Canada's National Research Council has funded a sixteen-member team at Connaught Laboratories which is working to do likewise. Novo Industry, which dominates the market in Europe, introduced "humanized" insulin last June. It is pig insulin converted chemically to match the human variety.

Diabetics who depend on injections may have a number of serious secondary problems—they are twenty-five times more likely to go blind than other people, seventeen times more likely to develop gangrene and twice as vulnerable to heart disease.

Some of these difficulties probably develop when the insulin supplied does not match the amount needed, resulting in alternating high and low blood sugar levels. The use of animal insulin instead of human insulin may also contribute.

Researchers at Connaught Laboratories (where Banting and Best were working in 1921) are trying to develop a more ambitious implant that would eliminate these difficulties as well as those that hamper the pump makers.

Their implant is, in effect, an artificial pancreas. Living animal pancreas cells, suspended in a liquid in a small cylinder behind a plastic membrane, produce the hormones glucagon and somatostatin as well as insulin. The first raises blood sugar levels when needed, the second inhibits the release of either glucagon or insulin when necessary.

The cylinder—in one version it is the size and shape of a spool of thread—is connected to a vein or artery. The cells pass insulin and the other hormones through the membrane into the blood, providing exactly the amount required to metabolize the blood sugar present at the time. New cells can be injected into the cylinders as the old ones die. This device could be reduced in size, researchers believe, and implanted in a vein or artery and reseeded without being removed. It has been tested on monkeys and some problems have been identified. The plastic tubes carrying the blood tend to cause clotting, for example. Scientists at Joslin Research Laboratory in Boston working on the same problem have reduced the tendency by varying the tube sizes and winding them in new configurations.

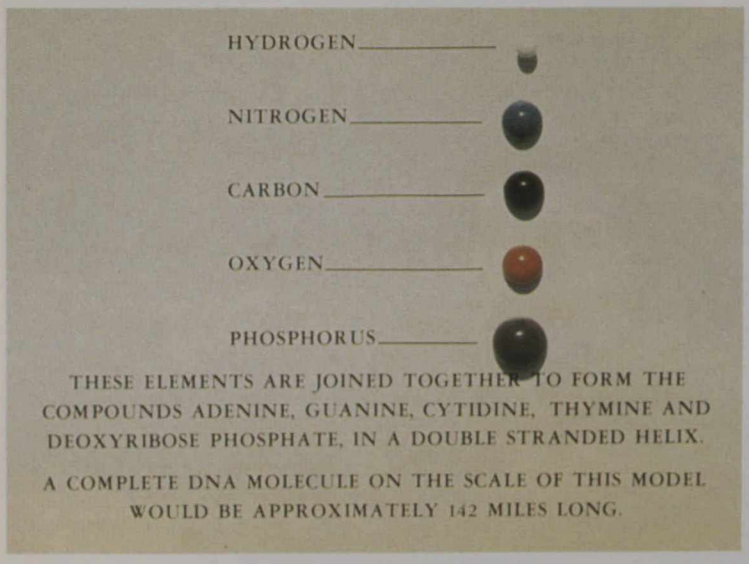
None of the problems seem insurmountable.

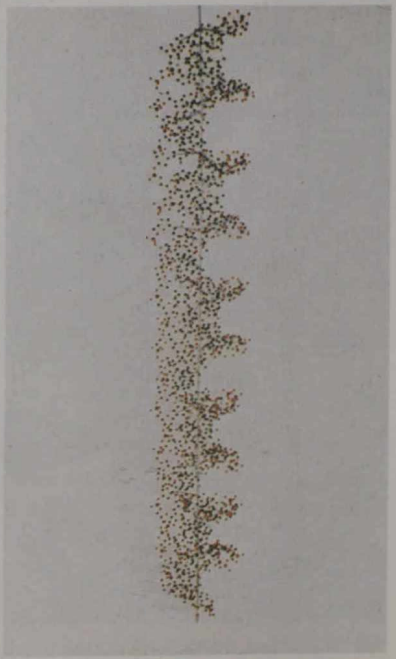
Basic Blueprints

The DNA double helix was identified some thirty years ago.

Current research on DNA, deoxyribonucleic acid, has produced a new understanding of cancer, and the secrets of cell structure have been unraveling with extraordinary speed.

The body has billions of cells, and each one contains five feet of tightly coiled DNA. If the strands in a single body were stretched and laid end to end, they would reach 400 times to the sun and back. Each strand has some 100,000 genes, and these include all the basic blueprints of the body. Particular cells use only the ones appropriate to their own function: red blood cells produce





The model at right represents a section of deoxyribonucleic acid, including all of its elements.