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NEWSLETTER

Myron "Max" Essex, DVM, PhD Celebration[©]

Evelyn E. Zuckerman, Editor

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In This Issue:

A celebration symposium, occurred on November 9, 2018 in Boston, to honor Max Essex's 46 years at Harvard, as the Mary Woodard Lasker Professor of Health Sciences at Harvard University, Chair of the Harvard School of Public Health AIDS Initiative (HAI) in the Department of Immunology and Infectious Diseases, and Chair of the Botswana-Harvard AIDS Institute in Gaborone, Botswana. I was honored to have been asked to present the opening lecture, covering our early retrovirus collaboration, along with Evelyn Zuckerman, on the feline leukemia virus (FeLV) from 1972 to 1981 with Max Essex's group. In this Fall, 2018 NVL Newsletter, we will review the symposium of our friend Max's outstanding research accomplishments held in celebration of his pending retirement in 2019. We, as veterinarians, should take enormous pride in Max's accomplishments for animals and humans.

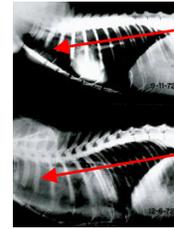
postdoctoral fellow. Dr. Klein and Dr. Old thought that Max and I would be right for collaboration on the FeLV. After reading Max's excellent letter, I eagerly returned my positive reply. When Max returned to a position at Harvard, we began our nine-year friendly and very productive research effort on the FeLV. An important point to remember is that in "those days" retroviruses of chickens and mice were known (dogma) to be only transmitted vertically as integrated viral genes or as replicating virus in the egg and sperm and NOT contagiously. Our clinical association in New York City was with the Henry Berg



Memorial Hospital of the ASPCA and the Animal Medical Center while Max's clinical associate, Dr. Susan Cotter, was an excellent clinician and researcher at Angell Memorial Animal Hospital in Boston. These three metropolitan veterinary hospitals were the largest in the country and were ideal for our clinical epidemiological research of FeLV in pet cats.

We developed an IFA test for detection of FeLV in the blood of cats which we then used for our collaborative epidemiological studies of multiple cat households (MCHH).¹

rest (28%) were neither infected nor immune, they just had not been exposed.^{2,3} Infected cats were at high risk of developing lymphosarcoma.



Top: Healthy FeLV-infected cat normal chest in 9-11-1972.

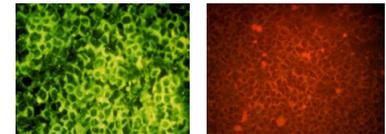
Bottom: Large anterior mediastinal lymphosarcoma developed 3 months later by 12-6-1972.

Surprisingly however, we found that more FeLV infected pet cats died from FeLV-induced immunosuppression (secondary diseases) than from FeLV-induced neoplasia- leukemia, lymphosarcoma, or erythroid neoplasia.^{4,5}



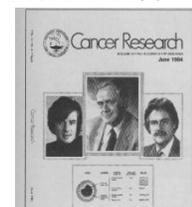
FeLV-immunosuppressive diseases: Upper: left- FIP, middle- pyothorax, right- URI; lower right- myeloblastopenia- leukopenias and anemia, middle- GI inflammation and right- FeLV antigens in the intestinal epithelial cells and Peyer's patches.

In 1976 we developed the FeLV Test and Isolation Program to prevent the spread of FeLV among cats in MCHHs.⁶ In 1979-1980 our groups reported the development of FeLV non-producer (FeLV-neg) lymphosarcomas in pet cats exposed to FeLV.^{7,8}



FeLV+ lymphosarcoma FeLV - lymphosarcoma

For the 9-year collaboration, we published 40 papers, 6 in Nature, 1 in Science, 1 in PNAS, 1 in J. Virol., 41 others and numerous meeting abstracts. We also appeared on the cover of the journal Cancer Research in 1984.



Max Essex, Bill Jarrett, Bill Hardy



1984



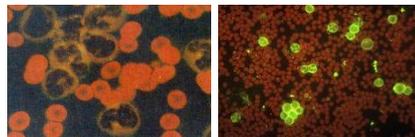
2018

Max Essex

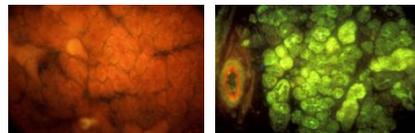
Myron "Max" Essex is Chair of the Harvard AIDS Initiative (HAI), the Mary Woodard Lasker Professor of Health Sciences at Harvard University, and Chair of the Botswana Harvard AIDS Institute Partnership (BHP). He received his DVM degree at Michigan State University in 1967, his PhD at the University of California, Davis in 1970, and was a postdoctoral fellow in the Department of Tumor Biology at the Karolinska Institute School of Medicine in Stockholm with Dr. George Klein.

Essex-Hardy FeLV Collaborative Research-1972-1981

In 1971, while I was a postdoctoral fellow at Memorial Sloan-Kettering Cancer Center, my mentor, Dr. Lloyd J Old met with Dr. George Klein from the Karolinska Institute in Sweden. Upon Dr. Klein's return to Sweden, I received a 3-page letter from Dr. Max Essex, his



FeLV negative WBCs FeLV positive WBCs



Cat salivary glands: FeLV - non-infected FeLV + Infected

These collaborative studies enabled us to observe that FeLV is transmitted contagiously among cats, mainly through the saliva, a paradigm change at that time.² We were also able to determine the outcomes of exposed cats by longitudinal studies lasting 5 to 10 years. Some cats became infected with FeLV (30%), some became immune (42%) to FeLV, and the

Our Collaboration Ends in 1982:

During the late 1970s, many scientists thought that infectious diseases caused by microbes, including viruses, no longer posed a threat in industrialized countries. Scientists, even at Memorial Sloan Kettering Cancer Center, believed that there were no viruses that caused human cancers and that no retroviruses infected humans. Many virologists, that had the greatest retrovirus expertise, turned their efforts toward research on oncogenes- endogenous genes that could be triggered into transforming cells into cancer cells. One stalwart researcher at the NIH, Dr. Robert Gallo (co-discoverer of the AIDS virus, HIV), persisted in the hunt for human cancer viruses. He was the nidus to bring together many of the animal retrovirus researchers with his yearly lab meetings. This was very important, as



Dr. Hardy and Dr. Gallo fostered collaborations. The search finally paid off with his discovery of the human T-cell leukemia virus types 1 and 2 (HTLV-1 and HTLV-2), the first of which was shown to cause an unusual human T-cell leukemia and neurological disease.⁹

Max Essex's HIV/AIDS Accomplishments:

The first recognized cases of AIDS were reported by the CDC in the Morbidity and Mortality Weekly Report (MMWR) on June 5, 1981.¹⁰ By the time the AIDS epidemic hit, retrovirologists saw FeLV, an animal model, as a possible unknown retrovirus etiology for AIDS. Essex and Robert Gallo and Luc Montagnier hypothesized in 1982, that a retrovirus was the likely cause of AIDS. For this incite, the three eventually shared the 1986 Lasker Award, the highest honor given for medical research in the U.S, the American "Nobel Prize." Evelyn Zuckerman and I were honored to have been asked to attend the Lasker Award ceremony. Max was the first, of now two, veterinarians to receive a Lasker Award. The second recipient, Dr. John Glen, a Scottish veterinarian, received the recent 2018 award for developing the anesthetic propofol which transformed many surgeries into day surgeries because patients recover so quickly without a hangover effect.

When the AIDS epidemic hit, Max turned all his attentions to HIV and established the Harvard AIDS Institute, which officially changed its name to the Harvard School for Public Health AIDS Initiative in 2004. With doctoral students and postdoctoral fellows, he identified the envelope proteins routinely used for HIV/AIDS diagnosis and for blood screening. His laboratory group also identified many other HIV and HTLV-1 proteins. With students and collaborators, he discovered the simian T cell leukemia virus (STLV) and the simian immunodeficiency virus (SIV) in monkeys, and HIV-2 in people living in West Africa.¹¹ Max's group also showed that HIV-2 was less virulent and not as easily transmitted as HIV-1, and that certain subtypes of HIV-1, are more efficiently transmitted from mother to infant *in utero* and during birth. With collaborators, Essex also provided the first evidence that HIV could be transmitted by heterosexual intercourse.

In 1984, Essex identified gp120, the virus surface protein that is used worldwide for blood screening, HIV detection, and epidemiological monitoring.¹¹ Since 1986, he has developed programs for AIDS collaboration in Senegal, Thailand, Botswana, India, Mexico, and China. In 1996, Essex helped establish the Botswana-Harvard Partnership for HIV Research and Education (now the Botswana-Harvard AIDS Institute). This is a collaboration of the Ministry of Health in Botswana and HAI. In 2007, the Harvard T. H. Chan School of



Public Health established the Essex Fellowship for Students from Africa in his honor. His recent research has focused on the use of antiretroviral drugs for Treatment as Prevention (TasP) in adults. He and his team have conducted several breakthrough studies on the prevention of mother-to-infant transmission of HIV.¹²⁻¹³ These studies have resulted in guideline recommendations used by the World Health Organization (WHO) to reduce maternal transmission of HIV in developing countries. Essex has published 678 research papers; more than 40 have been in Science or Nature. He has edited 11 books, including *AIDS in Africa* and *Emerging Infections in Asia* (ISBN 0306466996). His most recent book, coauthored with AIDS activist and former Botswana Supreme Court Justice, Unity Dow, *Saturday Is for Funerals* (ISBN 0674050770), was published in 2010. He has trained 27 doctoral students and 60 postdoctoral fellows.



Research Associates:
Standing:
Evelyn Zuckerman
44 years of service
Seated:
Left Mary Fran
McLane 53 years of
service, and
Dr. Ann Sliski.

Max is an elected member of the Institute of Medicine of the National Academy of Sciences. In November 2011 Essex received the HIV Lifetime Achievement Award for Scientific Contributions from the Institute of Human Virology at the University of Maryland School of Medicine. In 2014, he received the AIDS Society of India's Lifetime Achievement Award. Unfortunately, the veterinary professional societies have not bestowed similar honors to Max.

Botswana-Harvard AIDS Initiative Partnership (BHP)

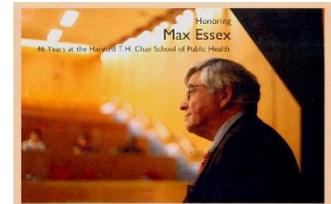
www.botswanaharvardpartnership.org

The Botswana-Harvard AIDS Initiative Partnership (BHP) is a collaborative research and training initiative between the Government of Botswana and Harvard established in 1996. Located in Gaborone, Botswana, the BHP also houses the Botswana-Harvard HIV Reference Laboratory, the largest HIV/AIDS laboratory in Africa, which serves as the reference testing lab



**Festus Mogae,
Former President of Botswana**

The BHP is an NIH-funded Clinical Trials Unit site for various trial networks including the HIV Prevention Trials Network, AIDS Clinical Trials Group, the International Maternal Pediatric Adolescent AIDS Clinical Trials Group, and the HIV Vaccines Trial Network.



Now, after 46 years at Harvard, Max will retire to emeritus status. On this occasion, the Essex celebration symposium brought together dozens of Max's doctoral students, postdocs and collaborators from the US and Africa. Bob Gallo gave an excellent summary lecture of Max's accomplishments. All of his former students and collaborators could not praise Max enough for his guidance and thanked their mentor. His daughters each gave loving appreciative speeches to the assembled attendees. And as usual, Max took the accolades in quiet appreciation, fitting the Harvard tradition. Science and humanity will miss veterinarian, mentor, and humanitarian, Max Essex. We wish him a healthy and happy retirement, although we are sure he will remain scientifically productive.

References:

1. Hardy, W.D., Jr., Hirshaut, Y., and Hess, P. Detection of the feline leukemia virus and other mammalian oncoviruses by immunofluorescence. Vth International Leukemia Symposium. Padova, Italy. September 1971. Bibl. Haemat. Vol. 39, Karger, Basel/New York, pp. 778-779, 1973.
2. Hardy, W.D., Jr., Old, L.J., Hess, P.W., Essex, M & Cotter, S.: Horizontal transmission of feline leukemia virus. Nature 244: 266, 1973.
3. Cotter, S.M., Essex, M., and Hardy, W.D., Jr. Serologic studies of normal and leukemic cats in a multiple- case leukemia cluster. Cancer Res. 34: 1061-1069, 1974.
4. Cotter, S.M., Hardy, W.D., 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. Essex, M., Sliski, A., Cotter, S.M., Jakowski, R.M., Hardy, W.D., Jr. Immunosurveillance of naturally occurring feline leukemia. Science 190: 790-792, 1975.
6. Hardy, W.D., Jr., McClelland, A.J., Zuckerman, E.E., Hess, P.W., Essex, M., Cotter, S.M., MacEwen, E.G., & Hayes, A.A.: Prevention of the contagious spread of feline leukemia virus and the development of leukemia in pet cats. Nature 263: 326-328, 1976.
7. Hardy, W.D., Jr., McClelland, A.J., Zuckerman, E.E., Snyder, H.W., MacEwen, E.G., Francis, D. & Essex, M. . Development of virus non-producer lymphosarcoms in pet cats exposed to FeLV. Nature 288: 90, 1980.
8. Francis, D.P., Cotter, S.M., Hardy, W.D., Jr., and Essex, M. Comparison of virus- positive and virus- negative cases of feline leukemia and lymphoma. Cancer Res. 39: 3866-3870, 1979.
9. Poesz BJ, Ruscetti FW, Gazdar AF, et al. Detection and isolation of type C retrovirus particles from fresh and cultured lymphocytes of a patient with cutaneous T-cell lymphoma. Proc. Natl. Acad. Sci. USA. 77:7415-7419, 1980.
10. Pneumocystis Pneumonia --- Los Angeles. Morbidity and Mortality Weekly Report (MMWR) on June 5, 1981.
11. Yu XF, Ito S, Essex M, Lee TH. A naturally immunogenic virion-associated protein specific for HIV-2 and SIV. Nature. 15:335: 262-5, 1988. Morbidity and Mortality Weekly Report (MMWR) on June 5, 1981.
12. Thior I, et al. Breastfeeding plus infant zidovudine prophylaxis for 6 months vs formula feeding plus infant zidovudine for 1 month to reduce mother-to-child HIV transmission in Botswana: a randomized trial: the Mashai Study. JAMA. Aug 16;296(7):794-805 2006.
13. Shapiro RL. Risk factors for early and late transmission of HIV via breastfeeding among infants born to HIV-infected women in a randomized clinical trial in Botswana. J Infect Dis. 1:199(3):414-8, 2009.