# NATIONAL VETERINARY LABORATORY

**P.O. Box 239, 1Tice Road**
**Franklin Lakes, NJ 07417**
**877-NVL-LABS (877-685-5227)**
**www.natvetlab.com**

# NEWSLETTER

## Honoring Those We Have Lost©

**Evelyn E. Zuckerman, Editor** **Spring 2017** **Vol. 16, Number 2**


## In This Issue:

The Spring 2017 issue of the NVL Newsletter will honor important individuals, in society and in science, that we have lost over the past few years. Many of these individuals made major contributions to science and have crossed paths with Dr. Hardy or have contributed important techniques used in our research and test service work. However, one non-scientist, Mr. Joseph Cervino, a high school teacher, legendary football and baseball coach in Teaneck, New Jersey, had a major influence on Dr. Hardy growing up in the 1950s.

## Coach Joe Cervino- Role Model:

It was a wonderful time to be growing up in America in the 1940s and 50s. Although World War II had just started, the end in 1945 began a flourishing time in this country. By the mid-1950s Dr. Hardy was in high school and had the good fortune to play football and baseball under a legendary coach Mr. Joseph Cervino. He taught Dr. Hardy the craft of being a quarterback, and with two championship teams, he was fortunate enough to receive a full football scholarship to the George Washington University in Washington DC where he majored in zoology in preparation for veterinary medicine.

**Coach Joseph Cervino**


**Dr. Hardy in 1956- yes, with a leather helmet!**

It was only many years later that Dr. Hardy learned that Mr. Cervino, a gentle deeply religious individual, had in fact stormed the beaches at Normandy during the D-day invasion. He was awarded the Bronze Star for his courageous efforts during the war. His commendation read: on 22 November 1944 in the attack on Nennig, Germany your action in courageously shielding a wounded man from shell burst with your own body and in aiding the 15 other seriously wounded men resulted in their rescue and safe evacuation from the combat area. This courageous action taken under intense artillery, mortar, and small arms fire displayed great loyalty to your fellow soldiers and reflects great credit upon you and your organization. Dated: 6 February, 1945- From Headquarters 61st Armored Infantry Battalion: Myles L Standish Lt. Col., Infantry Commanding.

Coach Cervino not only taught the intricacies of football and baseball, he taught the values of teamwork, playing fair, hard work, and fellowship to young boys that helped them become responsible men. Coach Cervino died on December 20, 2016 at the age of 93. He left behind a wonderful family, many of whom are teachers and coaches, and hundreds of young men who are better people due to his interactions in their lives. He was a role model.

## Scientists We Have Lost:

We have lost some legendary scientists during the past several years ranging from virologists, immunologists, clinicians, cancer researchers, an AIDS researcher, and a paleoanthropologist. These scientists, in some ways, have impacted on Dr. Hardy and this laboratory's origin and work. While working at the Memorial Sloan Kettering Cancer Center for 24 years, 8 years in the laboratory of Lloyd Old, a pioneer in cancer immunology and immunotherapy, I was fortunate enough to meet many esteemed scientists. Three such scientists were George Klein, Donald Metcalf and Mark Wainberg. All were brilliant clinicians and immunologists and warm and encompassing individuals.

## George Klein (1925 – 2016)

George Klein, and his wife Eva, discovered many fundamental phenomena in cancer research. They showed that the immune system can recognize and even eliminate certain cancer cells. They also showed that normal cells possess tumor suppressor genes that function to prevent cancer formation.

**Professor George Klein, Karolinska Institute, Sweden**
**Photo credit: Bengt Oberger, Wikipedia**

George and Eva published a seminal paper in 1960 where they showed that cancer cells displayed unique antigens on their cell surface. They also showed that tumor viruses, such as the mouse polyomavirus, induce common antigens on the tumor cells that they transform. In 1975, they discovered natural killer cells that can eliminate both cancerous and infected cells. Together these monumental observations are the basis for much of the tumor immunology and current specific tumor immunotherapy.

George and my mentor, Dr. Lloyd J Old at the Memorial Sloan-Kettering Cancer Center, were close friends scientifically and socially. He often visited Dr. Old's lab when he came to this country and I was fortunate enough to have met with him several times. Dr. Max Essex, a veterinarian who we collaborated with on the feline leukemia virus, was doing a postdoctoral fellowship in Dr. Klein's laboratory at the Karolinska Institute in Sweden. After a very long overnight transatlantic flight to Stockholm to visit Dr. Essex, I toured the harbor with Dr. Essex right after de-plaining and spent the beautiful boat tour falling in and out of sleep. We then had the fortunate experience to meet with George Klein in his office for coffee and crullers and a lively scientific discussion of our research. In addition to his numerous scientific papers, George published books on the amenities, popular science, and even philosophy.

## Donald Metcalf (1929 – 2014)

Donald Metcalf was an Australian physician who discovered how blood cells differentiate into their different functional cell types.

**Donald Metcalf**
**Photo credit: Walter and Eliza Hall Institute**

He discovered a way to grow peripheral blood cells in agar by providing the correct stimuli which turned out to be hormones. He called these hormones colony-stimulating factors

(CSFs). His team identified and purified four CSFs: granulocyte macrophage CSF (GM-CSF), macrophage CSF (M-CSF), granulocyte CSF (G-CSF), and multi-CSF, now called interleukin-3. These factors have been used therapeutically in many millions of people to ameliorate leukopenia induced by chemotherapy. An additional benefit of this work has been the use of these factors to induce the production of stem cells in the bone marrow which then spill out into the peripheral blood which can be simply harvested by venipuncture rather than having to perform bone marrow aspirates.

I was fortunate to have met Dr. Metcalf on his several visits to Dr. Old's laboratory. His basic discoveries are still benefiting millions of people every day.

## Phillip Tobias (1925– 2012)

Dr. Tobias was the senior most paleoanthropologist in the 20th century. He described the early hominid fossils that were found at the Olduvai Gorge, Tanzania. These descriptions are the basis for our knowledge of human origins. He was a colleague of Lewis and Mary Leakey, the husband-and-wife team who were instrumental in establishing that humans originated in Africa. His collaborations and work on the Olduvai fossils were the basis for the description of *Homo habilis*. Aside from his excellent scientific work, he was a consistent thorn in the side of the South African apartheid regime.

**Phillip Vallentine Tobias**
**Photo credit: Raasgat, Wikipedia**

We visited the Olduvai Gorge in Tanzania in 2013 (see our Summer 2013 Newsletter- The Common Feline Pathogens of African Wild Cats Vol. 12 No.3 at www.natvetlab.com). It was most impressive to be standing on the exact spot where these early hominid fossils were discovered. To think that we were standing at the origin of the human species was almost incomprehensible.

**Olduvai Gorge, Tanzania**
**Photo credit WD Hardy, Jr.**

East Africa, and possibly the Olduvai Gorge area in Tanzania, is the site for the origin of humans. Deposits exposed in the sides of the gorge cover a time span from about 2.1 million to 15,000 years ago (Figure above). They yielded the fossil remains of more than 60 hominins (members of the human lineage), providing the most continuous known record of human evolution during the past 2 million years. One theory proposes that as the African climate changed and became drier, apes and hominins came out of the forest to scurry upright in the grassland savannas in search of food.[1-2] As humans continued to evolve, they spread to eventually settle in the Fertile Crescent, a curved area encompassing the Middle East-parts of Iraq, Syria, Lebanon, Jordan, Israel, and northern Egypt. The area was known as the Cradle of Civilization and the birthplace of agriculture, urbanization, writing, trade, and science.

## Oliver Smithies (1925 – 2017)

Oliver Smithies won the Nobel Prize in Physiology or Medicine in 2007 for developing methods to genetically alter mammalian genes.

**OliverSmithies**
**Photo credit: Chemical Heritage Foundation, Wikipedia**

His grandfather taught him to make useful things from junk, a talent he maintained and utilized in science for his entire life. He tried to isolate the precursor protein to insulin by separating proteins by moving them through a matrix of filter paper. This method had frustrating shortcomings, and using his training from his grandfather, he developed an alternative which entailed using common starch to make a gel to replace the filter paper. This method worked much better and it was the first application of gel electrophoresis, a method we use every day in our laboratory to produce western blots for *Bartonella* and FIV proteins. The gel electrophoresis method utilizes the separation of proteins based on their different sizes. Dr. Smithies boasted that he was over 60 years old when he did his Nobel-prizewinning work. His career is an example that one is never too old to advance-or enjoy-science.

## Mark Wainberg (1945 – 2017)

Mark Wainberg was a Canadian microbiologist, AIDS researcher and activist who, less than a month ago on April 12, 2017, tragically drowned in rough surf while vacationing in Florida.

**Mark Wainberg**
**Photo credit: CBC News**

Mark was an early researcher in the AIDS epidemic and attended the early AIDS-retrovirus meetings in Dr. Robert Gallo's laboratory where we met. Many of the retrovirus researchers of the early 1970-80s attended the retrovirus meetings at Dr. Bob Gallo's laboratory at the NIH. When the AIDS epidemic began many of us turned our attention to finding the cause of the disease which seemed to mirror the immunosuppressive diseases caused by a cat retrovirus, the feline leukemia virus.[3-6]

Once the cause of AIDS was found to be another retrovirus, HIV-1, many of us began to work to find a treatment against this devastating virus. The Burroughs Wellcome company asked us to test several compounds they had against the feline leukemia virus in cat cell cultures. We found that compound BW A509U, AZT (Zidovudine) was effective in preventing the infection of susceptible cells by the feline leukemia virus.[7] This compound was eventually developed as the first anti-retroviral, anti-reverse transcriptase, medication used for human therapy. Mark and his collaborators were the first to identify the anti-HIV capabilities of 3TC (Lamivudine). Lamivudine became an early component of the AIDS-cocktail drug therapy regime that has significantly prolonged the lives of HIV-infected individuals.[8,9]

Mark was outspoken against the HIV deniers who, despite overwhelming evidence to the contrary, were outspoken in their denial of the HIV cause for AIDS. He was very critical of politicians, especially the former South African President Thabo Mbeki, who ignored the problem of AIDS in his country and caused hundreds of thousands to die. Wainberg was President of the International AIDS Society from 1998 to 2000, and he founded the Journal of the International AIDS Society in 2004.

## References:


1. Summers, BA Climate Change and Animal Disease. Vet Pathol 46:1185-1186, 2009.
2. Gibbons, A. Human Evolution. How a Fickle Climate Made Us Human. Science 341:474-479, 2013.
3. Hardy, WD, Jr, Old, LJ, Hess, PW, Essex, M, and Cotter, S. Horizontal transmission of feline leukemia virus. Nature 244: 266 269, 1973.
4. Cotter, SM, Hardy, WD, Jr, and Essex, M. Association of feline leukemia virus with lymphosarcoma and other disorders in the cat. J. Am. Vet. Med. Assoc. 166: 449 454, 1975.
5. Hardy, WD, Jr, McClelland, AJ, Zuckerman, E, Hess, PW, Essex, M, Cotter, SM, MacEwen, EG, and Hayes, AA. Prevention of the contagious spread of feline virus and the development of leukemia in pet cats. Nature 263: 326 328, 1976.
6. Hardy, WD, Jr., Geering, G, Old, LJ, and de Harven, E. Feline leukemia virus; occurrence of viral antigen in the tissues of cats with lymphosarcoma and other diseases. Science 166: 1019 1021, 1969.
7. Hardy, W.D., Jr., Zuckerman, E.E., Lehrman, S.N., and Barry, D.W. Anti-viral effects of BW A509U (AZT) against naturally occurring feline acquired immunodeficiency syndrome (FAIDS)-inducing retrovirus. In Abstracts 25th Antimicrobial Agents and Chemotherapy p 171, 1985.
8. Quan, Y., L. W. Rong, C. Liang, and M. A. Wainberg. 1999, Reverse transcriptase inhibitors can selectively block the synthesis of differently sized viral DNA transcripts in cells acutely infected with human immunodeficiency virus type 1. J. Virol. 73:6700-6707.
9. Wainberg, M. A., W. C. Drosopoulos, H. Salomon, et al. Enhanced fidelity of 3TC-selected mutant HIV-1 reverse transcriptase. Science 271:1282-1285, 1996.