

Discovery

It has been generally assumed for decades that insulin was discovered, exclusively, by Banting, a surgeon, and Best, a medical student.

The legend was shaped by Paul De Kruif's best-selling book, *Men Against Death*, and it had villains as well as heroes. The major villain seemed to be Dr. Banting's boss, J.J.R. Macleod, the head of the physiology department at the University of Toronto, who was on vacation in Scotland the summer that Banting and Best did the vital work. Lesser villains included the Nobel Prize committee which gave its 1923 medical award to Banting and Macleod instead of Banting and Best.

Banting reacted to the award by publicly announcing that he would share his half of the award money with Best anyway. Macleod responded by sharing his with James B. Collip, a young biochemist who joined the research team some months after what was

assumed to be the significant summer.

Michael Bliss, an historian at the University of Toronto, has now published *The Discovery of Insulin*, which greatly changes the picture.

According to Bliss, Macleod had given Banting and Best detailed technical advice and explicit instructions before going to Scotland. When he returned and insisted on extensive further tests, Banting threatened to quit. He didn't, and Macleod put the entire laboratory staff to work on the project. Banting asked for the services of a skilled chemist, and Macleod assigned Collip. The next January a diabetic boy, Leonard Thompson, was given first an injection prepared by Banting and Best, which failed, and then one by Collip, which worked.

Bliss believes Banting and Best could not have "carried the work to a successful conclusion" without the aid of Macleod and Collip.

the globin protein for hemoglobin, pancreatic cells produce insulin.

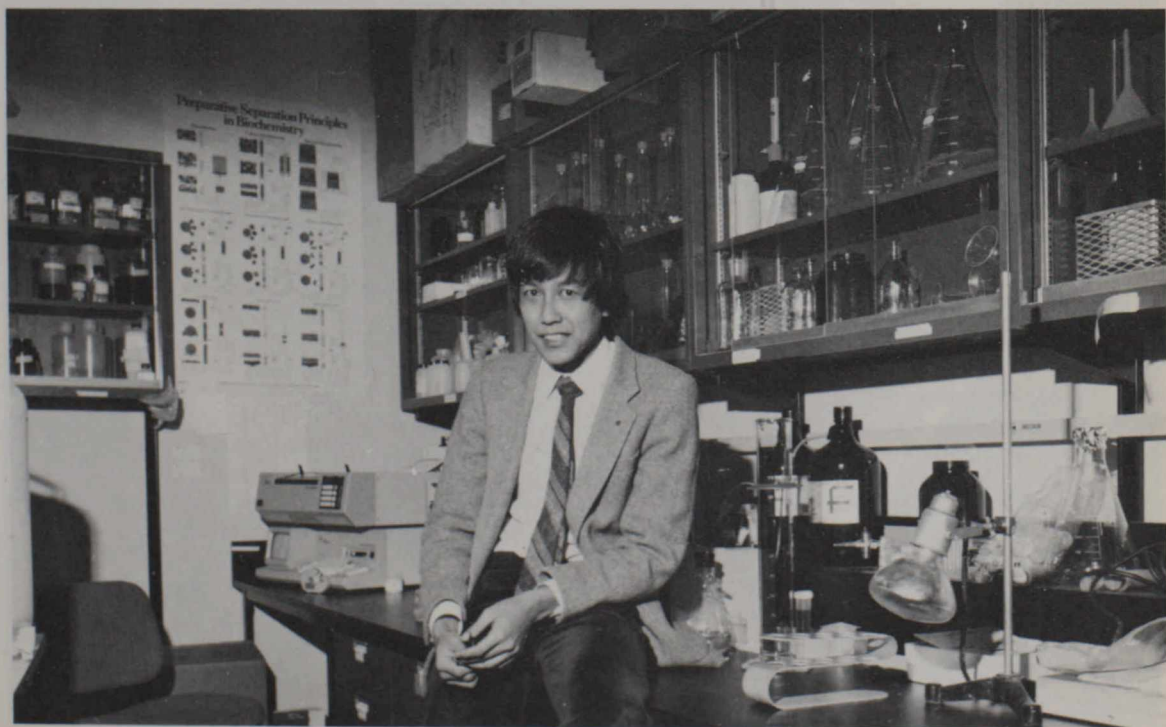
When the person is fully mature the genes stop growth, but some may be activated in a way that produces cancer.

There are more than a hundred diseases called cancer. All are believed to be caused by errors in the DNA. Some are inherited and a few are caused by viruses, but most result from damage to the DNA.

The body has its built-in defences—antigens,

proteins that attach themselves to the outside of damaged or diseased cells and to disease-causing intruders such as viruses and bacteria, and antibodies that seek out cells tagged by antigens. In combination with other kinds of cells, antibodies can help kill the damaged or diseased cells and the intruders. (The description here is greatly simplified. The immune system is complex, and its parts interact in ways that are not easily described.)

Scientists can now sometimes manufacture



Dr. Chris Tan, who has done pioneering work on interferon.