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CONTENTS

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The insulin gene
It's really a chemist's game

For certain kinds of diabetes, the problem may be one of communication. The information stored in the genes of certain pancreas cells fails to translate into another kind of molecular code that allows them to process sugar. That code, as every diabetic knows, is the protein hormone insulin.

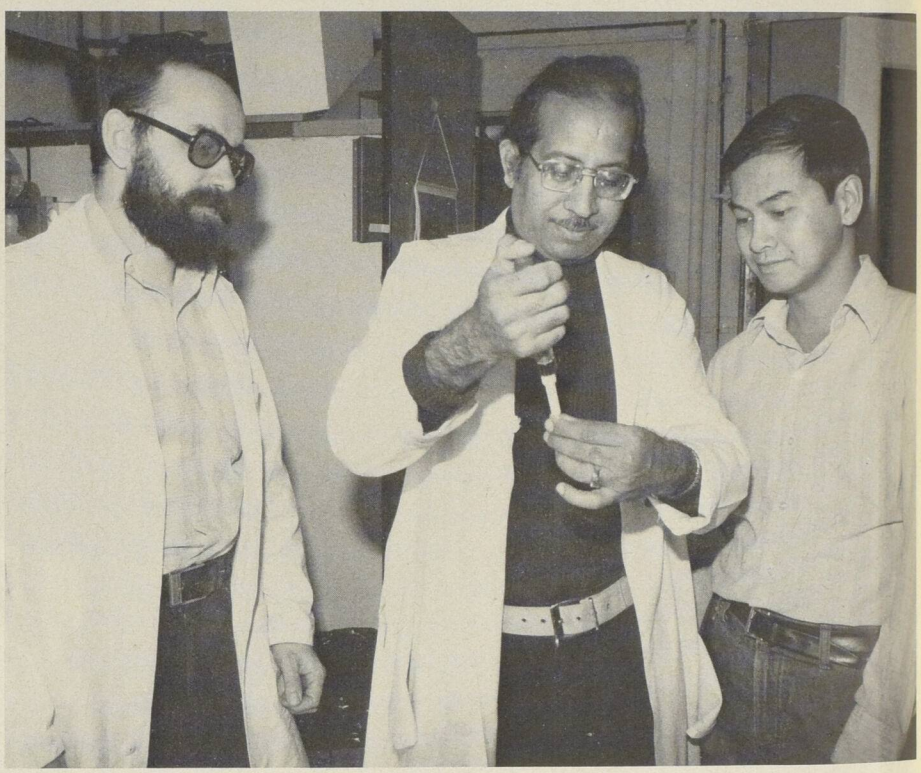
During the last decade, scientists have attempted to ameliorate the diabetic's lot through what are known as recombinant DNA or "genetic engineering" techniques in which human insulin is generated from a gene transcription system, but one lodged in bacterial cells rather than the human pancreas (this would free diabetics from reliance on animal insulins and the threat of a predicted scarcity in the near future). The idea has been to trick the bacterium by slipping the gene for human insulin into its works, thus diverting some of the microorganism's replicative energy toward the production of the vital human hormone. Reports mainly from America have made various claims to success in this endeavor during 1979, and recently an NRC-Cornell University team has come up with what could be the most advanced work yet in the highly competitive field.

Dr. Saran Narang, an NRC organic chemist, succeeded last December in synthesizing the gene for human proinsulin (a biological precursor of the active hormone measuring 86 amino acids in length). He then sent it off to his colleague Dr. Ray Wu in Ithaca, New York, where the Cornell microbiologist inserted it into the bacterium *E. coli* and showed that the microorganism replicated or "cloned" the foreign insulin gene. It remains now to prove that the modified bacterium carries the process to its end and translates the gene into the proinsulin protein. "When this gene expression takes place," says Dr. Narang, "then the resulting protein can be treated with enzymes outside the bacterium to give the functioning hormone insulin.

To produce the human insulin gene for cloning, scientists have, by and large, attempted to isolate it from the cell, a process fraught with difficulties. Narang, on the other hand, chose to build it from the ground up, assuring not only a better characterized product, but one whose ends were chemically "prepared" for insertion into a plasmid, the bacterial "cloning vehicle".

Narang's gene corresponding to the proinsulin molecule amounts to a DNA chain 279 base pairs in length (this includes necessary genetic "signals" along with the insulin code), ranking it as one of the largest structural genes yet synthesized. □

Wayne Campbell



NRC's gene builders: Joe Michniewicz, Saran Narang, Wing Sung. *(Photo: Bruce Kane, NRC)*

Les assembleurs de gènes du CNRC: Joe Michniewicz, Saran Narang, Wing Sung. *(Photo: Bruce Kane, CNRC)*