Once the CF gene is located, group members will attempt to identify the one or more mutations with the ''cystic fibrosis gene.'' Some researchers will look to discovering the steps needed to open or close the ''chloride pathway''; others will explore the consequences of cell membrane defects on other cell functions such as mucus production.

Until recently, scientists have been studying the symptoms of CF in the lungs, the pancreas, the sweat glands and working back towards some common denominator that triggers the malfunctions, but today CF genetics holds the prospect of an assault on the disease from an understanding of its cause — the basic genetic defect.

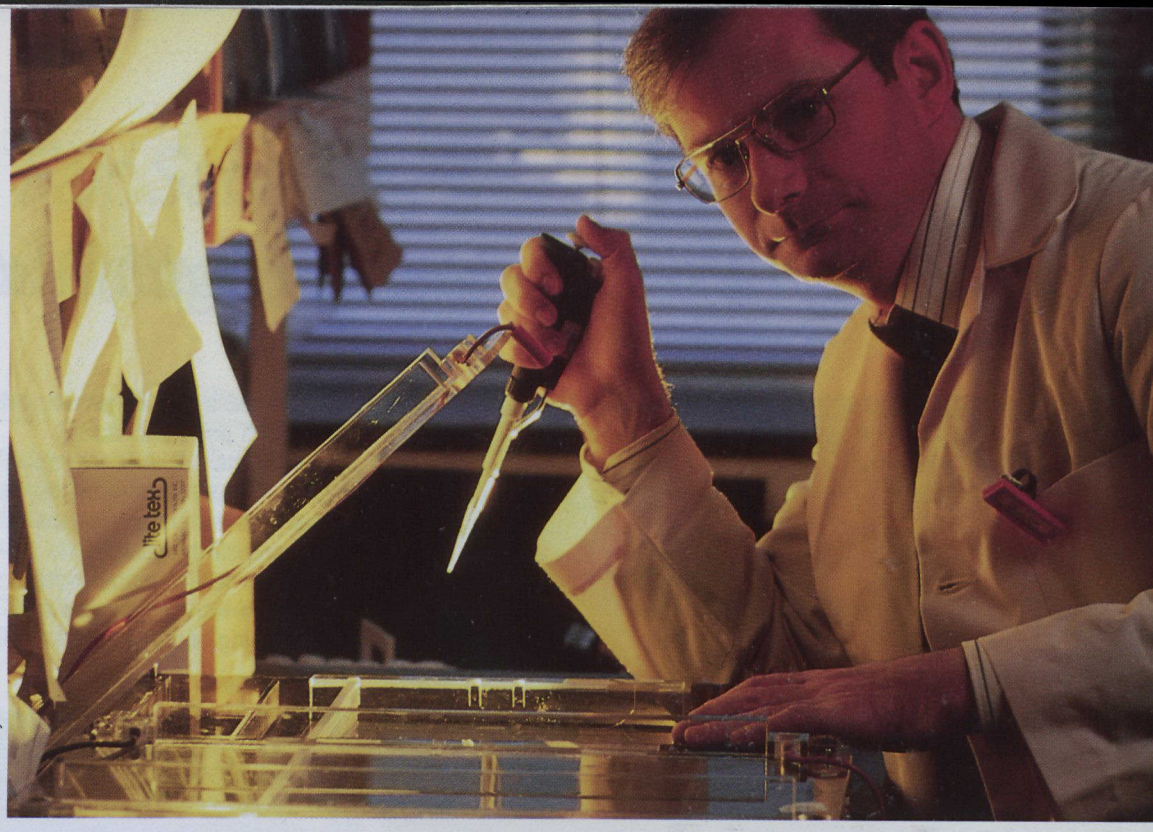

Photo: Henry Hilliard

The Mind's Make-up

Recently, a team of Canadian and U.S. scientists identified a new marker for the gene responsible for Huntington's disease — an inherited degenerative illness that leads to the involuntary movement of limbs, severe mental impairment and personality change. When found, the gene is expected to yield knowledge that could bring about improved treatment for the more than 2 500 Canadians who suffer from the illness.

The discovery of the marker has led researchers to develop a test that determines a person's susceptibility to Huntington's. The discovery has also led to the creation in Canada of the world's first national testing program for the disease.

''Until now, people have been unwitting partners in the transmission of this disorder to future offspring,'' says Dr. Michael Hayden of the University of British Columbia Health Science Centre where clinical trials were initiated. ''People will now be able to make informed decisions about whether they want to have children and risk passing the disease on to them.''

Meanwhile, the search goes on to locate the ''Huntington's gene.'' When found, it will be possible for scientists to determine what the defective gene does biochemically and what goes wrong as a result. Ultimately, the hope is that drugs can be developed to counteract the disfunctioning gene and stop the inexorable progress of the devastating disorder.

Dr. Peter St. George-Hyslop, a Canadian working at Boston's Massachusett's General Hospital, made another major genetic breakthrough in 1987 when he located the site of a gene that is involved in up to 30 per cent of inherited Alzheimer's cases. After studying inheritance patterns in four extended families, he and a team of researchers began looking for a genetic marker. They believed that the 21st chromosome was a good place to begin because victims of Down's syndrome — who have an extra copy of this chromosome — often manifest the same abnormalities as Alzheimer's patients.

After testing a number of markers on chromosome 21, last year the team located the area of the gene. Now they are searching for the specific gene that causes brain malfunctions in Alzheimer's patients.

Mental Illness: Decoding Its Secrets

In 1986, a study of one family by Vancouver psychiatrist Anne Bassett found startling similarities between two schizophrenic family members. The two men — an uncle and his nephew — shared strong physical resemblances, with both having wide-set eyes and short fourth toes. But most striking was the genetic similarity: both had an extra copy of part of the fifth chromosome located inside the first chromosome. Said Bassett: ''It was a complete surprise that they had the same chromosomal abnormality. It was a one-in-a-million chance.''

Prior to Dr. Bassett's finding, researchers who suspected a genetic cause of schizophrenia did not know where to begin looking. Since that time, however, this new genetic direction has given exciting promise to researchers in the field.

Dr. Peter St. George-Hyslop: a race to isolate the Alzheimer's gene and find a cure.

What the Future Holds

For all the progress that genetic research has made in the past decade, the field is still rich in mysteries. Admittedly, genetics may not hold all the answers for all diseases. Medical researchers, however, do believe that the field is a promising one as it assists them more and more in decoding the secrets of the human anatomy.

New genetic engineering techniques have produced the knowledge that many physical and mental illnesses are indeed the result of inherited characteristics passed from parent to child. And the pioneering work — much of which has been done by Canadians — has set off a wave of studies worldwide that are looking to identify the genes believed to be involved in such diseases as manic depression, muscular dystrophy, alcoholism, Parkinson's and some cancers. In very short order it should be known if the research has borne fruit.