

## **Arnold L. Demain, PhD**

For over five decades, Professor Arnold L. Demain, Research Fellow in Microbial Biochemistry at the Charles A. Dana Research Institute for Scientists Emeriti (R.I.S.E.) of Drew University, has been a scientist constantly in the forefront of industrial microbiology and biotechnology. Demain is one of the world's leading industrial microbiologists, a pioneer in research on the elucidation and regulation of the biosynthetic pathways leading to penicillins and cephalosporins, and has been instrumental in the development of the beta-lactam industry.

Born in Brooklyn, New York, in 1927, Demain was educated in the New York public school system. He received his B.S. and M.S. degrees in bacteriology from Michigan State College (Now University) in 1949 and 1950, respectively. He obtained his Ph.D. in 1954 from the University of California, having divided his time between the Berkeley and Davis campuses. He joined Merck & Co., Inc. at the penicillin research laboratories in Pennsylvania and then in 1956, moved to the Microbiology Department of the Merck Research Laboratories in Rahway, New Jersey. At Merck, he worked on fermentation microbiology, beta-lactam antibiotics, flavor nucleotides, and microbial nutrition. In 1965, he founded the Fermentation Microbiology Department at Merck and directed research and development on processes for monosodium glutamate, vitamin B12, streptomycin, riboflavin, cephamycin, fosfomycin, and interferon inducers.

In 1969, after 15 years at Merck, he joined the Massachusetts Institute of Technology (MIT), where he set up the Fermentation Microbiology Laboratory. He was Professor of Industrial Microbiology in the Department of Nutrition and Food Science and then later in the Department of Biology. He mentored over 100 graduate students, postdoctoral fellows and undergraduate students, and minority summer students over a 32 year period. At MIT, Demain published extensively on enzyme fermentations, mutational biosynthesis, bioconversions, and metabolic regulation of primary and secondary metabolism.

Demain's career is characterized by a sustained level of important

discoveries and contributions in several areas of industrial microbiology, including research on microbial production of cholesterol-lowering drugs and immunosuppressive, anti-tumor and anti-fungal drugs. He also explored the effect of microgravity on secondary metabolism, an effort that may impact space travelers as well as commercial production strategies. His final work at MIT involved the development of “animal-free” processes for the production of clostridial toxins made by *Clostridium tetani* and *Clostridium difficile*. Since 2001, Demain has been Fellow in Microbial Biochemistry at The Charles A. Dana Research Institute for Scientists Emeriti (R.I.S.E.) at Drew University in Madison, New Jersey. His main activity there is the training of undergraduate students in the execution of research in microbial biochemistry. Demain’s success is evident in a long list of publications (greater than 500), 12 books of which he is coeditor or coauthor, and 21 U.S. Patents.

His ability to “hybridize” basic studies and industrial applications was recognized by his election to the Presidency of the Society for Industrial Microbiology in 1990, membership in the National Academy of Sciences in 1994, the Mexican Academy of Sciences in 1997, and in the Hungarian Academy of Science in 2002. Demain has received honorary doctorates from the University of Leon (Spain), Ghent University (Belgium), Technion (Israel), Michigan State University (USA), and Muenster University (Germany). He has received numerous honors and awards that are listed in his CV.