

The University of Minnesota's Hormel Institute

The first 66 years of a unique scientific enterprise

By Harald H. O. Schmid

The Hormel Institute owes its existence to the curiosity and foresight of one man – Jay C. Hormel, long-time president and CEO of Geo. A. Hormel & Co. (now Hormel Foods Corp.). Jay Hormel was a visionary who realized that mankind's progress is largely based on scientific discoveries. Hence, when he established The Hormel Foundation he resolved that part of the Foundation's income should be used for scientific research, to be carried out locally. With that philosophy, the Hormel Institute was established on November 20, 1942, when The Hormel Foundation and the Regents of the University of Minnesota entered into an agreement to operate a biological research laboratory in the small town of Austin, Minnesota.

Humble beginnings and the development of a research theme

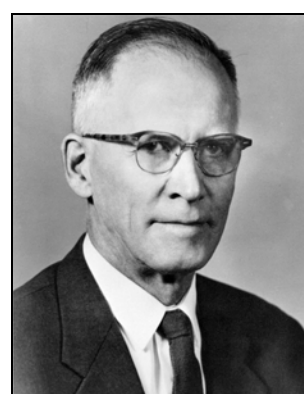
The first work was done on the main campus of the University of Minnesota under H. O. Halvorson, a prominent professor in the University's Department of Bacteriology, who had served as an advisor to Jay Hormel on food stability. He became the Hormel Institute's first Executive Director. Another "founding father" was Theodore C. Blegen, Dean of the University's Graduate School, who served as the chairman of the Hormel Institute's Board of Directors at the time it was founded, remained in that position for 17 years and had a major influence on its early development. Other members of the original Institute Board included C. H. Bailey, Dean and Director of the University's Department of Agriculture; R. P. Crane of The Hormel Foundation; F. C. Mann, Professor of Experimental Surgery at the Mayo Foundation; and Walter M. Lauer, Professor of Organic Chemistry at the University.



Hormel



Blegen



Halvorson

The composition of the five-member Board of Directors, representing the University administration, as well as science, medicine, agriculture and The Hormel Foundation, worked well at the beginning and, with minor changes, remained in place throughout the Institute's history. In later developments, the Dean of the Graduate School also became the University's Vice President for Research and, as the Institute's agricultural emphasis decreased, its representative was replaced with a Board member representing biochemistry/molecular biology.

This organization assured that the Institute became and remained an independent research unit of the University of Minnesota's graduate school, with all Institute faculty and staff employed by the University and all University rules and regulations applicable to the Institute. However, the University never assumed financial responsibility and did not grant University tenure to Institute faculty. Initially, all operational costs were provided by The Hormel Foundation, but it was agreed that "gifts, grants and donations from other sources" would be accepted, "when such funds are in support of the purposes of the Institute, and when by their acceptance the Institute can render valuable service."

Once the organization was in place, Halvorson began to recruit scientists at the University's main campus in Minneapolis and St. Paul. Areas of interest at that time were the nutritional values of different foods, methods of food preservation, and various agricultural projects, such as measurements of soil composition and the proper use of fertilizers. While these projects were underway, laboratories were being installed in the horse stables of the Hormel family's country estate outside of Austin. Jacques R. Chipault was the first to arrive, early in 1944, to begin work in a laboratory encompassing a total of 400 square feet.



The Hormel Institute began in the stables of the Hormel family estate

As Chipault was finishing his Ph.D. thesis, Halvorson recruited Walter O. Lundberg to serve as Resident Director in Austin, supervising the local developments and the Institute's expansion. Lundberg was a physical chemist with an interest in the mechanisms of autoxidation, and both he and Chipault began a multi-year program of investigating the use of antioxidants to enhance food stability. This work was not only of great interest to Jay Hormel and The Hormel Foundation, but attracted financial support from other sources, including the U.S. Army quartermaster.

At the time, the Second World War was still underway, refrigeration was not always available, and food preservation was of high priority. Indirectly, the targets of autoxidation processes, namely unsaturated fats, became an Institute research interest for many decades to come.

Other early projects concerned studies of the nutritional requirements of swine and of various swine diseases, including salmonella infections. These experiments used The Hormel Foundation's swine herd, held in a separate barn. Later, a breeding program aimed at the production of a miniature pig for medical research was initiated under the general supervision of W. E. Rempel, a veterinarian at the University's Department of Animal Sciences in St. Paul. New investigators and technical assistants were added, as horses were replaced and new laboratory space became available. Early project leaders, in addition to Lundberg and Chipault, included H. M. Tsuchiya, L. E. Carpenter and G. A. Young.



Lundberg

By the mid 1940s, several additional laboratories were constructed in the main building, a library was installed in the former hayloft, and office space was created. Institute faculty began to teach on the main campus, several graduate students carried out research at the Institute and postdoctoral fellows began to arrive, including Orville S. Privett, who stayed on as a faculty member. A collaborative project between the Institute and the Mayo Foundation (in nearby Rochester, Minnesota) on lipid metabolism in humans was initiated. Also, Institute faculty began to make purified lipids available to the scientific community, a program later formalized as the Institute's Lipids Preparation Project. By 1950, Professor Halvorson had left the Institute and the University to become chairman of the Department of Bacteriology at the University of Illinois, Walter Lundberg became Executive Director and the Institute faculty and staff had grown to 28.

The Hormel Institute becomes a major lipid research center

Although "fats and other lipids" were among the early research interests of the Hormel Institute, progress was severely limited by the lack of suitable analytical methods. This would change significantly in the ensuing years. By the early 1950s, several of the early project leaders had left the Institute, and Ralph T. Holman and Hermann Schlenk were recruited from Texas A&M University. Both were established scientists with international experience, and their arrival had a major impact on the Institute's further development. Holman, a native Minnesotan, had worked with George O. Burr, the discoverer of "essential" fatty acids at the Minneapolis campus of the University and later with the Nobel Laureate Arne Tiselius in Sweden. Schlenk, the son of a prominent German Professor of Organic Chemistry, had studied with the Nobel Laureate Heinrich Wieland in Germany, before emigrating to the United States shortly after the Second World War. Working together with Lundberg, Chipault and Privett, they transformed the Hormel Institute's research in a way that attracted national and international attention.

Holman expanded his earlier work on essential fatty acids by defining physiological and biochemical deficiencies when such unsaturated fatty acids were withheld from the diet. He

determined their minimal dietary requirements for animals and man and, perhaps most importantly, he embarked on a major project defining their metabolism and interconversion. It became clear that such interconversions could occur only within certain “families” of polyunsaturated fatty acids, which were defined by the position of their first double bonds, counting from the end of the hydrocarbon chain. For these families he coined the terms “omega-3” and “omega-6” fatty acids (omega being the last letter of the Greek alphabet). These terms became widely popular in the press and the general public, even though they were never officially accepted by scientific nomenclature commissions.

Schlenk began the chemical synthesis of pure glycerides, which made it possible to introduce radioactive carbon atoms (carbon-14) at specific positions of the molecules. Later he used algae, grown in an atmosphere of radioactive carbon dioxide, to obtain some of the first radioisotope-labeled fatty acids. These projects required the development of new methods of chemical degradation and derivatisation, as well as chromatographic separation techniques.

A major success was the application of thin-layer chromatography (TLC) to lipid research. Helmut K. Mangold, who had joined Schlenk’s group during the work on the preparation of labeled fatty acids, obtained the new TLC equipment in Germany and pioneered the technique's development. TLC had been developed for the analysis of water soluble plant constituents, but had never been applied to lipids. However, this technique soon became the standard method of lipid fractionation and analysis, first at the Hormel Institute and then worldwide.

By that time the entire former horse barn had been converted to laboratories and new space for the chemical and radioisotope studies had to be found in the former chicken house, a separate building on the Hormel estate. Work with radioisotopes was new during the 1950s and required special training offered in Oak Ridge, Tennessee, site of the Manhattan Project. Although the chemical and biological work involved only low-energy isotopes, all such knowledge was officially restricted to American citizens. Because many of the scientists arriving in the U.S. from abroad were visitors or immigrants, Oak Ridge administrators arranged to make them “honorary citizens” of Tennessee, and the Hormel Institute thus helped to create quite a few of them.

During the late 1950s, the biological sciences in the United States grew at a rapid pace. Research grants from the National Institutes of Health (NIH) had grown from 4 million dollars per year in 1947 to 100 million in 1957, the so-called “golden years,” and the Hormel Institute soon participated in this growth. Also, in October of 1957 the Soviet Union launched Sputnik, starting the race into space and convincing the U. S. Congress to further increase support for science and education. Already by the mid-1950s more than one half of the Institute’s financial support came from outside sources, including various U. S. government agencies, and increasing support came from the NIH.

Commercial development of sophisticated instruments thrived and the Institute soon obtained early versions of infrared spectrophotometers and the first gas-chromatographs, which allowed the rapid separation of fatty acids and other volatile lipid components in minute amounts. The seminar program attracted prominent scientists from the United States and foreign countries, Lundberg and Holman, together with T. Malkin of the University of Bristol, U. K., founded a series of publications “Progress in the Chemistry of Fats and Other Lipids,” later renamed “Progress in Lipid Research,” and Mangold became a founding editor of the journal “Chemistry and Physics of Lipids”.

Breakthroughs in lipid analysis also attracted increasing numbers of postdoctoral fellows and this trend would accelerate in the following years. Although useable space at the Institute had increased from the initial 400 square feet to about 12,000 (not counting animal barns), further expansion was impossible without a new laboratory building. Such a building, located near the Hormel plant and corporate offices, was approved in 1958, financed in equal parts by the Hormel Foundation and NIH, and opened in June 1960.

Thus began a highly productive period in the Institute's history. At that time, most of the Institute's work was in the general area of lipid chemistry and the development of analytical methods. Hence, the new building consisted largely of a series of chemical laboratories, plus faculty offices, a business office and a library/seminar room. Progress in chemical and analytical techniques led rapidly to pioneering work on lipid metabolism in experimental animals and plants, and later in cultured cells.



In 1960 the Hormel Institute opened a new building in northeast Austin

This was also a time of increasing outreach to the scientific community. Both Mangold and Privett lectured extensively on TLC and other chromatographic techniques; Privett even produced two instructional movies ("TLC" and "Microanalytical Techniques") that found worldwide use. Institute faculty began to serve on various advisory councils, including the National Research Council, National Science Foundation and NIH, and they reported their work regularly at the annual meetings of the American Oil Chemists' Society (AOCS). Lundberg edited a two volume book "Autoxidation and Antioxidants" and became AOCS President in 1963. Later, he received the Society's lipid chemistry award and, when AOCS launched the scientific journal "Lipids," he became its editor.

Meanwhile, Holman and others participated in the public discussion about the nutritional and health effects of saturated *versus* unsaturated dietary fats, an approach that was later refined to the comparative effects of omega-3 *versus* omega-6 fatty acids. Institute publications received great attention and papers by Holman, Schlenk and Mangold became "citation classics." Perhaps most importantly, the National Heart Institute of the NIH (later the National Heart, Lung and Blood Institute, NHLBI) awarded the Institute a Program Project Grant (PPG) which, starting in 1965, provided major financial support to the Institute. Although the aim of the program was the understanding, prevention and potential cure of atherosclerosis, a better knowledge of lipid metabolism in general was considered to be of crucial importance. Hence, work on lipids in

plants, fish and microorganisms, as well as in mammals, was supported from this source. By 1965 the Hormel Institute employed over 100 people, including many part-time students involved in routine work with animals and in data handling (before the advent of automated instruments).

Throughout its history the Hormel Institute maintained an international atmosphere by the presence of postdoctoral fellows who spent two or more years there. As soon as the lipid research theme was established in the late 1950s, postdocs from Germany, France, Denmark, England, Switzerland and Spain began to arrive, and this trend was greatly accelerated when the new building became available in 1960. In addition to the United States and Canada, postdocs also came from Austria, Israel, Norway, Sweden, Scotland, Italy, Mexico, New Zealand, Argentina, Brazil, Egypt, India, Japan, and later from Korea, Poland, Hungary, Finland, Russia and China. In 1965, there were 17 postdoctoral fellows from 9 different countries working at the Institute. Most continued their scientific careers in academia or industry and several became leaders in the ever broadening lipid field. These include Howard Sprecher, V. Natarajan and S. Parthasarathy in the United States; Yves Marcel in Canada; William Christie in Scotland; Zvi Selinger in Israel; and Fritz Spener in Germany.

Other postdoctoral fellows, such as Wolfgang J. Baumann and myself, chose to remain at the Institute, when we were able to attract research grant support and were invited to join the regular faculty. I had joined Mangold's laboratory in 1962 and received my first NIH grant and my own laboratory in 1965. These two faculty additions strengthened the chemical/analytical aspects of the overall program, including new projects on the structure, metabolism and physiological significance of trace lipid constituents. Later work in my own laboratory focused on lipid-mediated cell signaling, including the role of "endocannabinoids." The Institute's chemical expertise was balanced by the recruitment of Howard M. Jenkin, a microbiologist previously at the University of Chicago, who set up a modern cell culture laboratory in a special building attached to the main laboratory building. Other modifications of the main building included walk-in cold rooms, and the construction of a mass-spectrometry laboratory (Holman) in the basement. Later, when Howard L. Brockman was recruited to study lipid-protein interactions at interfaces, another basement area was converted to a biophysics laboratory to provide a clean, vibration-free environment for his surface balances.

Throughout the 1960s and early 1970s, the original Institute buildings on the Hormel estate were used primarily for the Lipids Preparation Project, under the direction of O. S. Privett, and for the miniature pig breeding project. However, the breeding project did not become financially self-supporting and the two employees carrying out the lipids preparation work, Lowell Nutter and John Nadenicek, resigned to found Nu-Chek-Prep, Inc. as a commercial enterprise. Also, H. K. Mangold left the Institute in 1969 to accept a position as Director of the H. P. Kaufmann Institute at the Federal Center for Fat Research in Muenster, Germany.

As the Hormel Institute had grown and developed largely by the initiative and ingenuity of its faculty, organizational weaknesses began to appear, which led to a series of financial problems, beginning around 1970. In addition to the uncertainty of federal grant support, financial support from The Hormel Foundation had become uncertain as well, because of the appearance of other local clients and charities, and the University continued to claim a portion of Indirect Cost Recovery (ICR) funds from Institute grants for administration and other services.

Also, Lundberg's health was failing and much responsibility rested with Hermann Schlenk as Assistant Director, who served in that capacity until Lundberg's retirement in 1974, and then became Acting Director. During that time the financial problems were resolved by convincing The Hormel Foundation to provide annually a fixed percentage of their distributable income to the Institute, by persuading the University to return all ICR funds to the Institute, and by working with local legislators to obtain a State Special appropriation to the Institute, later incorporated into the University's State appropriation.



Schlenk

Leadership changes and development of new programs

After conducting a worldwide search the Board appointed Ralph Holman in 1975 as the new Executive Director for an initial 5-year period. Also, the Board asked Hermann Schlenk to chair an Institute committee charged with the writing of a Hormel Institute Constitution. The search for a new Director had highlighted the fact that Institute faculty had no job security beyond the one-year, renewable, appointments given by the University to temporary academic employees. In contrast, laboratory technicians were University civil service employees, protected by seniority rules. Because virtually all University departments offered lifetime tenure to regular faculty members at that time, it was feared that the Institute could not be successful in recruiting and retaining highly qualified faculty.

The new Constitution tried to address this problem by creating "Hormel Institute tenure" for all faculty in the rank of Associate Professor and Professor, based on the assumption that income from both The Hormel Foundation and the NIH Program Project Grant would continue to be available in increasing amounts indefinitely. Other provisions attempted to make sure that faculty members and representatives of other Institute stakeholders were to be kept informed about the Director's decisions regarding finances, hiring and other matters of common interest. As expected, the new Constitution was greeted with enthusiasm by Institute faculty and staff, approved by the Board, but never accepted by the University due to its conflict with University tenure rules.

Nevertheless, enthusiasm and cooperation remained high for many years, and scientific and financial success remained high as well. The Lipids Preparation Project was terminated, the Miniature Pig (PIGmeePIG) Program was transferred to the University of Missouri, all work in the original laboratory was terminated and the buildings were returned to The Hormel Foundation. Several laboratories were created in the new building, both on the main floor and in the basement, in preparation for new programs. A guest professor program was initiated, which

brought prominent scientists to the Institute for several weeks or months at a time. During Holman's first year as Director the Institute's budget exceeded \$1.6 million, derived primarily from individual NIH research grants, the Program Project grant and The Hormel Foundation.

Overall, the Institute's research programs became more diversified and sophisticated. Douglas R. Pfeiffer was recruited from the University of Wisconsin's Enzyme Institute to initiate a program on mitochondrial metabolism and function. This program expansion was funded by a supplement to the PPG, which also provided a number of major instruments, including an NMR spectrometer, gas-chromatograph/mass spectrometer, as well as fluorescence, atomic absorption and infrared spectrometers.



Holman

Three Institute faculty members (Holman, Schmid, Baumann) were invited to become co-investigators of a new, NIH-funded, Mayo Peripheral Neuropathy Clinical Research Center, organized and headed by Peter J. Dyck, professor of neurology at Mayo Clinic. This represented the first long-range, funded collaboration between the two institutions. Also, an NHLBI Training grant, organized and written by Brockman, supported an additional four postdoctoral positions under Holman's overall direction.

By the late 1970s, the Institute was comprised of nine independent Sections, headed by regular faculty: Agricultural and Food Chemistry (J. R. Chipault), Analytical Biochemistry (O. S. Privett), Bioenergetics (D. R. Pfeiffer), Biophysics (H. L. Brockman), Microbiology (H. M. Jenkin), Natural Products Chemistry (H. Schlenk), Nutritional Biochemistry (R. T. Holman), Organic Chemistry (W. J. Baumann) and Physiological Chemistry (H. H. O. Schmid).

During these years, senior Institute faculty still interacted closely with the American Oil Chemists' Society. Like Lundberg, Holman had been AOCS President and, upon Lundberg's retirement, became editor of the Society's journal, *Lipids*. He won the Society's Lipid Chemistry Award in 1978. In 1980 Holman organized and chaired a "Golden Jubilee" International Congress on Essential Fatty Acids and Prostaglandins at the University's main campus in Minneapolis. Guests of honor were George O. Burr who had discovered essential fatty acids in 1929/30 and Ulf S. von Euler, who had discovered prostaglandins in 1935/36. Also in 1980, Holman was elected to membership in the U. S. National Academy of Sciences. Perhaps most importantly for the Institute, Holman was able to convince Minnesota Governor Rudy Perpich and key State legislators to fund a large new animal research building, providing laminar flow ultrafiltered ventilation. This made it possible to continue and expand research on animals, including nutritional studies. In 1982, Margot P. Cleary was recruited to head a new section, Nutrition and Metabolism, to study obesity, a public health problem of increasing importance. By

that time, the basement area of the new animal research building had been transformed into several modern biological laboratories, instrument rooms, walk-in cold rooms and faculty offices.

As the Hormel Institute celebrated its 40th birthday in 1982, it had expanded and consolidated its research programs to address the role of complex lipids in membranes and their alterations in disease. It had employed a total of 164 postdoctoral fellows and well over 200 high school and undergraduate college students. The latter program was later formalized as the Summer Undergraduate Research Experience (SURE) program, which still attracts applicants from various area colleges to carry out research projects with Institute faculty. The Institute also added a third editorial office, when I became co-managing editor, together with Fritz Paltauf of the Technical University of Graz, Austria, of the Elsevier journal “Chemistry and Physics of Lipids.”

Both Holman’s appointment as Executive Director and the Program Project Grant were renewed in 1980 for another 5-year period, and this major grant supported 12 projects and 11 core facilities, including a new electron microscopy laboratory (Schmid, Pfeiffer). However, by the early 1980s, questions about the Institute’s future needed to be addressed. At that time, the PPG represented about 65% of all research grant income of the Institute and almost one half of its annual budget of 3 million dollars. Holman, who was close to retirement age, remained principal investigator for the next PPG renewal application, while the Institute Board began a worldwide search for a new Executive Director. However, although the new PPG application had received a fundable priority score, actual funding was uncertain due to an attempt by the director of the federal budget office to constrain spending by withholding funds that had already been appropriated by Congress. While this problem worked itself through the courts, the future of the PPG and the Institute hung in the balance. Hence, the Director search was canceled and I was asked to serve as Acting Director. By the summer of 1985 the PPG was funded and the Board approved the immediate recruitment of new faculty.



Schmid

Rhoderick E. Brown came from the University of Virginia to work on lipid transfer proteins and to head a new Membrane Biochemistry Section. His group became part of the PPG through a supplemental application. I was named Executive Director in 1987 and for several years Institute programs remained successful against increased competition. A joint instrument grant application with Mayo Clinic brought a new 300 MHz NMR instrument to the Institute (Baumann). Both Holman and Schlenk retired at the end of the decade, and Baumann became editor in chief of Lipids. In spite of the fact that NIH experienced major financial difficulties and had to implement across-the-board cuts of funded programs, the Institute was able to recruit Zoltan Kiss from the National Cancer Institute to study phospholipase-mediated cell signaling and to head a

new Cell Biochemistry Section. Unfortunately, the next 5-year renewal application of the PPG, under D. R. Pfeiffer as principal investigator, failed to achieve a fundable priority score, but a revised application, which included several outside collaborators, received a priority score in the top 15%, well within fundable limits. Hence, the Institute continued to operate unchanged in 1991, during the one-year funding lapse, using transition funds provided by NIH, as well as reserve funds. Also, to celebrate its 50th anniversary, the Institute made plans for an International Conference “Intracellular Transport and Remodeling of Lipids”, to take place in Austin in September of 1992.

Life changed dramatically for everyone at the Institute in December of 1991, due to an unprecedented action by the Director of the National Heart Lung and Blood Institute (NHLBI). Rather than to initiate funding as expected on January 1, 1992, the PPG was administratively “disaggregated” and only 3 projects (2 for Pfeiffer, 1 for Brockman) were funded as individual (RO-1) grants; funds for Core facilities were added to these grants proportionally. Appeals to the NIH Director directly or through political representatives were unsuccessful. It was learned that opinions of scientific review panels were only advisory and administrative decisions by the NHLBI Director were final. Because no early information had been given, the Institute was still operating with full staff at a deficit exceeding \$ 3,000 per day, and a large portion of the reserve funds had been used up. Fortunately, both The Hormel Foundation, under its chairman I.J. Holton, and the University, under the newly appointed Vice President for Research, Anne Petersen, pledged moral and financial support. Brown had also submitted his PPG project as an RO-1 grant, which was approved for funding. Overall, however, the long-feared crisis had arrived and needed to be addressed.

Crisis management and a major change in direction

The following measures were implemented immediately: the four faculty members, including the Director, who had lost all grant support agreed to reduce their appointment by 20%, all employees in the laboratory technician category, as well as some office and support personnel, were laid off, several Associate Faculty members were asked to leave and the 50th anniversary conference was cancelled. All employees in the Junior Scientist to Scientist category were retained, some at reduced appointment, partly to maintain productivity and partly because they were protected by University seniority rules. The situation was further complicated by the announcement that Pfeiffer had been offered a tenured professorship at Ohio State University. Because the Institute was in no position to make a comparable counter offer, Pfeiffer prepared to transfer his grant support, co-workers and equipment to Ohio. With the departure of Pfeiffer’s group it became clear that any attempts to have the PPG re-instated would be futile. Although this was perceived as a problem at the time, it turned out to be a great blessing for the Institute, because it made a change in direction not only possible but necessary.

After the drastic reduction of expenses, it was important to find other income. The Hormel Foundation provided some emergency support and the University agreed to provide all severance pay for the laid-off employees. Faculty members were not only encouraged to apply for new research grants, but also to solicit contracts from industry. In order to keep the members of the electronics and computer group at the Institute, they were asked to market their expertise as well.

While most of these measures were implemented, the Board asked the Institute faculty to draft a “Strategic Plan” for the future. Such a plan was developed during the summer of 1992 and submitted to the Board. However, perhaps because this plan had to accommodate the interests

and ideas of a rather diverse group of individuals of different age and talent, it did not meet expectations and failed to be accepted. During a subsequent Board of Directors meeting I proposed to submit my own plan which was later accepted.

The most important long-range goal of this plan was a change in direction from lipid research, related to heart disease, to cell signaling in carcinogenesis. Because a realistic transition to cancer research required a major shift from biochemistry/biophysics to molecular biology, a search for a new faculty member was essential. Although there was concern about entering the very competitive field of cancer research, the potential scientific and financial payoffs were irresistible. Clearly, the cellular signaling systems involved in the transformation of normal cells to cancer cells were ideally suited for the kinds of laboratory research that existed or could develop at the Hormel Institute. Hence, with extra financial support from The Hormel Foundation, a search for an outstanding molecular biologist was initiated and Zigang Dong was recruited from the National Cancer Institute in 1995 to set up a Section of Cellular and Molecular Biology.

In the meantime, further attempts were made to increase Institute income. Some unused laboratory space was rented to biotechnology start-up companies, not only to raise income, but also with the hope to enhance the local economy by attracting new industry. Bioenergy, Inc. eventually moved to Minneapolis, but Natural Biologics, Inc. later built a production facility in the area. Furthermore, the Institute's electronics and computer group, first under Dale Jarvis and later under Craig Jones, helped to bring early Internet service to local schools and libraries, as well as to private customers in Austin and the surrounding rural towns and villages. Subscriptions to the Southern Minnesota Internet Group (SMIG) began in 1994 and exceeded 2,000 within 3 years. Eventually, this enterprise not only provided educational outreach to the community, but a steady source of income for the Institute. The new emphasis on cancer research also made it possible to apply for financial support from the Rochester Eagles Cancer Telethon, an annual fund-raising event under the leadership of Robert Callier. Increasing donations from this source played a significant role in the rapid development of cancer-related projects at the Institute. Most Institute faculty members were also able to attract broad-based support from several different Institutes within the NIH, as well as from various other Government agencies, foundations and private industry. The improved financial situation allowed for the purchase of major new equipment, and the University provided funds for health and safety upgrades of the main laboratory building and for a new heating system.

Most importantly, Zigang Dong's projects turned out to be spectacularly successful, both scientifically and financially. He had quickly set up collaborations with pharmaceutical companies and with colleagues at other Universities in the United States, as well as in China and Russia; he recruited a large number of talented co-workers and obtained major grant support from the National Cancer Institute and other agencies. By the end of the decade the Hormel Institute budget was over 4 million dollars, total publications had risen to over 1400 and SMIG subscriptions had risen to 4500.

While the Institute changed direction and gradually worked itself out of the problems created by the loss of the PPG, the University faced a number of financial problems and painful retrenchments, which included the closing of a small agriculture campus in Waseca, Minnesota (it later became a federal prison). In this environment, beginning in the mid-1990s, some University officials became less supportive of the Hormel Institute and began to consider it as somewhat of a financial burden, existing outside the major educational mission of the University.

Also, the change in direction from the traditional emphasis on lipid research to the molecular biology of cancer was not universally accepted by Institute faculty, leading to internal as well as external stress. The situation was finally resolved by the arrival of a new University President, Mark Yudov, who appointed a new Vice President for Research, Christine Maziar, in 1998. She immediately recognized the great scientific potential of the Institute, as well as the potential benefits of a good relationship between the University and the Hormel Foods Corporation/Hormel Foundation. With Christine Maziar as the new Chair of the Institute Board of Directors, I was re-appointed in 1999 for a third five-year term as Executive Director, with the clear mandate to engineer a transition to new leadership. To fulfill this mandate turned out to be relatively easy. The great scientific and financial success of Zigang Dong had resulted in his rapid promotions to Associate Professor and Professor, and his high profile as a rising star in the field of molecular carcinogenesis had attracted the attention of several major Universities and cancer research centers. There was also no longer any doubt that the Institute's new research theme would be able to succeed very well in the competition for federal funds.

Hence, in discussions with Richard Knowlton, chairman of The Hormel Foundation Board of Directors, Christine Maziar and Zigang Dong, we laid the groundwork for the successful further development of the Institute. Zigang Dong received an endowment as Hormel/Knowlton Professor and I agreed to step down as Executive Director in June of 2001, so that Dong could take over that position. There was a one-year transition period during which some of the remaining staff employees were helped to retire and the Institute Board, under its new chairman Victor Bloomfield, resolved the faculty employment issue by making tenure at the Institute dependent on the ability of a Section Leader to attract a specified amount of continuous outside financial support.



Maziar



Knowlton



Dong

Dong immediately expanded the Institute's overall program by recruiting Junxuan (Johnny) Lu from the AMC Cancer Center at the University of Colorado, to establish a Section of Cancer Biology. Together with the Mayo Clinic Cancer Center he also helped to organize several international symposia, "Dietary Factors and Chemoprevention: Current Premises and Future Promises", in September of 2004; "Targeting Carcinogenesis: Transcription-Transduction-Translation", in October of 2005. These events attracted some of the most prominent cancer researchers and helped to enhance the Institute's visibility and prestige. Also, a further expansion of research programs occurred in 2005 with the recruitment of D. Joshua Liao to head a Section, Translational Cancer Research, and of Peter Ruvolo to head a Section, Signal Transduction and Apoptosis.

The major expansion of 2006-2008

This expansion of Institute research programs was just the beginning of major new developments, largely due to the initiative and generosity of Richard Knowlton. Like Jay Hormel a half century earlier, Knowlton had been born and raised in Austin and later became his home town's major benefactor. As the long-time CEO of Hormel Foods Corp., he had dramatically increased the company's value, and that of The Hormel Foundation, its major shareholder. Knowlton and The Hormel Foundation had already been instrumental in the upgrading of Austin schools, the building of Austin's new public library and many other community projects. Also, while most of the Foundation's income had long been dedicated to various Hormel family trusts, their expiration increased available funds substantially.

In 2006, The Hormel Foundation and Hormel Foods Corp., together with other donors from the Austin community, and with the enthusiastic support of the University, under its new President Robert Bruininks, funded a new state-of-the-art research building to accommodate the further expansion of the Institute's cancer research program. This multi-million dollar structure encompasses 20 new research laboratories, plus adjacent instrument rooms, cold rooms and faculty offices, while the original structure was completely remodeled to provide administrative office space, a conference center, media center, library, lunch rooms and research support space.



The Hormel Institute was remodeled and greatly expanded between 2006 and 2008

Ground for the new construction was broken in August 2006 and the opening festivities occurred in October 2008, almost exactly 66 years after the Hormel Institute was founded. While construction proceeded, new faculty members were recruited, with major financial support of the University. They include Yibin Deng (Cell death and Cancer Genetics), Edward "Ted" Hinchcliffe (Cellular Dynamics) and Rebecca Morris (Stem Cells and Cancer). Also, major high-end research equipment was acquired, including an ultracentrifuge, high speed centrifuge and spectrophotometer, as well as IBM's BlueGene/L, one of the world's most powerful supercomputers.

Among the immediate results of the Institute's physical and scientific expansion are new collaborative arrangements. These include a new partnership between The Hormel Foundation, Mayo Clinic and University of Minnesota to strengthen and solidify scientific collaboration; the establishment of an office of translational research between the Hormel Institute and Mayo Clinic to facilitate movement of basic research findings to clinical application; collaboration between the Institute, IBM and the University's Supercomputer Center to identify and delineate key protein-protein and protein-small molecule interactions, and then to validate such interactions in living systems; the establishment of an International Center for Research Technology (ICRT), in collaboration with the Development Corporation of Austin, in order to provide cutting-edge technological advice and support to local and regional bio-technology businesses, medical centers, colleges and universities. ICRT will work with manufacturers of technology to facilitate the comprehensive study of human disease by combining analyses of protein structure and function with advanced methods of data management and drug screening.



The Grand Opening of the new building took place on October 3, 2008

The opening ceremonies of the new research building were attended by Minnesota Governor Tim Pawlenty, U.S. Senator Amy Klobuchar, U.S. Congressman Tim Walz, as well as University President Robert Bruininks, Hormel Foundation Chairman Richard Knowlton, Hormel Foods Corp. Chairman, President and CEO Jeffrey Ettinger, Mayo Clinic CEO Glenn S. Forbes, and James C. Hormel, son of the Institute's founder. This celebration brought Institute faculty and staff together with local community leaders and a large cross section of the people of Austin, emphasizing the importance of the Institute's research, not only for the understanding, prevention and potential cure of cancer, but also for the economic health and further development of the local community and the State of Minnesota. In recognition of Zigang Dong's major achievements as a scientist and administrator, the University has named him McKnight Presidential Professor. His drive and scientific judgment, together with the first-rate physical facilities and collaborative arrangements established over the past few years, will guarantee the future success of the unique enterprise envisioned by Jay C. Hormel some 66 years ago.