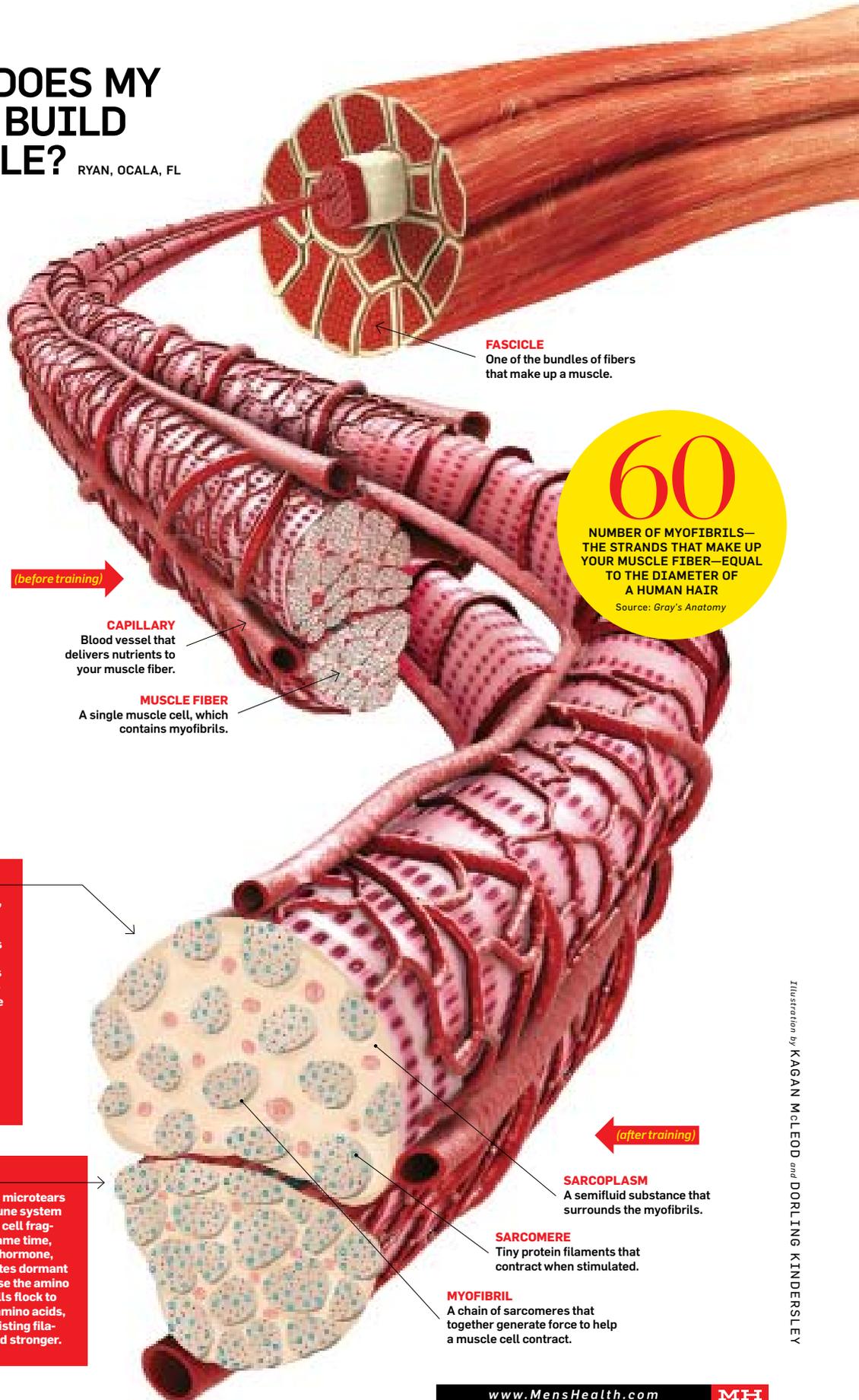


LIFE'S QUESTIONS, ANSWERED

## Q HOW DOES MY BODY BUILD MUSCLE?

RYAN, OCALA, FL

Let's say you want your construction crew to erect bigger biceps. They'll rely mostly on two key building materials: myofibrils (ropelike strands made up of thinner protein filaments) and sarcoplasm (a gel-like fuel that surrounds the myofibrils). Now, if you lift low reps of heavy weights, the crew will mainly thicken your myofibrils, increasing size and strength. If, on the other hand, you lift high reps of medium weights, those hard hats will primarily boost the volume of your sarcoplasm, building size and endurance. "Both kinds of growth require stressing your muscles beyond what they're used to, and the way you train dictates which kind of growth you emphasize," says Alexander Koch, Ph.D., C.S.C.S., an associate professor of exercise science at Truman State University. That's why he recommends cycling through weights that are moderately heavy (8 to 12 reps), heavy (4 to 6 reps), and maximally heavy (1 to 3 reps), over a period of several weeks.



**60**  
 NUMBER OF MYOFIBRILS—  
 THE STRANDS THAT MAKE UP  
 YOUR MUSCLE FIBER—EQUAL  
 TO THE DIAMETER OF  
 A HUMAN HAIR  
 Source: Gray's Anatomy

### SWELL

When you do a high number of reps with a moderate weight, some myofibril growth occurs (see "Shred," below), but your body also sends a signal to increase the size and number of mitochondria, the mini motors inside all your cells. As your mitochondria multiply to handle the endurance demands

of a high-rep workout, your supply of sarcoplasm also increases to make your muscles function more efficiently. Sarcoplasm is made up of adenosine triphosphate, creatine phosphate, glycogen, and water—a combination that not only transports energy to your muscles but also adds volume to your myofibrils.

### SHRED

A workout of heavy weights and low reps causes microtears in your myofibrils. These tears trigger your immune system to send white blood cells to clear away damaged cell fragments, preparing the site for rebuilding. At the same time, your body experiences a boost in human growth hormone, which has a twofold effect: The extra HGH activates dormant stem cells and makes it easier for your body to use the amino acids in protein. Those newly awakened stem cells flock to your injured muscle. There, with the help of the amino acids, they may grow new filaments or fuse with the existing filaments, making your myofibrils denser, larger, and stronger.

Illustration by KAGAN MCLEOD and DORLING KINDERSLEY