

A One Health opinion piece...

"...There can be no doubt about the unique potential for the One Health Model for Multidisciplinary Training and Collaboration."

Gary Roubin, veterinarian-physician trained Interventional Cardiologist research team member who helped developed the first Balloon-expandable Coronary artery stent for humans.

Veterinarians merged with physician educations: Past and present combined into one individual "One Health" examples—a useful conjoined degree program?

Bruce Kaplan, DVM and *Steven W. Atwood, VMD, MRCVS, MD, MPH

Dr. Kaplan is a co-founding member of the One Health Initiative Autonomous *pro bono* Team: Laura H. Kahn, MD, MPH, MPP ▪ Bruce Kaplan, DVM ▪ Thomas P. Monath, MD ▪ Lisa A. Conti, DVM, MPH ▪ Thomas M. Yuill, PhD ▪ Helena J. Chapman, MD, MPH, PhD ▪ Craig N. Carter, DVM, PhD <https://qoo.gl/rs7MjP>

* Dr. Atwood practices veterinary medicine at Animal Health Care Associates, West Tisbury, MA (USA) <http://animalhealthcaremv.com/about-us/meet-the-team/>. He has also uniquely earned a human medical degree (MD) and is a longstanding member of the One Health Initiative team's Advisory Board <http://www.onehealthinitiative.com/advBoard.php>.

During Dr. Kaplan's early Epidemic Intelligence Service (EIS) training at the U. S. Centers For Disease Control and Prevention (1963-65), two DVM-MD educated colleagues in private conversations served as outstanding examples of the benefits attained by amalgamating the two disciplines, i.e. veterinary medicine with human medicine studies. Indeed, early on at the co-founding of the One Health Initiative team, renowned physician virologist/vaccinologist member, Thomas P. Monath, MD, FASTMH [currently Dr. Monath is Managing Partner and Chief Scientific Officer, Crozet BioPharma] posited the idea of establishing a DVM/MD program at various university campuses having schools of veterinary medicine and human medicine closely associated on campus, e.g. the University of Pennsylvania, Philadelphia, PA and others.

This paper advances a case for considering establishment of unique DVM/VMD-MD/DO programs in the U.S. and internationally. Other veterinary medical degree titles exist in other nations, e.g. BVSc, BVM & S, BVetMed (London), VetMB (Cambridge), BVM etc. as well as medical degrees, e.g. MB, MBBS, BMBS, MBChB, MBBS etc. In the U.S., the Veterinariae Medicinae Doctoris (VMD) degree is only awarded to veterinarians by the University of Pennsylvania, in Philadelphia, Pennsylvania USA. This is equivalent (i.e., the same training offered) to the Doctor of Veterinary Medicine (DVM) degree awarded by all other U.S. veterinary schools. These programs prepare individuals for the independent professional practice of veterinary medicine, including the diagnosis, treatment, and health care management of animals and animal populations and the prevention and management of zoonoses.

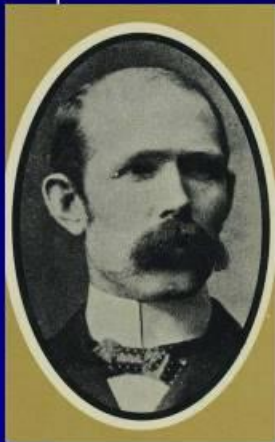
Instruction in the veterinary medical basic sciences are essentially identical to those of medical schools, e.g. anatomy, histology, physiology, biochemistry, pathology, pharmacology, microbiology, cell biology, genetics, and immunology. There is more emphasis on parasitology for veterinary medical students than for medical students. Subtle and overt differences among the species are enumerated, e.g. the difference of purine metabolism in Dalmation dogs vis-à-vis other canine species and humans. Clinically based studies—as is done in schools of medicine—for veterinary students are taught: extensively about infectious and noninfectious diseases, diagnostic procedures, veterinary internal medicine (in particular, concentrating on small animals and large animals), dermatology, ophthalmology, general surgery, orthopaedic surgery, obstetrics, radiology, anesthesiology, toxicology, animal health and preventive medicine [epidemiology], clinical nutrition, practice management, professional standards, ethics and more. Although psychiatry is obviously not part of the veterinary school curriculum, some important treatment of small animal (especially canine) abnormal behavior problems may be discussed.

It appears that a considerable majority of educated laymen as well as physicians and other professionals are relatively uninformed regarding the close similarity of training. Hence, the general erroneous perception of superiority (for those attaining medical school degrees) compared to those people obtaining veterinary medical degrees. Notably, during the veterinarian co-author's exposure to more than one DVM/MD graduates over the years private comments were shared stating essentially [paraphrasing], "in reality, there was not much difference between my veterinary medical training followed by medical school...except establishment of a broader scope of species variation understanding in my mind's eye. In addition, I believe the redundant studies helped cement my basic memory patterns of the subject matter and engaged a more in depth appreciation for species similarities...and differences."

Brief PAST History of a few impactful dual trained DVM/MD individuals:

Sir John McFadyean, Dip Vet, BM, MS (1853-1941)

"Founder Modern Veterinary Research"



- Veterinarian and physician
- Brought veterinary profession in the UK into scientific era
- Expanded discipline of veterinary pathology
- Founded *Journal of Comparative Pathology & Therapeutics*
- Built bridges across human and veterinary fields in infectious disease and comparative medicine

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- **Sir John McFadyean, MB, BSc, Hon. LLD, MRCVS (1853-1941), "Founder Modern Veterinary Research"**, a remarkable veterinarian and physician <https://goo.gl/5qg8BB>, founded the *Journal of Comparative Pathology & Therapeutics*, built bridges across human and veterinary medical fields in infectious diseases and comparative medicine. In addition to his degree in veterinary medicine, McFadyean sought to learn the newest and best in science, which led him to enroll at the Faculties of Medicine and Science of Edinburgh University where he earned his human medical degree. Notable for challenging the celebrated German physician and pioneering microbiologist, Robert Koch, known as the founder of modern bacteriology who gave the first description of the tubercle bacillus in 1882 and surprisingly had stated that no precautions were needed to be taken against milk or flesh from cattle afflicted with tuberculosis because bovine TB differed from the infection found in humans. McFadyean was subsequently proven right.

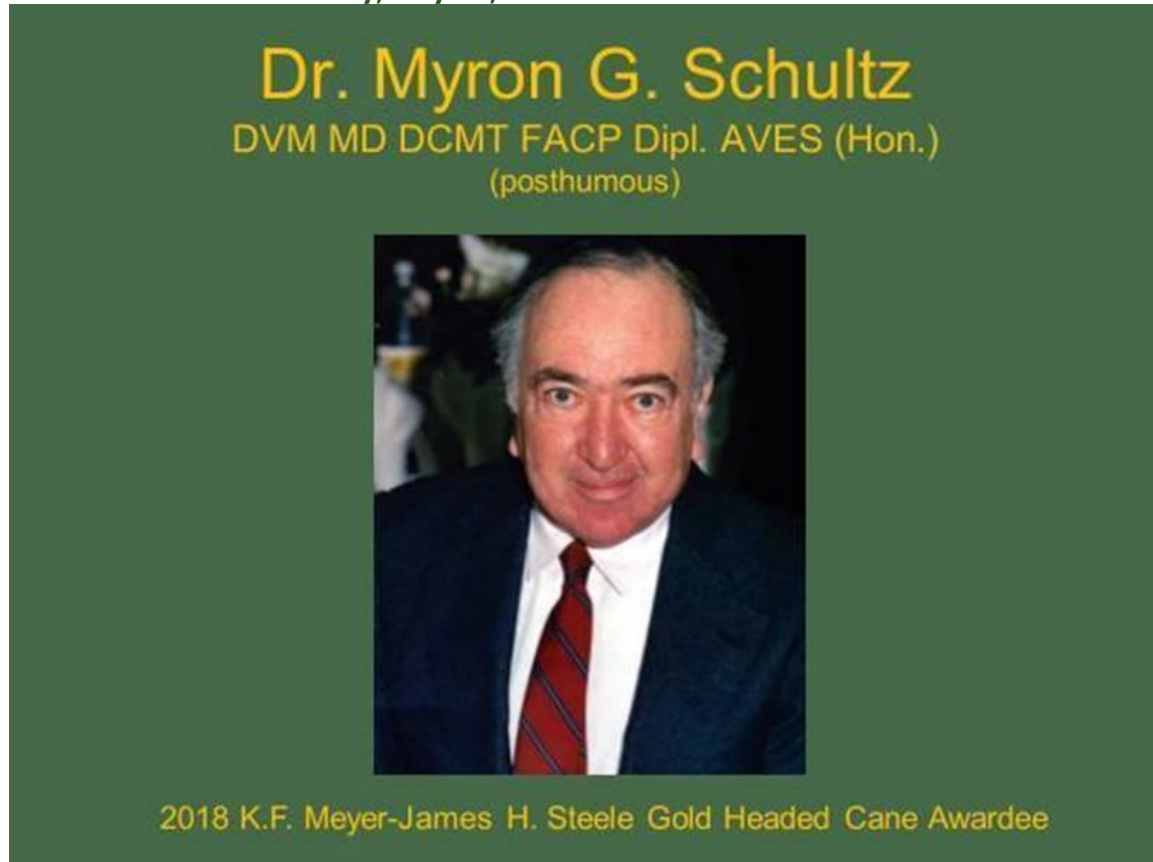
See: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1790170/pdf/canvetj00283-0010.pdf>; https://en.wikipedia.org/wiki/John_McFadyean; https://en.wikipedia.org/wiki/John_McFadyean; <https://www.findagrave.com/memorial/45300171/john-mcfadyean>

- **Christopher Graham, VMD, MD (1856-1952)**, was an early partner (co-founder) of the Mayo Clinic along with his brothers-in-law, Drs. William and Charles Mayo et. al. Graham became the clinic's chief diagnostician and started its pioneering clinical pathology laboratory. In 1897, he wrote: "*Side by side the two branches of medicine have developed; each has contributed its share in the in the development of general medicine. Each as time passed profited by the labors of the others....[but] from the time the historical differentiation between human and veterinary medicine took place, veterinary medicine has been a clearer cut science than human. It is based more on*

practical experience and investigation, observations of facts, and the truths and principles derived therefrom.” (Veterinary Medicine and Human Health, 3rd Ed., 1984, Pgs. 7, 260, Williams & Wilkins, C.W. Schwabe).

See: [https://www.mayoclinicproceedings.org/article/S0025-6196\(12\)60366-8/pdf](https://www.mayoclinicproceedings.org/article/S0025-6196(12)60366-8/pdf);
<https://circulatingnow.nlm.nih.gov/2016/06/14/the-origins-and-evolution-of-the-mayo-clinic/>

One Health Leaders Receive American Veterinary Epidemiology Society Awards – Posted One Health Initiative website Saturday, July 21, 2018



- **Myron G. “Mike” Schultz, DVM, MD (1935-2016)** was posthumously awarded the coveted K.F. Meyer-James H. Steele Gold Headed Cane at the annual awards breakfast program, Monday July 16, 2018, 7-10 am, Hyatt Regency Center, Colorado Convention Center, 650 15th St., Denver, Colorado.

Schultz has been credited with helping public health officials identify the AIDS epidemic in the 1980s among many other notable global public health accomplishments. He was also a prolific author chronicler of historic health professional individuals (physicians, veterinarians, other health scientists) and events in the CDC’s Emerging Infectious Diseases (EID) Journal and other publications. See NY Times obituary at <https://www.nytimes.com/2016/03/06/health/dr-myron-g-schultz-who-helped-identify-aids-crisis-dies-at-81.html>.

Some current ACTIVE dual trained veterinarian-physician notables:

- **Stephen Francis Badylak, DVM, PhD, MD – See**
<https://2019.biomaterials.org/program/speakers/stephen-francis-badylak-dvm-phd-md>

On March 25, 2007 the newly established One Health Initiative team received the following comments from Dr. Steve Badylak, an extraordinary and eminent scientific author and medical research professor:

"I have read the information that you forwarded to me a few days ago. Although I am of course very familiar with the work and contributions of Virchow, Guerin, Law, Osler and others, I must confess that I had never heard of the "One Medicine" philosophy. This only validates your statements of how this concept has languished in the last century. **I have lived this concept for my entire career having been the beneficiary of a rather unconventional education. I can tell you that this has paid me dividends every day in the way that I "think", work and practice. The benefits go far beyond the obvious zoonotic applications and extend into biomedical research at all levels.**

Consider this note an indication of my support for One Medicine [now commonly referred to as 'One Health'."

Sincerely,

Steve Badylak

Stephen Francis Badylak, D.V.M., Ph.D., M.D.

University of Pittsburgh

Research Professor, Department of Surgery Director of Tissue Engineering, McGowan Institute for Regenerative Medicine

Since then, among many other remarkable endeavors, in 2014 Badylak's multidisciplinary research team developed a significant One Health translational medicine research approach, i.e. regrowth of injured muscles in mice and humans using material from pig bladders has been demonstrated by Badylak's multidisciplinary [One Health] research team from the University of Pittsburgh—led by Badylak, <http://www.mirm.pitt.edu/badylak/>— a University of Pittsburgh Research Professor, Department of Surgery, Director of Tissue Engineering, McGowan Institute of Regenerative Medicine. Reference citation: B. M. Sicari, J. P. Rubin, C. L. Dearth, M. T. Wolf, F. Ambrosio, M. Boninger, N. J. Turner, D. J. Weber, T. W. Simpson, A. Wyse, E. H. Brown, J. L. Dziki, L. E. Fisher, S. Brown, S. F. Badylak, An Acellular Biologic Scaffold Promotes Skeletal Muscle Formation in Mice and Humans with Volumetric Muscle Loss. *Sci. Transl. Med.* **6**, 234ra58 (2014).

- **Gary S. Roubin, BVSc. (Hons.), MB, BS., PhD, MD, FRACP, FACC, FAHA, FSCAI** trained in veterinary medicine and human medicine in Australia, now medical director at Cardiovascular Associates of the Southeast Birmingham, Alabama (USA).

Renowned Physician Interventional Cardiologist Endorses One Health Concept

The One Health Concept: How Multidisciplinary Training and Collaboration Leads to Major Advances in Health Care

Please see

<http://www.onehealthinitiative.com/publications/The%20One%20Health%20concept%20is%20a%20worldwide%20strategy%20for%20expanding%20interdisciplinary%20collaborations%20and%20communications%20in%20all%20aspects%20of%20health%20care%20for%20humans.pdf> or <https://goo.gl/cZ61UE>.

"The One Health, One Medicine philosophy of multidisciplinary collaboration has the extraordinary potential to expand scientific knowledge and innovation in health care. This collaboration can improve the longevity and quality of life for millions of patients. There is marked synergy between animal and human health. The way scientific collaboration between the Veterinary and the Medical community can improve patient care is well illustrated by the development of the First Balloon Expandable Coronary Stent.*

The writer was fortunate to have completed a 5-year Veterinary Medical Degree followed 1-year later by a 5-year Medical Degree at the University of Queensland, Australia. Following clinical training that culminated in specialist qualifications in Cardiovascular Diseases, he completed his education with a PhD in Cardiac Hemodynamics at Sydney University, Australia.

A National Heart Foundation Fellowship took him to Emory University in Atlanta Georgia USA to work with Professor Andreas Gruentzig – the pioneer of Coronary Balloon Angioplasty. Coronary angioplasty was plagued by the shortcoming abrupt vessel collapse and closure complicating this potentially valuable procedure.

The writer's multidisciplinary skills facilitated successful research in multiple animal species and disease models. He collaborated closely with fellow veterinarians at Emory University and the University of Alabama at Birmingham. This work culminated in the development of the first balloon expandable coronary stent and first FDA approved coronary stent in 1994. The innovative, early clinical work and the scientific foundation of the preclinical animal studies was the underpinning for a medical procedure that has been used in hundreds of millions of patients since its introduction. Coronary stenting revolutionized coronary intervention - saving lives in patients with unstable coronary syndromes and improving quality of life in countless others.

Utilizing his multidisciplinary Veterinary and Medical skills the writer has gone on to develop devices for stenting of the carotid artery, embolic protection filters for the brain and devices for closing large bore access punctures in arteries.

There can be no doubt about the unique potential for the One Health Model for Multidisciplinary Training and Collaboration."

**The First Balloon-Expandable Coronary Stent: An expedition that Changed Cardiovascular Medicine. : Roubin, Gary: University of Queensland Press 2014*

[<https://www.amazon.com/First-Balloon-Expandable-Coronary-Stent-Cardiovascular-ebook/dp/B00QEGEQXG>]

Provided by Dr. Gary S. Roubin to the One Health Initiative team's website September 4, 2017 via Bruce Kaplan, DVM <https://goo.gl/XwQMfw>, and Peter G. Anderson, DVM, PhD, University of Alabama (USA) School of Medicine <http://apps.medicine.uab.edu/FacultyDirectory/FacultyData.asp?FID=19493>. Dr. Anderson <http://apps.medicine.uab.edu/FacultyDirectory/FacultyData.asp?FID=19493>, a veterinarian, was the extraordinary veterinary pathologist member of the interdisciplinary research team.

Note: Dr. Roubin and his colleagues' ground breaking *One Health achievement*, i.e. *development of the First Balloon-Expandable Coronary Stent*, was first reported by the One Health Initiative team in the One Health Initiative website February 9, 2010 <http://www.onehealthinitiative.com/news.php?query=++%93ONE+HEALTH+i+n+Action%94+-+First+Flexible+Coil+Balloon+Expandable+Intracoronary+Stent+Development+for+Humans>.

- **Larry R. Anderson, DVM, MD** <https://www.doximity.com/pub/larry-anderson-md-493904a6> – A noteworthy general practice physician at the Sumner County Family Care Center, PA, Wellington, Kansas (USA) and member of the One Health Initiative team's Advisory Board <http://www.onehealthinitiative.com/advBoard.php>. Anderson was a member of the original AVMA One Health taskforce <https://www.avma.org/KB/Resources/Reports/Pages/One-Health160.aspx> which served as a significant milestone in promoting/jump-starting the "One Health" movement in the U.S. and worldwide.

Notably, an important discussion of "One Health—One Education: Medical and Veterinary Inter-Professional Training" was advanced in the American Journal of Veterinary Education November 18, 2018 <https://jvme.utpjournals.press/doi/10.3138/jvme.1116-171r>. In addition, the authors contend that schools of medicine, veterinary medicine and public health should seriously consider instituting this sea change educational One Health approach within and among appropriate university campuses. It would help facilitate the established premise of "*One Health implementation will help protect and/or save untold millions of lives in our generation and for those to come.*"