

MASONIC MEDICAL RESEARCH LABORATORY

by: Ronald P. Kamp

Never in our history has there been a better time to get sick. From heart disease, cancer to AIDS, we are blessed today with an unprecedented number of drugs and techniques to fight disease. Discovery will continue because the tools at hand are more sophisticated than ever before. Just twenty years ago, people laughed at the idea of cataloging the 3 billion DNA base pairs in the human body. Today the human genome project is way ahead of schedule thanks to computers and new technology.

We are also on the threshold of new scientific wonders. the ability to introduce normal genes into the body to replace defective ones has almost limitless applications. The ability to grow tissue to repair damaged hearts, and other organs is mind boggling.

Scientists can now grow heart valves from human cells. The approach, called tissue engineering, is intended to create a fresh source of heart valves to replace those that wear out or are faulty from birth. Using the recipient's own cells it is hoped that the valve will grow as the patient grows. No longer will we use animal valves or mechanical valves that require blood thinning drugs to prevent clots. Hopefully, tissue engineering will be available for human use within five years.

Recent work at many research centers, the Masonic Medical Research Laboratory (MMRL) included, offer unprecedented opportunities for the development of major advances in the prevention, diagnosis and treatment of disease. Our contributions to medical research over the past 42 years have been very significant ones, providing benefits to peoples of all nations. However, they merely foreshadow what is to come.

The Masonic Medical Research Laboratory's history dates back to 1947 when the Masonic Grand Lodge of New York created the Masonic Foundation for Medical Research and Human Welfare, a not for profit corporation. Over the next seven years, the Fraternity raised and the Foundation allocated nearly \$1.5 million to research programs at various institutions dedicated to the elimination of rheumatic fever. Encouraged by their success in raising funds and in making a significant contribution to the eradication of this dreaded disease, the Fraternity sought a new challenge. In 1954, a decision was made by the Grand Lodge of New York to build and equip a medical laboratory that would carry the mantel of Freemasonry and be supported by the Masonic Fraternity. It was dedicated on the grounds of the Masonic Home in Utica, NY in 1958.

From those humble beginnings, the Masonic Medical Research Laboratory has developed into a world renowned research center, especially in the area of experimental cardiology. The chief sources of extramural support include the National Institutes of Health (NIH) and the American

Heart Association (AHA). Findings generated by the research programs at the Laboratory are published in the finest medical peer-reviewed scientific and medical journals worldwide.

The Masonic Fraternity's commitment in support of medical research has never waived. In 1994, the Grand Master of the Most Worshipful Grand Lodge of Florida designated the MMRL as his Grand Master's Charity. The Laboratory continued to be named the Grand Master's Charity of choice by every succeeding Grand Master. In 1997, the Grand Lodge of Florida passed historic legislation designating the Masonic Medical Research Laboratory as their permanent "Flagship Charity."

The Laboratory has played and continues to play a prominent role in providing valuable insight into many of the medical problems that afflict humankind. The Laboratory's achievements include research findings that have helped to form the foundation for the modern day practice of cardiology worldwide. Its scientific work in the field of experimental cardiology has received 7 international awards within the last three years, an achievement that is unprecedented for an institute its size.

Our Experimental Cardiologists have the capability of measuring voltage signals and ion currents in single heart cells. The knowledge gained from that single cardiac cell is translated into an understanding of the function of the heart as a whole. The information acquired is then applied to help physicians make better use of diagnostic tools such as the ECG.

Studies are underway to define the cellular basis for the different waves found in the electrocardiogram (ECG). Our Cardiology team recently published a paper dealing with the cellular basis for the J wave that appeared in the journal *Circulation*. This work has led to the development of a model that may explain why some apparently normal people experience sudden cardiac death.

Two papers dealing with the characteristics of the M cells, discovered at the Laboratory, and cellular basis for the T wave of the ECG in health and disease appeared in the November, 1998 issue of the prestigious scientific journal, *Circulation*. These articles are perhaps the most important ever published by the MMRL. Both papers were selected as finalists in two separate international research award competitions. Accompanying those papers was an article by Dr. J. Willis Hurst, one of the fathers of modern day electrocardiography. In that article Dr. Hurst said, "The spectacular work of Dr. Charles Antzelevitch, MMRL Executive Director, and his coworkers should be reviewed by every clinician who uses the ECG as a diagnostic tool." Very high praise indeed from a world authority.

Defining the basic, clinical and genetic aspects of a recently highlighted form of sudden death known as idiopathic ventricular fibrillation and the Brugada Syndrome are a high priority of the MMRL. Working together with scientists at Baylor College School of Medicine, our scientists recently discovered the first gene defect responsible for the Brugada syndrome. The finding was published in March, 1998 in one of the most widely circulated scientific journals, *Nature*.

MMRL scientists have recently demonstrated the cellular basis for the effects of the sympathetic nervous system in a hereditary disease of the heart known as the long QT syndrome. The

mechanism for this has escaped the grasp of scientists for over 30 years, until now. Our scientists have developed experimental models of several forms of the long QT syndrome and have used these models to assess the protective effect of various drugs. Based on these findings, we have provided alternatives to the current treatment strategies and have shown that use of beta blockers (standard treatment) may be problematic in one genetic form of the disease. Clinical trials are already underway to examine whether these findings apply to humans.

Another major area of concentration are studies designed to probe the basis for Sudden Infant Death Syndrome (SIDS). The specific causes of sudden infant death syndrome (SIDS) have eluded scientists and physicians for many years. Respiratory problems, infectious diseases and cardiovascular defects have long been suspected. Although a congenital defect of the heart known as the long QT syndrome has long been implicated, definitive evidence has been lacking. The first direct evidence linking SIDS to a congenital heart defect associated with a life-threatening abnormal heart rhythm appeared in the July, 2000 issue of the *New England Journal of Medicine*. The report is the result of a collaboration between investigators at the University of Pavia in Pavia, Italy and the Masonic Medical Research Laboratory.

Our molecular biologists are also working at the Laboratory to probe the basis of electrical heterogeneity or differences within the heart (work pioneered at the MMRL) at the genetic level. We have recently demonstrated heterogeneity exists in the genetic material of cells in different parts of the heart, indicating that the electrical differences that our Laboratory has described over the past decade are controlled at the level of the genetic code. This information will hopefully permit the design of better and more rational treatments and cures to a variety of cardiac diseases.

These are indeed exciting times for science and medicine. The Masonic Medical Research Laboratory has come far thanks to the support of Masons everywhere, especially in New York and Florida. Our achievements and accomplishments are a direct result of the wonderful support that we have been privileged to receive, especially in the form of wills and bequests from friends throughout the world.

Millions of Americans and citizens of other countries have benefited from the research conducted at the MMRL and at similar research facilities worldwide. The need to intensify support of medical research is undeniable if we acknowledge a responsibility to leave, as a legacy to our children and grandchildren the prospect for a healthier life, one free of pain and suffering that many of us have endured. It is our hope that dissemination of the Laboratory's achievements will help foster pride in our great Fraternity and makes the light of Masonry shine brighter than ever before.