Biomedicine

Joanne Silberner reports from the American Heart Association meeting in Anaheim, Calif.

Monkey clue to heart disease

A positive relationship between exercise and a healthy heart has long been recognized, but just how exercise exerts its beneficial effect has not been determined. Polly Beere and colleagues from the University of Chicago feel heart rate may be a factor. If their belief is confirmed, lowering heart rate may provide a way to limit or prevent coronary artery disease.

Beere destroyed part of the heart's pacing mechanism in 12 monkeys, causing their heart rates to drop to 97 beats per minute. Both these monkeys and five monkeys that had bogus operations and had heart rates averaging 137 beats per minute were fed high cholesterol diets. After six months, Beere looked at their arteries and found that the plaques in the low heart-rate group were only half the size of those in the high heart-rate group.

The reason, she suggests, has to do with fluid dynamics. Though it would seem that a high heart rate, and thus rapid circulation, would scrub the artery walls and keep plaque from forming, this is not the case. As blood pulses, Beere explains, slow-flowing eddies form, keeping the blood around long enough to cause damage. "If you have a high heart rate you have more beats," she notes, and thus more eddies.

A slow heart rate paradoxically means a longer period of high flow. "If you decrease the heart rate, the contraction phase doesn't change, but the filling rate — when coronary blood flow is at its highest — changes, which we think is good," says Beere. "You have more time during [the beat when] blood is flowing at a high velocity, and we think that's good."

Good night's sleep for blood pressure

Sleep apnea — periods of temporary cessation of breathing during sleep — may cause high blood pressure.

Because most people with sleep apnea have high blood pressure, or hypertension, Eugene C. Fletcher and colleagues at Baylor College of Medicine in Houston decided to look for sleep apnea in hypertensive men. Comparing 40 hypertensive men with 30 men who had normal blood pressure, they found that 45 percent of the hypertensive men had sleep apnea, while only 20 percent of the men with normal blood pressure did.

The blood pressure of four of nine apneic hypertensive men dropped to normal after their apneas were treated with antidepressant drugs, "implying that apnea was the cause of their hypertension," says Fletcher.

Equal rights for older hearts

The hearts of older people may be getting a bad rap, say researchers from the Johns Hopkins University and the National Institute on Aging in Baltimore. "One of the big prejudices that everybody has about older people is that they have a marked decrease in the ability of the heart to [tolerate] exercise," says Myron Weisfeldt of Hopkins. "If you select normal healthy people ...you end up with a population whose cardiovascular response to age is undiminished at maximum exercise."

That's not to say that the elderly heart is indistinguishable from the young heart. "It does the job just as well in the old as the young, but it does the job by different means," Weisfeldt explains.

The heart's total output can be measured by multiplying the number of beats per minute by the amount of blood pumped in each beat. In a study of 61 elderly patients, the researchers found that while the heart rates did not go up during exercise as markedly as with younger people, there was a greater increase among the older people in the amount of blood pumped with each beat. They found that the heart muscle itself swelled to a larger size. And the larger the heart muscle is, the more force with which it will contract. The adaptations allow the heart to work "in a fashion which is effective in delivering the same amount of blood flow," says Weisfeldt.

Olympic athletes will need heart

Athletes at the 1984 Summer Olympic games in Los Angeles will not only be facing competition from other entrants — they will also have to contend with heat and air pollution-related high carbon monoxide levels, both of which strain the heart.

Researchers disagree exactly how much of a role the city's air pollution can be expected to play. Peter Snell, who won three gold medals in middle distance runs in the 1960 and 1964 Olympics and is now in charge of the Wellness Program at the University of Texas in Dallas, feels pollution won't be a problem. "The choice of L.A. was appropriate," he says. But Steve Horvath of the University of California at Santa Barbara is less sanguine. The 80 to 100 liters of air per minute an athlete can inhale during peak exertion — compared to a resting level of 5 to 10 liters — means trouble when weather conditions cause pollution to accumulate, Horvath says. "If the weather is nice and cool, no overcast, we won't have any problems," he says. "I think basically we're completely dependent on the weather."

And David Sheps, a cardiologist at the University of North Carolina in Chapel Hill, notes that athletes are not the only ones at risk. "The concern about the Olympics should be a concern not only for the athletes but for the spectators ... a lot of whom will have coronary artery disease and other types of cardiovascular disease," he says.

Where and when events are held will make a difference. The women's marathon, Horvath says, "will start out in a nice part of the city but will end up in the [Los Angeles] Coliseum at noon. If there's going to be any high levels of air pollution they will occur at that time. So the women will be running under more stringent conditions than the men."

Horvath had people exercise at a first stage pollution alert level, a condition not uncommon in Los Angeles in the summer. He was never able to finish the study. "When we asked them (the participants) to repeat the study, they refused to come bak," he says.

Going around the block

In the recently introduced technique of coronary angioplasty (SN: 11/29/80, p. 341), a balloon is inflated inside a narrowed coronary artery in order to push the artery walls out and provide more room for blood flow. But while prolonged inflation is good for the artery, it is bad for the heart muscle beyond it, which is starved for blood during the procedure.

Enter a tiny tube within the balloon. J. Richard Spears and colleagues at Beth Israel Hospital in Boston tunnel oxygen-containing fluid through and beyond the balloon. Red blood cells break down in the process of being forced through the tube, so they are using fluosol, an artificial blood (SN: 8/28/82, p. 137).

In tests on 15 dogs, coronary angioplasty for more than five minutes had "no untoward effects." And the procedure proved safe in seven patients for one minute; the researchers plan to extend the trials to five or ten minutes.

For smokers, halfway is not enough

Cigarette smokers who forgo the cold turkey approach and compromise with pipes or cigars are not doing themselves much good, say researchers from the University of Minnesota in Minneapolis.

Ex-cigarette smokers tend to take in a greater amount of smoke than cigar and pipe smokers who never used cigarettes, says Aaron R. Folsom. He and his colleagues looked at 308 pipe and cigar smokers, 194 of whom were former cigarette smokers. Blood levels of thiocyanate, a chemical indicator of smoke inhalation, were much higher in the ex-smokers, he says.

Their conclusion — switching to pipes or cigars is not a healthy alternative for cigarette smokers.