

Episode 11: Nutrition in Pregnancy

Researcher Biography

Lawrence D. Longo, M.D., D.h.c. (Hon), FACOG, FRCOG

Lawrence D. Longo, Emeritus Director, Center for Perinatal Biology, Bernard D. Briggs Distinguished Professor of Physiology, and Professor of Obstetrics and Gynecology, Loma Linda University School of Medicine is one of the world's most respected scientists in developmental physiology. Over the past five decades he has compiled an impressive record in research, and academic leadership. He has developed the Center for Perinatal Biology at Loma Linda University with 13 full-time NIH funded faculty, into one of the world's leading research groups in this field.

A pioneer investigator in developmental physiology, Dr. Longo is internationally recognized for his research on regulatory mechanisms in the developing fetus. This early work was on the relation of carbon monoxide to fetal oxygenation, and was the basis for his contributions to several of the Surgeon General's reports on Smoking and Health. His studies on maternal exercise in pregnancy gave fresh insights into the mechanisms whereby such activity affects fetal development, and resulted in guidelines by the American College of Obstetricians and Gynecologists for the mother who exercises during pregnancy.

He also has contributed to understanding fetal oxygen delivery by his studies of respiratory gas exchange in the placenta. During the past several decades Dr. Longo has concentrated on signal transduction mechanisms in cerebral arteries, their role in establishing cerebrovascular tone, and how these mechanisms change from preterm fetus to term fetus to newborn to adult. These studies explore the mechanisms of biochemical signaling pathways (receptor-second messenger pharmaco- and electro-mechanical coupling) in the cerebrovasculature. They include *in vitro* and *in vivo* responses to both acute and long-term hypoxia, and the role of oxidative stress. Profound differences in both Ca²⁺-dependent and Ca²⁺-independent signaling pathways, and related aspects of structure-function relationships, make the developing cerebral vessels particularly vulnerable to pathologies that lead to the development of periventricular leucomalacia, brain neuropathology, cerebral palsy, and related disorders.

Overall, these studies have contributed greatly to an understanding of the physiologic/neurochemical basis of fetal and neonatal development, and responses to hypoxia. More recently, Dr. Longo's group has been exploring the epigenetic basis of maternal dietary deprivation, hypoxia, and other stress on gene regulation in the fetus, with the development of hypertension, metabolic syndrome, and related diseases in the adult. His research program has been funded by the National Institutes of Health continuously since 1964.

Dr. Longo is a renowned author and editor. He has published over 350 scientific articles and has written or edited 20 books. As an educator and leader in academic medicine, he has served as a Visiting Professor at two dozen universities, both in the United States and Abroad.

Dr. Longo has received numerous honors and awards for his contributions to medicine. These include: Loma Linda University Alumnus of the Year (1976), and the Frank C. and Margaret P. Boucek Prize (1988). In 1988, he was awarded a five-year NATO Professorship by the *Consiglio Nazionale delle*

Ricerche of Italy. He was awarded Fellowship *ad eundem* by the Royal College of Obstetricians and Gynaecologists of Great Britain (1994), the President's Distinguished Scientist Award by the Society for Gynecologic Investigation (1996), and the first Naftolin Award for Excellence in Mentoring from that Society (2004). Dr. Longo also served as President of that Society (1982-1983).

For his many contributions to cardiovascular physiology and understanding the regulation of the cerebral vasculature of the developing brain, the American Physiological Society honored him as a Fellow of the Society (2006), and he was named the Bernard D. Briggs Endowed Chair in Physiology Research (2009). The Faculty of Medicine of the University of the Republic of Uruguay awarded him the degree *Doctor Honoris Causa* (2011).

In an effort to increase the research capabilities of academic departments of obstetrics and gynecology in America, in 1987 Dr. Longo spearheaded the organization and funding of the Reproductive Scientist Development Program. This national program trains bright, energetic and committed young obstetrician gynecologists for a career in cell and molecular reproductive biology. The 100 or so scholars to date, work at many of the highly rated research universities in the country, and the program is funded jointly by the National Institutes of Health and several private foundations.

Dr. Longo is also known for his work in the history of medicine. He edited the "Classic Pages in Obstetrics and Gynecology" for the *American Journal of Obstetrics and Gynecology* (1970-1979), and was Editor-in-Chief for the book series *Classics in Obstetrics and Gynecology* (1989-1997). He is a renowned bibliophile, and collector of rare books in the reproductive sciences, which recently he donated to the Huntington Library, San Marino, CA. He is a member of the Grolier Club of New York, and the Zamorano Club of California, both of which are societies of distinguished bookmen and women. Most recently he published *The Rise of Fetal and Neonatal Physiology: Basic Science to Clinical Care* (2013), with a revised second edition due in 2016.

Dr. Longo has served on the Governing Council and several Committees of the American Association for the History of Medicine. For twelve years he served as Secretary-Treasurer of the American Osler Society, and also served as that Society's President (2002-2003). That Society honored Dr. Longo with its Lifetime Achievement Award (2007). He also received the Charles Elliott Weniger Award for excellence in education (2007). In 1993, Dr. Longo endowed an annual Lectureship at Pacific Union College, Angwin, CA in his parents' honor, the "Frank A. and Florine A. Longo Lectureship in Faith, Knowledge, and Human Values".