is an increase in intracellular production of lipase, an enzyme that breaks down fat. When the alpha$_2$ receptor is stimulated, however, this fat destruction is inhibited and fat remains inside, making the fat cell even fatter.

Determining how these cell receptors relate to body shape and subsequent health risks is a matter of comparing apples and pears, since most overweight males have apple-like shapes and the majority of overweight females are pear-shaped. In a recently completed study of fat cells taken from various body sites, Leibel and his co-workers found that men and women essentially have equivalent beta$_1$ activity in the buttocks. Also, both sexes have higher alpha$_2$ activity in the buttocks than in the abdominal area – meaning, as Leibel explains, that both sexes are likely "to hang on to fat in their [buttocks]." But he says gender makes a difference when it comes to potbellies: Men tend to have more alpha$_2$ activity, and therefore fat retention, in the abdomen than do women, according to the study.

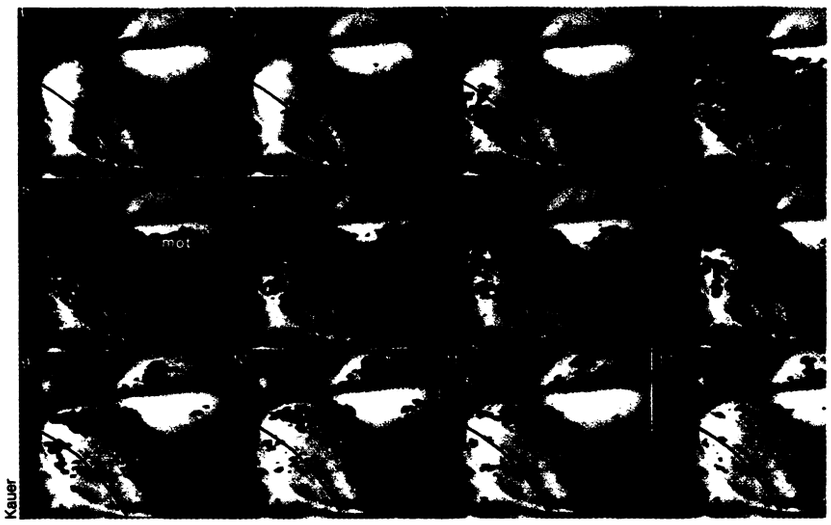
The researchers also observed that fat tissue serves as an energy depot during breast-feeding. A woman's receptor response changes during lactation, with the alpha$_2$ activity in the hips and thighs temporarily dropping in a form of spot reducing, making fat available for use elsewhere in the body. If scientists were able to determine how these localized changes take place, says Leibel, "we would clearly have a very powerful tool for the clinical management of obesity and related problems."

If there were a way to lose weight just from the abdomen, the amount of weight loss needed to gain health benefits would not have to be so great, says Leibel. But how such selective slimming will come about is a mystery. Designing a drug specific enough to properly alter receptor activity will be a difficult task, he says. He also notes that liposuction, a procedure used to remove fat from under the skin surface, cannot reduce the deeper, more important fat deposits.

And results from his current research sound depressing for those fighting a bulge here and there. In a preliminary study of 18 women undergoing weight loss through dieting, he discovered that body proportions stay constant, while the alpha$_2$ and beta$_1$ receptors "go haywire." In measuring the waist- to hip-size ratio, Leibel and his colleagues found no change in body proportion when comparing the pre-diet figure to that after a 10 percent weight loss. What they did see were large changes in the performance of both receptors in the abdominal and buttock region. Leibel emphasizes that this research is preliminary and the scientists are not yet able to explain why these apparent receptor changes do not seem to affect body shape.

– D.D. Edwards

Video reveals brain activity patterns



A new video technique is allowing scientists to visualize working brain circuits with unprecedented detail in living salamanders. The technique is helping to show how the brain "maps" sensations, and may someday reveal the neural basis of learning, memory and thought, researchers say.

As reported in the Jan. 14 NATURE, *John Kauer of the New England Medical Center in Boston applied a voltage-sensitive dye to exposed salamander brains and filmed the dye as it fluoresced in response to electrical activity of individual neurons. In this series of computer-enhanced video frames taken at 30-millisecond intervals, the spread of nerve firing within one plane of the brain can be observed following an initial electrical stimulation of the olfactory nerve. Green represents electrical activity more than 1 standard deviation (SD) above baseline; red represents activity 2 SDs above baseline. Superimposed black lines show divisions between different layers of the brain. By focusing at different depths, scientists can obtain a three-dimensional image of neural activity for various sorts of stimulation.*

"We don't really know how odors are encoded by a neural system," Kauer says. "But many, many cells participate in the response to each odor, and what we presently think is that it's the pattern of activity distributed across these many cells that encodes the odor. You can think of it as an ensemble or a hologram of some kind. What we've developed is a way to record this ensemble activity." He says the new imaging system may help to validate some of the computer models that attempt to simulate neural networks (SN: 1/9/88, p.27).

U.S., Soviets sign scientific accord

The recent thaw in U.S.-Soviet relations has spilled over into science. On Jan. 12 in Moscow, the scientific academies of the two countries signed a five-year cooperative agreement that invigorates and broadens their formal scientific relations, which had begun to erode this decade largely because of the U.S. response to Soviet treatment of dissident scientists.

The U.S. National Academy of Sciences (NAS) and the Academy of Sciences of the USSR have engaged in scientific exchanges and other joint efforts since 1959. Prompted in part by the Soviets' internal exile of physicist Andrei Sakharov, the NAS in 1980 suspended all bilateral workshops. These were not reinstated until 1986, when a formal agreement was signed following the 1985 Geneva summit. The new Agreement on Scientific Cooperation builds on this previous two-year program.

The recent accord expands programs for the exchanges of scientists, resumes the convening of joint workshops and extends various cooperative research projects. According to a statement released by the U.S. delegation to Moscow, some of the scientific workshops planned for the next two years will focus on earthquake prediction, the development of new vaccines (including those for AIDS), biotechnology and its agricultural applications, astrophysics and planetary sciences.

Cooperative research that will be continued or initiated includes studies on condensed matter theory, the evolution of geological processes, abating erosion of the global ecology, energy conservation and nuclear reactor safety.

– S. Weisburd

News of the week continued on p. 60