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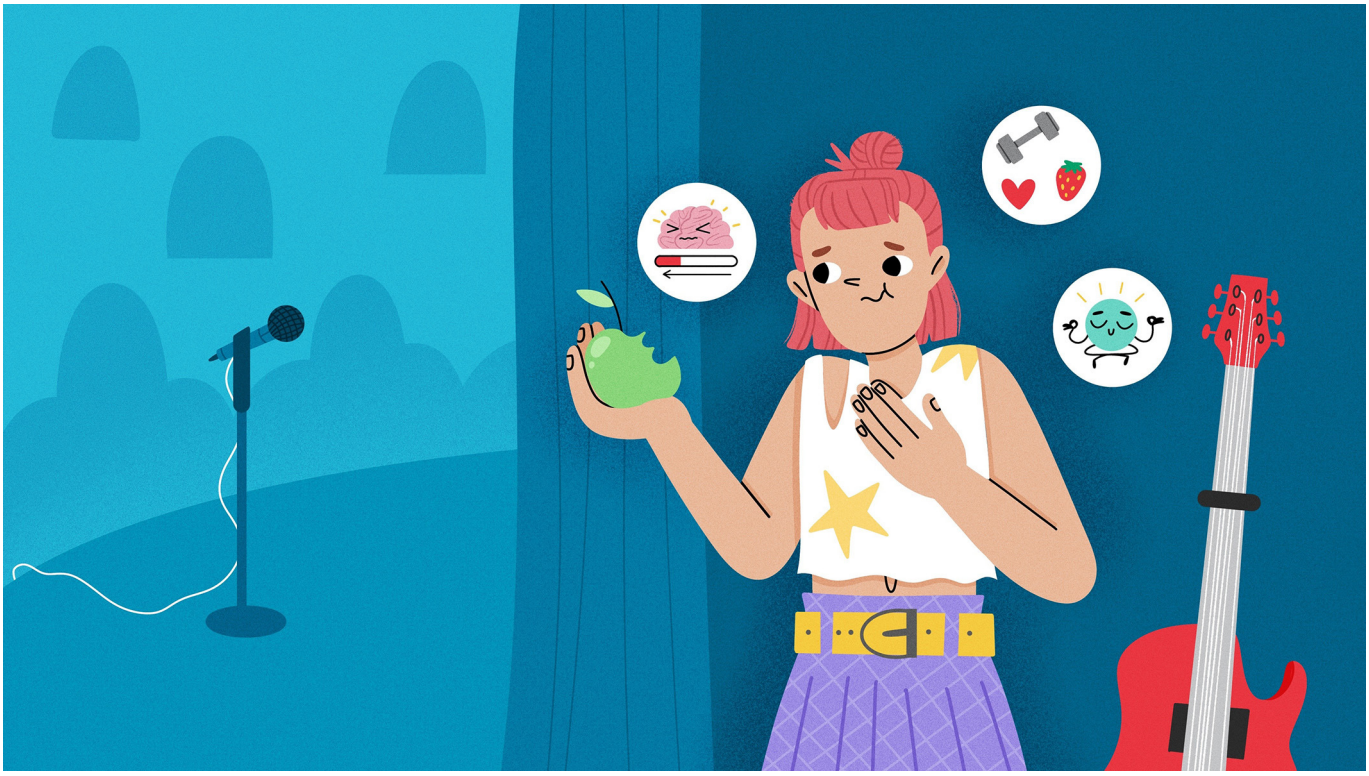

AN APPLE A DAY KEEPS THE STRESS AWAY: HOW FOOD CAN LOWER STRESS LEVELS

Jessica Kamuche * ***and Amin Shah***

School of Medicine, Wake Forest University, Winston-Salem, NC, United States

YOUNG REVIEWERS:

NORTHLAND PRIMARY SCHOOL

AGE: 12

Maintaining a healthy lifestyle can be quite challenging. Many factors can affect human health and influence how good or bad we feel. One of these factors is stress. Stress is a response caused by both internal and external factors that affect people's bodies, minds, and behavior. Stress can be good or bad depending on the outside factors. Some factors can help lower stress levels and food is one of those factors. Depending on what and how much we eat, food can reduce stress and lead to overall better health.

STRESSORS

Are events, situations, or conditions that cause stress by placing physical, mental, or emotional demands on a person.

WHAT IS STRESS? THE GOOD AND THE BAD

Stress is something we all encounter throughout our lives. It is caused by **stressors** that put your body off balance. Stressors are things that cause you to worry or become excited. Stressors could include preparing for a test or giving a presentation in front of a class. From peer pressure to life changes, stress is the natural reaction

your body has when changes or challenges occur. Stress can result in many different physical (how your body reacts), emotional (how your emotions react), and behavioral (how your behavior reacts) responses. The body is designed to handle and respond to stress. The stressful experiences you encounter can help your body become better adjusted to new situations. Stress is often noted as a bad thing, but there are both good stress (called **eustress**) and bad stress (called **distress**). Too much stress for too long can harm your body and lead to health problems. Therefore, it is important to take steps to control your stress. By learning and understanding how stress works, you will be able to see the different ways to help lower stress in your everyday life, resulting in better health overall.

EUSTRESS

A positive form of stress that is beneficial, which motivates, energizes, and helps a person improve their performance or adapt effectively.

DISTRESS

A negative form of stress that is harmful, that causes discomfort and can negatively affect a person's health and well-being.

Good Stress: Eustress

Eustress is a positive type of stress that can be good for you. Eustress is short-lived, and it results from challenges and reachable goals. Eustress helps motivate you and brings a sense of accomplishment and happiness from achieving and overcoming the stressor. Examples of eustress include preparing for a dance competition, getting excited about trying a new activity, or feeling happy for the new school year. Although eustress can be good for you, too much can lead to distress.

Bad Stress: Distress

Distress is a negative type of stress that can have bad effects on your body, mind, and behavior. Being faced with something you are unable to handle, whether small or large, can lead to distress due to feeling a lack of control. Distress can cause anxiety, extreme sadness (depression), or both. Distress can occur for both short and long periods. Examples of distress include feeling nervous about a big test, getting scared during a storm, or dealing with bullies.

HOW DOES STRESS WORK?

Stress occurs when you encounter a stressor. The stressor is detected by a small area of the brain called the amygdala (the brain's "alarm system"). The amygdala detects stressors and sends signals to another area of the brain called the hypothalamus. The hypothalamus controls **hormones** for mood, hunger, and heart rate. Think of it as a control center that keeps everything in balance. The hypothalamus then activates two systems: the **sympathetic nervous system (SNS)**, and the **hypothalamic-pituitary-adrenal (HPA) axis** [1]. Both systems respond to stress by releasing different hormones. The SNS, a faster message system, leads to a "fight or flight" response, which you may have heard of before. In contrast, the HPA axis responds more slowly and steadily by releasing hormones that help control your stress.

HORMONE

A small chemical messenger that sends signals to different parts of the body to help them work together.

SYMPATHETIC NERVOUS SYSTEM (SNS)

A part of the body's nervous system that helps it get ready to deal with stress.

HYPOTHALAMIC-PITUITARY-ADRENAL AXIS

A body system that helps respond to stress, which includes the hypothalamus, pituitary gland, and adrenal glands.

Think of hormones as text messages telling the body's stress response system what to do (Figure 1). In the first step, the hypothalamus releases corticotropin-releasing hormone (CRH), which then sends a "text message" to the pituitary gland. In the second step, the pituitary gland releases adrenocorticotropic hormone (ACTH), which then sends a message through the blood to the adrenal glands located on top of the kidneys. In the third step, the adrenal glands receive the message, which tells them to make cortisol. Also, one part of the adrenal glands (called the medulla) makes adrenaline. Cortisol and adrenaline are known as stress hormones.

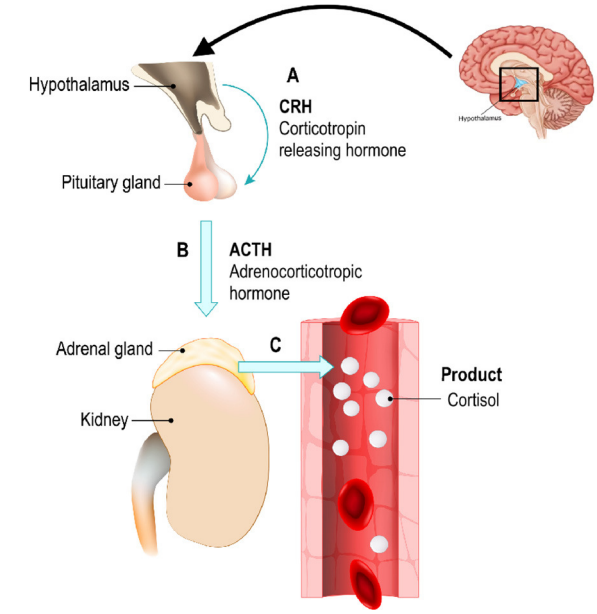

Figure 1

Figure 1

The HPA axis in the body's stress response. **(A)** In the first step, the hypothalamus releases CRH in response to stress. CRH sends a message to the pituitary gland. **(B)** In the second step, the pituitary gland releases ACTH in response to the message from CRH. **(C)** In the third step, ACTH sends a message to the adrenal glands, located on top of the kidneys, to release the stress hormones cortisol and adrenaline (Image credit: Adapted from VectorMine *via* iStockphoto [2]).

The increase in these stress hormones causes physical responses that help the body prepare to focus on the stressor, whether that is through "fight" (standing up to it) or "flight" (running away). These physical responses include a faster heart rate, quicker breathing, higher blood pressure, decreased digestive activity (not feeling hungry), and release of extra sugar (glucose) from the liver into the blood. Figure 2 shows the various physical responses to stress. Once the stressor is gone, the body slowly returns to its normal state. However, repeated stressors can lead to health problems.

SHORT- VS. LONG-TERM STRESS

Stress can be classified into two main types: acute and chronic. Acute stress is short-term stress, and it goes away quickly. Examples include an argument with your sibling or friend, running late for an event, or feeling excitement for a competition. Chronic stress is long-term

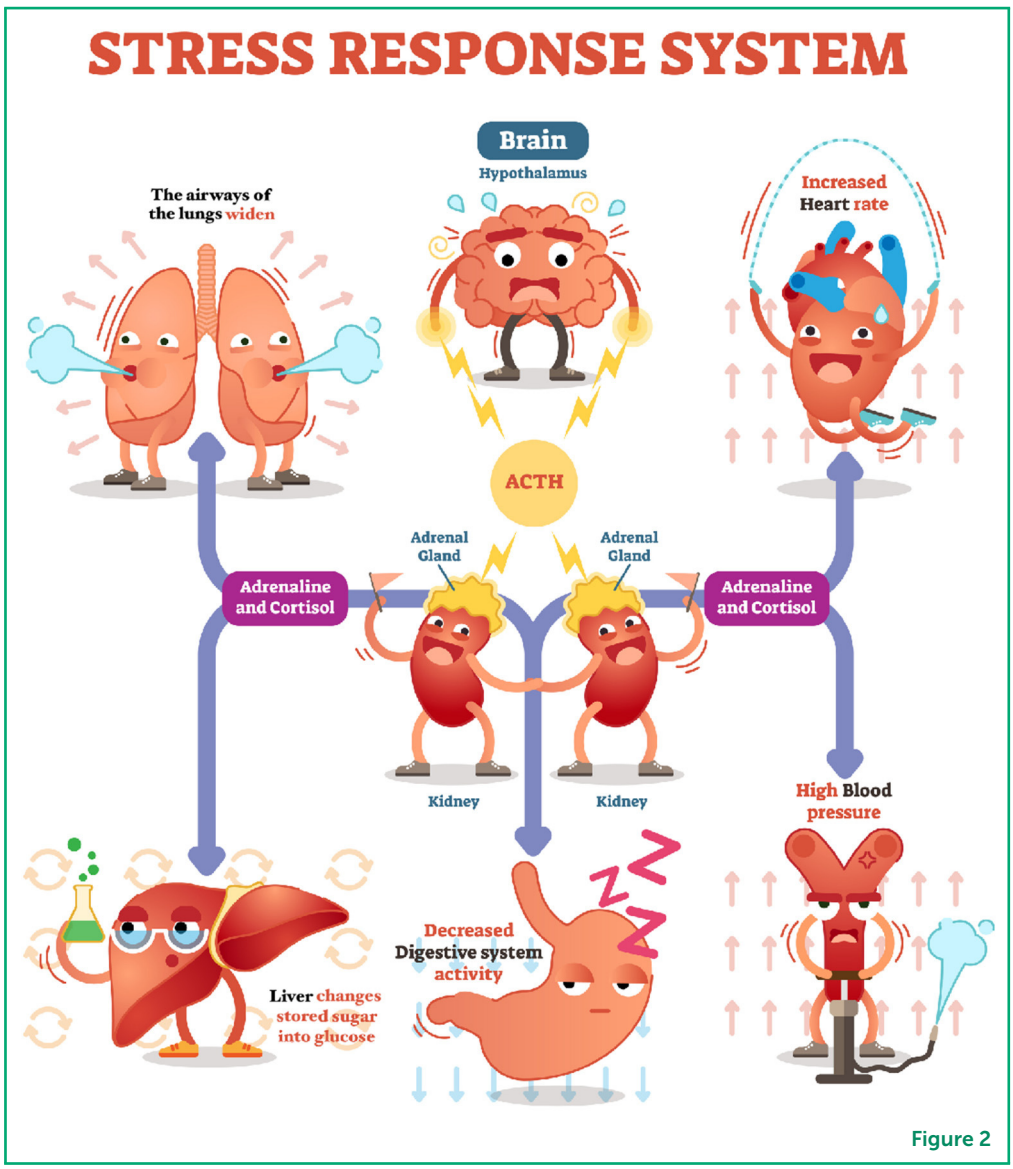

Figure 2

Physical effects caused by stress. Stress can lead to problems with the heart, lungs, liver, and stomach due to the increase of adrenaline and cortisol made by the adrenal glands (Figure credit: Adapted from VectorMine *via* iStockphoto [3]).

stress that lasts for weeks or months. Examples include ongoing family issues, being involved in too many extracurricular activities, bullying, and academic pressures. Both acute and chronic stress can lead to distress.

FACTORS THAT INFLUENCE STRESS

Knowing what stress is and how it works provides a better understanding of the different factors that affect your stress levels. As mentioned earlier, stress is mainly caused by environmental and personal factors, but other factors increase or decrease stress levels. Factors including your lifestyle, whether or not you exercise, social media use, whether you have support from friends and family, and even the foods you eat can all impact how much stress you have. How you manage these factors can either increase or decrease your stress

levels. It is important to be aware of such factors to keep your lifestyle healthy and prevent stress from negatively impacting your health.

HOW FOOD REDUCES STRESS

Have you ever heard the phrase "An apple a day keeps the doctor away"? There might be some actual truth to the phrase when it comes to stress. As we mentioned, the amount and types of food you eat can impact your stress level. Foods that lower stress include yogurt, fish, brown rice, fruits, and vegetables. Eating such foods helps lower stress hormones (cortisol and adrenaline). When you eat an apple, it can increase the levels of a "brain messenger" called serotonin within the body [4]. Increased serotonin levels send messages to the brain that provide a feeling of happiness and relief. Sometimes eating any kind of "comfort foods" can lower your stress through the increase in serotonin. Foods like bananas and dark chocolate can also help lower cortisol and adrenaline, calming your body and reducing stress. Other foods that can help lower stress include:

- Leafy green vegetables (e.g., spinach, broccoli, kale)
- Fruits (e.g., bananas, strawberries)
- Avocados
- Fish products
- Cocoa products (e.g., dark chocolate)
- Nuts
- Eggs
- Yogurt

However, it is also important to note that some foods can contribute to higher stress levels. Things like sodas, coffee, and energy drinks all contain caffeine, which can increase stress. Caffeine over-excites parts of the brain, stimulating the release of cortisol and adrenaline, which can lead to increased heart rate and blood pressure [5].

Being mindful of the foods you eat can help you with the amount of stress you feel and give you a practical way to help lessen your stress. However, food should not be the only choice to lower your stress levels. Other factors, such as exercising, maintaining healthy relationships, and getting enough sleep, all contribute to reducing stress.

BRINGING IT ALL TOGETHER

Everyone faces stress at some point in their life. Stress can be good or bad depending on the type of stressors a person faces. Distress is the negative stress that many people are more familiar with, and it can change a person's body, mind, and behavior. Multiple factors

can affect how much stress a person feels. Eating certain foods can help to reduce stress by increasing the release of serotonin, which brings feelings of happiness. Specific foods such as tuna and broccoli decrease levels of stress hormones. Being aware of the types of foods you eat can help lower the amount of stress you experience and provide a possible solution to everyday stressors that you may encounter.

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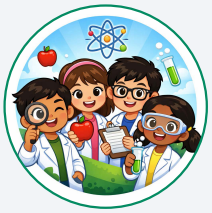

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We are a group of curious and thoughtful P6 science learners who enjoy discovering how food powers our bodies and shapes our minds. We ask meaningful questions, share ideas, and learn through hands-on exploration. Science helps us make sense of everyday choices, from what we eat to how we feel. With curiosity as our guide and teamwork as our strength, we are motivated to keep discovering, experimenting, and learning something new each day.

AUTHORS

JESSICA KAMUCHE

Jessica Kamuche is a recent graduate student who received her master's degree in biomedical sciences from Wake Forest University Graduate School of Arts and Sciences. Her research focuses on augmentative and alternative communication (AAC) devices and their current integration in medical care settings. She strives to contribute meaningful knowledge to both academic and public conversations. She is passionate about contributing to scientific discovery through interdisciplinary collaboration and advancing knowledge that can impact human health. *jessica.kamuche.stem@gmail.com

AMIN SHAH

Dr. Amin Shah is an associate professor at Wake Forest University School of Medicine. He completed his PhD in medical sciences at Chonbuk National University, South Korea. Dr. Shah did a postdoctoral fellowship at the University of Alberta, Canada. His research specialization includes cardiovascular diseases, obesity, and fetal programming of adult diseases. His broad research interest includes the cardiac natriuretic peptide system, the renin-angiotensin system, hypertension, cardiac hypertrophy, myocardial infarction, fetal programming of cardiovascular diseases, and the therapeutic effects of resveratrol.