

# The Fat Burning Zone

We all want to understand, save time, and maximise returns on our training efforts which is the appeal of the 'fat burning zone'. But does it actually exist? **Dr. Jason R. Karp, Ph.D.** recalls an early introduction to the 'zone'.

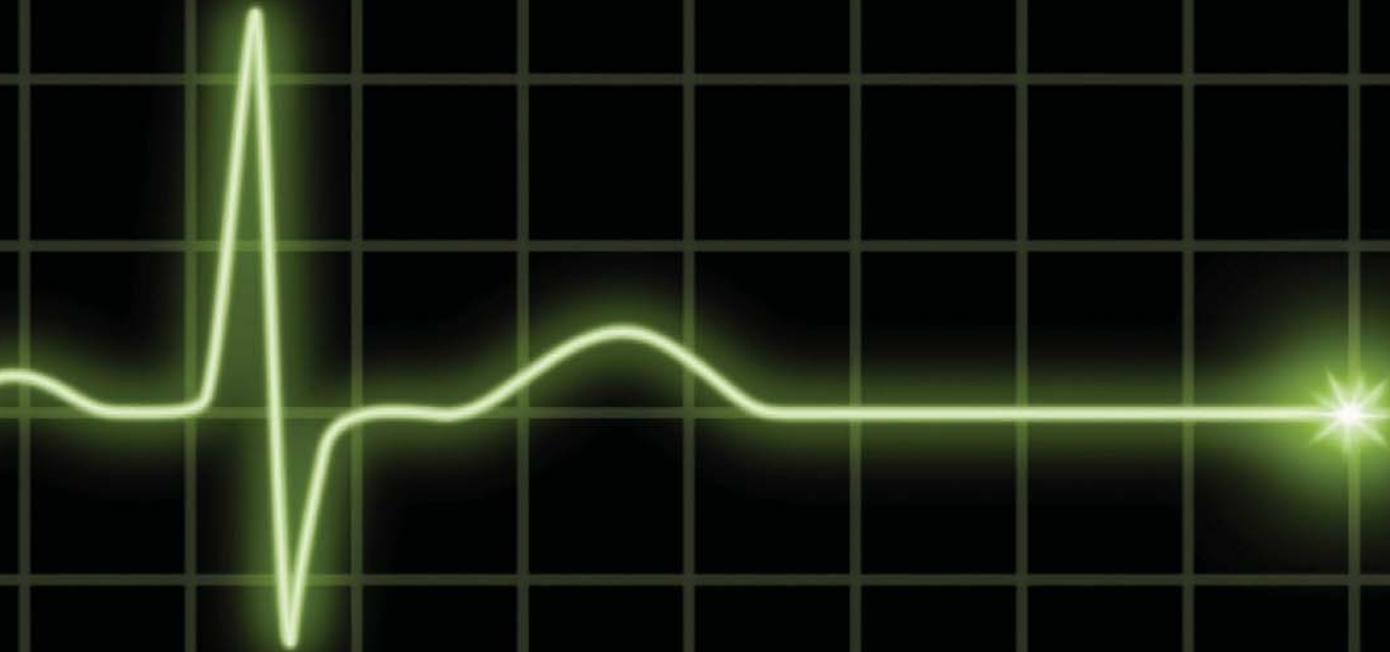
**One day, while I was** running on a treadmill at the gym, a personal trainer approached the person next to me to give her some advice. "Muriel," she said, "if you want to burn fat, you should keep your heart rate within a specific zone." I was so shocked at what I heard I nearly fell off the treadmill! The most popular myth about exercise may be that there is a specific range of heart rates in which you must exercise to burn fat. I hear fitness professionals all the time tell their clients not to exercise above a certain heart rate, as if it's bad for people to run or bike fast! You may have heard them yourselves: "You don't want your heart rate to go too high, because then you

won't be burning fat," they advise. Even many cardio machines display a "fat burning zone" on their front panels that show the corresponding heart rates to be lower than when in an "aerobic zone" or a "cardiovascular training zone." Have you ever wondered if you really have to exercise in a specific heart rate zone to lose fat? And what happens if you venture out of that zone? Is that dangerous?

People often assume that low-intensity exercise is best for burning fat. During exercise at a very low intensity (e.g., walking), fat does account for most of the energy expenditure, while at a moderate intensity (e.g., 80% maximum heart rate or about 70-75% VO<sub>2</sub>max), fat accounts for only

about half of the energy used. While you use both fat and carbohydrates for energy during exercise, these two fuels provide that energy on a sliding scale—as you increase your intensity up to your lactate threshold (the exercise intensity that demarcates the transition between exercise that is almost purely aerobic and exercise that includes a significant anaerobic contribution; also considered your fastest sustainable aerobic speed), the contribution from fat decreases while the contribution from carbohydrates increases. When you exercise at an intensity above your lactate threshold, you use only carbohydrates. While there is only a minimal amount of fat used when exercising just below your lactate threshold, the number of

# Myth **or** Magic?



calories used per minute and the total number of calories expended are much greater than when exercising at a lower intensity, so the amount of fat used is also greater. Research has shown that the highest rate of fat use occurs when exercising at or slightly below the lactate threshold. What matters is the rate of energy expenditure, rather than simply the percentage of energy expenditure derived from fat. Since you use only carbohydrates when exercising at a high intensity, does that mean that if you run fast or take a high-intensity Spinning class, you won't get rid of that flabby belly? Of course not.

Despite what most people think, you don't have to use fat during exercise to

lose fat from your waistline. After all, have you ever seen a fat sprinter? Sprinters primarily train anaerobically, never using fat during their workouts. Carbohydrates are actually the muscles' preferred fuel during exercise. The little amount of fat that is used in combination with carbohydrates during exercise below the lactate threshold is in the form of intramuscular triglycerides—tiny droplets of fat within your muscles. Your adipose fat (the fat on your waistline and thighs) is burned during the hours before and after your workout while you're sitting at your desk. Since fat is oxidized inside your muscles' mitochondria—microscopic “energy powerhouses” that contain the

enzymes involved in aerobic metabolism—it is more efficient to use fat that is physically closer to the mitochondria during exercise when you need to regenerate energy (ATP) quickly for muscle contraction. To use adipose fat, it has to be transported to the mitochondria where it can be oxidized. If we used adipose fat during exercise, everyone's waist would shrink while he or she ran on the treadmill! For fat and weight loss, what matters most is the difference between the number of calories you expend and the number of calories you consume. Weight loss is really all about burning lots of calories.

How you become a better fat burning machine is by enhancing the metabolic



## Try This: Strategies for Fat Loss

To maximize your fat loss, try these workouts:

### Go Hard

Interval training burns lots of calories in a short amount of time and keeps your metabolic rate elevated for hours after your workout. Do one or two of these workouts each week:

- 8 x 2 minutes at 100% max heart rate with 2 minutes active recovery
- 8 to 12 x 30 seconds fast with 1 minute active recovery
- 4 x 4 minutes at 100% max heart rate with 3 minutes active recovery

### Go Very Long

Long runs or bike rides ( $\geq 1.5$  to 2 hours) that stimulate mitochondrial synthesis and promote the depletion of stored carbohydrates (glycogen) threatens the muscles' survival since carbohydrates are muscles' preferred fuel. In response to this threat, muscles "learn" how to use fat more effectively. With the right training stimulus, over time muscles become better fat burning machines.

profile of the muscles. For example, endurance training enhances fat oxidation by increasing skeletal muscle mitochondrial content and cellular respiratory capacity, allowing for the sparing of muscle carbohydrate (glycogen). This steering in fuel utilization to a greater reliance on fat at the same exercise intensity is one of the hallmark adaptations of endurance training.

### The "Afterburn"

Not only does high-intensity exercise burn more calories in the same amount of time because the rate of caloric expenditure is greater, there is also a higher rate of fat oxidation after your workout compared to following low-intensity exercise because metabolic rate

remains elevated. Research has shown that the more intense the exercise, the more and longer your post-workout metabolic rate is elevated and the more calories you burn. In a study published in *Medicine and Science in Sports and Exercise*, triathletes who cycled at 75%  $VO_{2max}$  for 20 minutes burned more calories after their workout compared to after cycling at 50%  $VO_{2max}$  for 30 or 60 minutes. Another study published in *Journal of the American College of Nutrition* compared metabolic rates following two equal calorie-burning workouts: a short-duration, high-intensity workout (51 minutes at 75%  $VO_{2max}$ ) and a long-duration, low-intensity workout (78 minutes at 50%  $VO_{2max}$ ). The researchers found that the high-intensity

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workout resulted in a higher post-workout metabolic rate than the low-intensity workout.

Since you can perform a greater intensity of work by breaking up the work with periods of rest, interval training is a great way to perform high-intensity exercise and to help decrease your body fat percentage. Not only does interval training allow you to quickly improve your fitness, it is also more effective than continuous exercise for increasing your post-workout metabolic rate. A study published in *Medicine and Science in Sports and Exercise* found that not only did subjects burn more calories during interval cycling (15 x 2 minutes at 100%  $VO_{2max}$  with 2 minutes rest) compared to continuous cycling (60 minutes at 50%  $VO_{2max}$ ), they also burned more calories during the 24 hours following the exercise. Other studies, in which subjects ran instead of cycled, have used different interval workouts (e.g., 6 x 3 minutes at 90%  $VO_{2max}$  with 3 minutes recovery at 30%  $VO_{2max}$  or 20 x 1 minute at 105%  $VO_{2max}$  with 2 minutes rest) and different continuous runs (e.g., 36 minutes at 60%  $VO_{2max}$  or 30 minutes at 70%  $VO_{2max}$ ), but still found that the interval workout resulted in a higher post-workout metabolic rate. Certainly, when doing all these types of interval workouts, your heart rate will exceed the traditional fat burning zone.

So, if you want to burn fat and lose weight, just remember that high-intensity exercise burns more calories both during and after your workouts. And don't worry about staying in your fat burning zone. Because there's no such thing. **UF**

**Next issue's Peak Fitness column will discuss how you can change body positions and grips when lifting weights to change the muscular emphasis of a variety of exercises.**

Dr. Jason R. Karp has a Ph.D. in exercise physiology, and is director and coach of REVO<sub>2</sub>LT Running Team, a freelance writer, and competitive runner. His writing has appeared in numerous international running, coaching, and fitness magazines and scientific journals. He has coached high school and college cross country and track and field, and currently coaches athletes of all levels through [RunCoachJason.com](http://RunCoachJason.com)