HEN SUNE BERGSTROM died in 2004 at the age of eighty-eight, the world lost one of its greatest scientists, humanitarians, and leaders in global health. Few scientists of his distinction in basic research have so broadened their scope as to affect the health and well-being of humanity.

Bergstrom shared the 1982 Nobel Prize for Physiology or Medicine with Bengt Samuelsson of the Karolinska Institute in Stockholm and John Vane of the Wellcome Laboratories in Britain for the discovery of the structures and functions of a chemical family called prostaglandins. They have many functions throughout the body.

Prostaglandins and drugs derived from them have since become widely used in birth control, abortions, controlling pain, preventing blood clots, preventing and healing peptic ulcers, and other applications—including the mechanism of action of aspirin in relieving pain.

Prostaglandins were discovered in 1936 by the eminent Swedish pharmacologist Ulf von Euler, who observed their activity in seminal fluid from a variety of species, including humans. In 1945, von Euler, recognizing Bergstrom’s exceptional ability, gave a sample of seminal fluid to Bergstrom, then a young biochemist at the Karolinska, and suggested he explore the prostaglandins. Bergstrom and his students purified two major forms, called prostaglandin E and prostaglandin F, and demonstrated how they are produced in the body from unsaturated fatty acids. They also discovered that the hormones are not stored but are produced by tissues throughout the body for use as needed, suggesting their pervasive importance in human physiology.

They showed that prostaglandins are hormone-like agents involved in many processes that cause inflammation after an injury or illness, affect the flexibility of blood vessels, regulate contractions of the uterus, help to clot blood, and influence other activities. However, prostaglandins differ from hormones in that they act locally, near their site of production, and are metabolized very rapidly. Another unusual feature is that the same prostaglandins act differently in different tissues.

The prostaglandins are also unusual in that they come in pairs with opposite activities. One prostaglandin, for example, causes smooth muscles to contract, while another causes them to dilate. One causes blood platelets to clot; another prevents them from clotting.

These discoveries opened the way for new approaches to heart disease, strokes, and peptic ulcers. Moreover, it made possible the development of a morning-after pill as well as prostaglandin-inhibiting compounds that relieve pain caused by menstruation, gallstones, and kidney stones.

Once the initial discoveries were solid, Bergstrom gradually shifted
his focus to the therapeutic and preventive uses of prostaglandins in human health and disease—e.g., of prostaglandins in birth control in developing countries under severe population pressure. He paid special attention to India over many years.

These interests led Bergstrom into the areas of tropical diseases and problems of nutrition as well as population. For five years he was a dynamic, far-sighted chairman of the World Health Organization’s Advisory Committee on Medical Research. In that role, he creatively fostered networks of scientists working on the health problems of developing countries. He was recognized in the biomedical and public health communities throughout the world as a great leader.

Sune Bergstrom was born in Stockholm and studied at the Karolinska Institute, a great center of biomedical research, then and now. But Bergstrom’s mentor, Jorges, was concerned about the lack of research on lipids or steroids in Sweden at that time. So he financed a trip for Bergstrom to Britain in 1938 to work on bile acids with Haslewood in an excellent laboratory at Hammersmith postgraduate medical school in London.

The following year, Bergstrom received a fellowship from the British Council to work in Edinburgh, which was canceled when World War II broke out. He responded to this disappointment by getting a Swedish-American fellowship to work at Columbia University and at the Squibb Institute in New Jersey, studying for two years the chemistry of cholesterol. He then returned to Sweden and developed new techniques of introducing radioactive atoms into cholesterol to study its activity. This is when von Euler’s wise suggestion led to Bergstrom’s prostaglandin discoveries.

The post–World War II period was one of great promise for biomedical research—nowhere more so than in Sweden and the United States. Interest grew, institutions were created, unprecedented financial support became available. Bergstrom, with scientific excellence and a strong sense of social responsibility, was a leader in these developments. There was a large build-up of resources for basic biomedical research at the Swedish universities. The Swedish Medical Research Council was also started. Concomitantly, in the following decade the National Institutes of Health (NIH) in the United States undertook what Bergstrom considered a far-sighted, unique international program of support of biomedical research. His laboratory received sizable grants for work in steroid and bile acid metabolism from NIH for a number of years.

He was always generous in providing support and giving credit to his graduate students who were trained in these fields—Bengt Borgstrom,
Jan Sjovall, Sven Lindstedt, Henry Danielsson, Bengt Samuelsson, and Rolf Blomstrand. They all contributed to the early prostaglandin development that went on in the 1950s. A decisive role in the prostaglandin work was the mass spectrometer development that Dr. Ragnar Ryhage was doing at Karolinska. He built the first instrument combining a gas chromatograph and a mass spectrometer.

The supply situation became critical around 1970 when prostaglandins were needed for clinical work before large-scale total syntheses had been developed. For several years the Upjohn Company isolated these prostaglandins from corals, which they transformed into supplies for clinical trials. From 1973 onward, the supplies have been prepared by total synthesis.

Many pharmaceutical companies had become interested in the field, and large synthetic programs to make prostaglandin analogues were started. These synthetic efforts were informed by the knowledge of the metabolism of prostaglandins that was accumulated in Stockholm. By now, more than five thousand prostaglandin analogues have been prepared and tested, for example, to get compounds with longer-lasting or more specific actions. There is no telling how many useful applications of this work will become available in the years ahead.

Bergstrom’s productivity was enhanced by a remarkably stimulating and generous mode of collaboration—on an international basis; for example, in the 1960s with Drs. Daniel Steinberg, Martha Vaughan, and Jack Orloff at the National Institutes of Health. In the 1970s and 1980s, in the WHO global health research context, he worked with Halfdan Mahler, Joshua Lederberg, Gus Nossal, John Evans, V. Ramalingaswami, and A. O. Lucas, among others. All of that reflects his wide-ranging intellectual curiosity and respect for other people and cultures—and an aversion to human suffering.

In his Nobel Lecture, Bergstrom relates an interesting episode of much practical importance.

At that time an important development was initiated by SIDA (the Swedish International Development Authority). In the sixties they had become heavily involved in supporting family planning in many developing countries. However, they found that the methods available left much to be desired and therefore were considering how best to stimulate and support research and development in the field.

The Director, Mr. Ernst Michanek, and Mr. Carl Wahren had developed advanced plans to start an international research foundation located here at the Karolinska for this purpose. However, for various reasons, it was decided to make a feasibility study of an alternative arrangement together with the Ford Foundation and WHO, in
which I had the honor to participate. This resulted in the creation of 
WHO's “Special Programme” for research on human reproduction in 
1971–72. The work should be focused on the needs of developing 
countries. The voluntary contributions to the program soon exceeded 
ten million US dollars annually of which more than half were pro-
vided from Swedish sources during the seventies.

One of the “Task Forces” of the program was devoted to explor-
ing the potential of the prostaglandins to interrupt pregnancy. During 
the first five years I had the stimulating assignment as chairman of this 
group of outstanding experts. The exploratory work done at the 
Karolinska and by Dr. Sultan Karim’s group formed the basis for 
large international coordinated clinical trials.

The most important new development has been the interruption 
of pregnancy during the “postconceptional” period, i.e., the first three 
weeks after a missed menstrual period.

Bergstrom concludes his Nobel Lecture with a characteristic state-
ment of this world citizen.

The traditional boundaries between various fields of science are rap-
idly disappearing and what is more important science does not know 
any national borders.

The scientists of the world are forming an invisible network with 
a very free flow of scientific information—a freedom accepted by the 
countries of the world irrespective of political systems or religions. . . .

A scientist cannot do anything that is not checked and rechecked 
by scientists of this network before it is accepted.

The scientists have come closest to creating the “open world” 
that Danish Nobel laureate Niels Bohr described as a prerequisite for 
a peaceful development in his famous letter to the United Nations in 
1950.

A promising development in this direction in the UN system is the 
involvement of thousands of biomedical scientists in the research 
work on the main health problems facing the world.

Bergstrom helped greatly to establish worldwide networks of scien-
tists working on health problems of developing countries; many of 
these scientists participated in such work in large part because of Berg-
strom’s inspirational leadership. When he stepped down from the 
chairmanship of the World Health Organization Advisory Committee 
on Medical Research, there was a spontaneous demonstration of afect-
tion; speakers from all over the world—few of whom knew much about 
prostaglandins—spoke of Bergstrom’s dedication, generosity, wisdom, 
and inspirational leadership.

Those of us fortunate enough to be his friends will never forget his 
low-key, highly professional curiosity, stimulation, profound encour-
agement, and unfailing kindness. His legacy in basic science, medicine, public health, and international relations must endure.

Elected 1984

DAVID A. HAMBURG
President Emeritus
Carnegie Corporation of New York
DeWitt Wallace Distinguished Scholar
Weill Medical College, Cornell University