substance called endocannabinoids.

Endocannabinoids can basically be thought of as the body's self-produced marijuana and, like cannabis, can impact a wide range of physiological processes, including appetite, pain, memory and mood.

Now the new research was only in mice, so it's unclear how it

will apply to humans, but what the researchers found is almost certainly intriguing enough to inspire followup studies.

Researchers from the Central Institute of Mental Health of the University of Heidelberg took mice and gave them running wheels. They found that after the runs, the mice were less anxious and tolerated pain better.

Then they used drugs to block the animals' endocannabinoid system. The results were striking. The animals were as anxious after running as before running and more sensitive to pain.

"We thus show for the first time to our knowledge that cannabinoid receptors are crucial for main aspects of a runner's high," the researchers wrote.

There's been a lot of other interesting research on the subject of runner's high recently. In August, scientists at the University of Montreal published their work on a different animal study involving the hormone leptin, which is nicknamed the "satiety hormone."

Leptin, which regulates energy stores, signals to the body when it has enough fuel and energy. The researchers said it's possible that when you are in the middle of a workout, your leptin levels may fall, and this could "send a hunger signal to the brain's pleasure center to generate the rewarding effects of running."

In a study published in the journal [Cell Metabolism](#), they compared normal mice with genetically engineered mice that lacked a leptin-sensitive protein called STAT3 that relays the leptin signal to release the reward chemical dopamine. The normal mice logged an average of six kilometers a day on a running wheel. But the genetically engineered mice ran nearly twice as much as the normal mice — 11 kilometers — each day.

If these studies are confirmed, the big question out there is whether these beneficial effects one day be bottled to help people exercise more to improve their health. It's looking more and more like a possibility.

This post has been updated.

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