thing") or suppression ("tried to relax and not think about the situation").

The researchers obtained blood samples from each participant before and after the patient listened to tapes, just before surgery, in the recovery room and on the two days following surgery.

Levels of adrenaline and cortisol – two hormones associated with the body's reaction to stress and danger – increased significantly during and after surgery only among patients who listened to the relaxation tape. Yet compared with the control group, relaxation patients reported less anxiety and worry, displayed a lower average heart rate and blood pressure, and received fewer pain-killing drugs following surgery.

Relaxation training may serve to distract people from focusing constructively on the upcoming surgery, Salmon suggests. "Our hypothesis is that thinking about and preparing for a stressful event is a better tactic," he says.

Further support for this notion comes from an unpublished study directed by Salmon. Surgical patients shown a videotape that describes ways to prepare mentally for surgery displayed lower adrenaline and cortisol levels than did controls, he maintains. Another study, reported by Salmon in the June 2, 1990 LANCET, charted marked jumps in stress hormones following major abdominal surgery among the least anxious patients. *– B. Bower*

Tracking the cause of asthma's wheeze

Until recently, scientists believed that asthma resulted when muscles surrounding the lung's airways went into spasm, restricting the flow of air. But a computer study augments recent evidence that inflammation and thickening of the airway tubes is the chief cause of an asthmatic's wheezy breathing.

Mathematician Barry R. Wiggs and his colleagues at the University of British Columbia in Vancouver turned to a computer model of the human lung in their search for the underlying cause of asthma. First, the team obtained data on the thickness of airway walls by studying tissue removed at autopsy from the lungs of people with severe asthma. The researchers gathered further data on airway walls by looking at lung tissue removed during surgery from people without asthma. Compared to the controls, the asthmatics' airway tubes were severely thickened by the effects of chronic inflammation.

Next, the Canadians plugged the data into the computer model. When the team simulated the constriction of the smooth muscles surrounding the airway tubes, they found some airflow resistance. That's to be expected, says Wiggs, who notes that a person with healthy lungs experiences some resistance to airflow when bronchial muscles constrict. Most people might notice a little more difficulty breathing but wouldn't experience any discomfort, he adds.

When the team looked at a model of an asthmatic lung, with its thickened and inflamed airway walls, a dramatic increase in airflow resistance occurred with the same constriction of smooth muscles, he says.

"The smallest airways had constricted so far down that they had collapsed," Wiggs says. The collapse of the very smallest bronchial tubes corresponds to the severe symptoms of asthma, he notes.

Healthy lungs can handle periodic muscle constrictions, which often occur in order to expel pollutants, Wiggs says. However, the effects of muscle spasm on airways already swollen with chronic inflammation are magnified, he notes.

The Canadian team's findings fit in with a growing body of scientific evidence that shifts the focus in asthma research away from the muscles surrounding the airway tubes.

"We still think that muscle constriction is important," comments asthma researcher Jeffrey M. Drazen of Harvard Medical School in Boston. Yet, Drazen and others now believe that muscle spasm alone doesn't explain the asthmatic's wheeze. "If you sit down and work out the fluid dynamics, you find that a little wall thickening has a big effect" on breathing ability, he says.

The new study, published in the June AMERICAN REVIEW OF RESPIRATORY DISEASE, underscores a recommendation made last year by a federally appointed panel. That group urged U.S. doctors to rely on anti-inflammatory drugs such as inhaled steroids as their first line of defense against asthma (SN: 2/9/91, p.86). However, Drazen says many doctors still rely on bronchodilators, drugs that temporarily improve breathing but do nothing to ease the underlying inflammation. *– K.A. Fackelmann*

Rio summit launches two 'Earth' treaties

Negotiating teams representing 178 nations this week wrapped up 12 days of complex deliberations at the United Nations Conference on Environment and Development (UNCED). This Earth summit brought heads of state from 116 nations to Rio de Janeiro for discussion of – and hopefully commitment to – "integrated strategies to prevent further degradation of the global environment."

While UNCED's organizers had hoped the agreements forged through their diplomatic labors would contain more legal bite, most concede that the documents emerging from this meeting represent important achievements. Indeed, three may eventually result in treaties.

Chief among them was the Convention on Climate Change. Aimed at limiting the threat of global warming, it requires no binding limits on greenhouse gases – just a commitment to policies for controlling emissions and enhancing absorption of the pollutants (SN: 5/16/92, p.326).

At press time, at least 150 nations had signed this convention, signaling their leaders' support. To enter into force, such proposed treaties require subsequent legislative ratification – in this case, by 50 countries.

A similar number of countries signed the Biological Diversity Convention. Once ratified by 30 of them, this treaty will bind signatories to protecting genetic resources harbored within indigenous plants and animals. For instance, it calls for cataloging species and supporting activities that foster survival of threatened ones. Wealthier nations would help finance such efforts in poorer ones.

The convention also argues that nations should be allowed to share in the technology or some unspecified "fair" share of profits – or both – that others derive from exploiting their species. While industrial nations have questioned how such provisions might ultimately be interpreted, only the United States pronounced them grounds for rejecting the convention.

Predicting that U.S. "efforts to protect biodiversity itself will exceed the requirements of the treaty," President Bush refused to sign the document. He argued at Rio that its provisions "threaten to retard biotechnology and undermine the protection of [patentable] ideas. And unlike the climate agreement," he added, "its financing scheme will not work."

Among other developments emerging from the Rio meeting:

• A nonbinding "statement of principle" outlining the need for preserving forests. The document, which many officials described as the first step toward a potential treaty, sets no timetables or standards for assessing compliance.

• A comprehensive environmental action plan. Known as Agenda 21, its roughly 800 pages call for integrated activities to reduce waste, improve energy efficiency and promote sustainable economic development. It also sets guidelines for who will finance such changes and how.

"Rio was clearly a great success," concluded UNCED organizer Maurice F. Strong of Canada. However, he warned at the meeting's close, "whether [UNCED] succeeds in its purpose of setting the planet on a new track remains to be seen. . . . People can't allow their leaders to forget what they promised here." *– J. Raloff*

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