insulin cDNA probe from a pancreatic tumor to use for the human studies.

Looking at fetal and neonatal mice, she finds at least three and possibly as many as five different mRNA's in the brain that resemble, yet are different from, insulin mRNA's. Moreover, she does not find these mRNA's in adult mouse brains. Human fetal brains, she has discovered, have at least two insulin-like mRNA's. And in both the human and mouse fetuses, these insulin-like mRNA's appear to be specific to the brain.

Villa-Komaroff has no information yet on what these insulin-like peptides are doing in the brain, but she does have what she refers to as a "working prejudice." She explains, "We think they are going to be growth factors. There are insulin-like growth factors in serum and there is something like them in fetal tissues. Our long-range goals are to make the proteins [coded by the insulin-like mRNA's] in bacteria and study their biology."

Other researchers, taking a similar approach, are just now gearing up to look for peptide hormones in the brain. For example, Richard Goodman of Massachusetts General Hospital is studying somatostatin, a 14-amino-acid peptide found originally in the hypothalamus and subsequently in pancreatic islets.

Goodman extracted somatostatin mRNA from the marble-sized pancreatic islets of the anglerfish. (In humans, the islets are microscopic.) Using this mRNA, he made a cDNA probe with which he looked for and found somatostatin mRNA in frog brains. Then he used the probe to extract somatostatin mRNA from a rat medullary carcinoma, a nerve-related tumor. He copied the rat mRNA into cDNA and cloned the cDNA, thereby obtaining a cDNA probe for mammalian somatostatin mRNA. Now, he says he is ready to look in rat brains for somatostatin mRNA's.

Roberts is planning to look for the peptide hormone LHRH in rat brains, using a cDNA probe. Herbert will be looking for enkephalin mRNA's in the rat brains and Lund plans to use her cDNA probes for glucagon mRNA's to look for that hormone in the brain.

If, as most neurobiologists think likely, there really are numerous peptide hormones that are made in the brain, what is their function? It is doubtful that they are all growth regulators, even if the insulin-like hormones serve this purpose. A number of researchers propose that they are used for intercellular communication in the brain. With the flexibility seen in the processing of the glucagon and opiate genes, the brain could generate a large variety of peptide signals. Says Habiner, "If, on top of the electrical circuitry of the brain you have a whole array of peptide signals that can change the qualitative reactions of cells, you could approach the complexity of signals needed for the brain to function."

Habiner, for one, is quite excited by the possibilities of using the techniques of molecular biology to study the brain. "Until now, there have been few attempts to use molecular biology to study the nervous system because people felt the nervous system was just too complex. But with the techniques of molecular biology available and developing rapidly, it has become reasonable to begin to explore brain functions on a molecular level," he says.—GINA KOLATA

The Scent Makes Sense

Pigs have been known to detect truffles buried as deeply as 3 feet below the ground by scent alone. After the truffle is detected, the sows root for the high-priced delicacy with such vigor that many truffle hunters have turned to dogs simply because they are easier to control. The ability of pigs to detect truffles results from their keen sense of smell, but the intensity with which the sows root them out has been a matter of some mystery. Now, three German investigators think they have solved this mystery with the discovery that truffles contain a pig sex pheromone [*Experientia* **37**, 1178 (1981)].

R. Claus and H. O. Hoppen of the Technical University of Munich and H. Karg of the Lubeck School of Medicine have shown by radioimmunoassay and gas chromatography–mass spectrometry that truffles contain a steroid, 5*a*-androst-16-en-3*a*-ol, that has a pronounced musklike scent. Other scientists had previously shown that this steroid is synthesized in the testes of the

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boar and transferred to the salivary gland, from which it is secreted during premating behavior. Interestingly, the concentration of the steroid in the most highly prized black Perigord truffles and white truffles is about twice the concentration in the blood plasma of boars. "The biological role of this boar sex pheromone," the authors say, "might explain the efficient interest of pigs in search of this delicacy."

It might also explain why humans like the fungus, which is said to taste like a cross between musk, nuts, and ozone. The same steroid is synthesized by human males in the testes and secreted by axillary sweat glands. In a 1978 study, Michael Kirk-Smith and his colleagues at the University of Birmingham showed pictures of normally dressed women to male and female volunteers, some of whom were exposed to the steroid during the viewing [*Res. Commun. Psychol. Psychiat. Behav.* **3**, 379 (1978)]. The volunteers were asked to score the pictures for beauty. Those who were exposed to the steroid consistently gave the women higher scores for beauty.—THOMAS H. MAUGH II

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