

Special Unit 1

Approach to a Healthy Life

London Transport Workers Study

In the busy London streets of 1953, a special study was conducted. Scientists observed more than 31,000 people who had various jobs on buses and trains. Some jobs demanded lots of moving around, like ticket collectors, while others, like drivers, didn't require much movement. What was interesting was that the workers with more active jobs had fewer heart problems than those who sat a lot. This implied that jobs requiring more moving around were healthier for workers than those jobs that didn't. What could account for the difference in their health outcomes?

Three Ways Energy Is Used

The answer to this requires a simple formula and a little bit of math. The formula is an easy equation: the total energy expenditure of the body equals 「BMR + TEF + PA」. In the human body, the energy from different foods people eat is used to keep everything running smoothly.

The basal metabolic rate (BMR) is a measurement of how much energy is needed to stay alive; the thermic effect of food (TEF) is a measurement of the energy used to consume and absorb energy from food; and physical activity (PA) is a measurement of the energy used beyond just lying in bed. Learning about the composition of these three elements can help people make better choices for their health and well-being.

Most of the energy the body uses each day is set or fixed. Assuming an energy input of 2,000 calories, about 1,400 calories, or 70%, goes to essential functions such as keeping the heart and the brain working; this is called the basal metabolic rate (BMR). Around 200 calories, or 10%, is used to consume and absorb energy from food and is called the thermic effect of food (TEF). In short, BMR and TEF are the minimum energy required for the body to stay alive. The remaining 400 calories, or 20%, is used for things people choose to do, including various physical activities (PA) like working, playing, and moving around. Maybe some of the London public transportation workers spent the remaining 20% differently, resulting in their different health outcomes.

Physical Activities and NEAT

Then, what do people do with the remaining 400 calories? They may be burned by intense physical exercise like jogging, working out at the gym, playing badminton or tennis, or venturing out for a hike. However, those calories may also be burned by small, seemingly unimportant activities we do throughout the day, like standing up and sitting down, walking around the house, washing dishes, doing the laundry, taking out the garbage, and many others. These actions are collectively called Non-Exercise Activity Thermogenesis (NEAT) as they use up energy too! For example, a 40-minute run will burn around 400 calories. Doing this could use up the excess energy budget completely, but not everyone has 40 minutes a day to go for a run. Taking 10,000 steps, which is like walking about 8 kilometers, burns 400 calories as well. What this means is that while a 40-minute run will burn 400 calories, doing small things like more walking, taking stairs, or even just cleaning your room can add up at the end of the day, too.

What Happens When You Increase NEAT

Each gram of body fat contains about 9 calories, so if you spend your day eating and not moving, your body may convert the 400 calories into 44 grams of fat. This is not healthy over the long term. While NEAT doesn't provide the heart and muscles with the same benefits that exercise does, excess energy still gets used up instead of being stored. You may not necessarily get fit, but you'll stay in energy balance, which is important for long term health.

Further Health Benefits

Paying attention to NEAT has other health benefits as well. Sitting too much can cause problems like heart disease and muscle loss, so standing not only increases NEAT but also decreases sitting time, which is a win-win. As people get older, it may become more difficult to stay healthy, so adopting a lifestyle that maximizes NEAT is a good habit for younger people to make. Walking more, taking stairs, or even using smaller water cups so they have to be refilled more often uses energy. Whether it's for weight management or trying to stay more active during exam week, understanding NEAT is a great way to maintain energy balance in the body.

In the big picture, your body is like an an energy account book that needs to be balanced. All the food you eat is credit in the account, and you need to spend energy to keep it all in balance. Thus if you eat too much food without using the excess energy, your body will store the extra as fat, which is not healthy. Remember, standing uses more energy than sitting, walking uses more energy than standing, and running uses more energy than walking, so let's all keep moving, stay active, and use our energy wisely for a healthier life!