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Biographical Feature

Patrick R. Murray, Ph.D.

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Like a bottle of fine wine that has been allowed to age, the 40-year career in clinical microbiology of Patrick R. Murray, Ph.D., has yielded a unique and sublime blend of contributions to our discipline. From clinical laboratory director to editor extraordinaire to innovator and discoverer of unusual pathogens, he has made accomplishments that extend globally.

Patrick R. Murray was born on 15 January 1948 in Los Angeles, CA. He went to Saint Mary's College in Moraga, CA, from 1965 to 1969, where he received a B.S. with honors in biology and chemistry. Following graduation, he attended the University of California at Los Angeles (UCLA), where he received his Ph.D. in microbiology and immunology.

Dr. Murray left the California sunshine for the cold, snowy environs of Rochester, MN, to complete a fellowship in clinical microbiology at the Mayo Clinic from 1974 to 1976 and to work with John Washington, M.D., as his mentor. Together, they published several important manuscripts on optimal recovery of important bacterial pathogens, such as group A streptococci, and on the appropriate methods of processing specimens for microbiologic diagnosis. Jim Jorgensen said, "John was very conservative and instilled in Pat the importance of performing studies that were statistically valid and clinically relevant." These lessons were carried forward throughout Pat's career and are reflected in his 263 peer-reviewed scientific publications. One early manuscript is highlighted by Erik Munson, Ph.D. "When I personally think of Dr. Murray, the first thing that comes to my mind is the 'sputum Gram stain rejection' paper that he coauthored way back in 1975 (1). I feel that it is a truly seminal work that withstands the test of time. When I teach clinical laboratory science students, we go through this paper in depth because of its significance."

After the fellowship, Pat became a diplomate of the American Board of Medical Microbiology in 1978, and he embarked on an

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amazing career in clinical microbiology, resulting in a legacy of contributions to the discipline that continues today. He joined the departments of pathology and medicine at Washington University in St. Louis, MO, initially as a consultant from 1976 to 1977 and then as a faculty member, rising among the ranks to professor in both departments by 1992. For 23 years (1976 to 1999), Pat served as director of the clinical microbiology and serology laboratories at the Barnes Hospital (later [1996] the Barnes-Jewish Hospital). During that time, he made remarkable contributions to clinical service, teaching, and research. With respect to clinical service, he not only directed the laboratory but served on numerous committees for both the university and the Barnes Hospital. He was acknowledged and honored for his excellence in teaching as a three-time recipient of the Washington University School of Medicine Distinguished Teaching Award. It was also during his days at Washington University that Pat became an inspiration to others. Mike Pfaller, M.D., shares the following comments: "I first met Pat in 1978 as I returned to Washington University to begin a residency in laboratory medicine. Although my training in clinical microbiology preceded the establishment of the postdoc program at Washington University, I am pretty sure that I served as the guinea pig for that successful program, for which I am eternally grateful. Now, 38 years later, I am happy to count Pat as a mentor, colleague, and friend. He has served as my role model throughout this time. Specifically, he showed me that in order to be an effective laboratory director and consultant to clinicians, one had to get out of the lab and talk to them as colleagues, guiding them through the maze of microbiology that most failed to register during their medical school days. Not all of Pat's mentoring had to do with scientific topics. I distinctly (or is that more hazy than distinct?) remember a couple of meetings in New Orleans during the early 1980s where I was introduced to the art of the 'hurricane' at Pat O'Brien's by a certain Irishman, followed by. . . . On second thought, never mind. Suffice it to say that my life and career have been most favorably impacted by Pat!"

On a more serious note, Dr. Susan Novak shares the following: "As a graduate student, I had the opportunity to attend a local meeting and was introduced to two very well-known and accomplished clinical microbiologists. One of those people was Dr. Pat Murray. It was a time when I was finishing my Ph.D. and I was looking forward to my new career as a doctoral-level scientist. At this meeting, Dr. Murray spent time with me discussing the wonderful career of clinical microbiology. It was not only the time spent with me but his obvious passion for his career and his genuine interest in me as a person and a new Ph.D. scientist. For just meeting him, this was very impactful. Because of this encounter, I ended up pursuing a career in clinical microbiology and have been in the field now for almost 25 years. Even after I had a job and my career was stable, Dr. Murray always checked in with me and has been a mentor to me ever since. I feel that I made the right choice in life and love clinical microbiology and really have Dr. Pat Murray to thank for this!"

In terms of research during the Washington University days, Jim Jorgensen comments, "He continued the basic blood culture studies he started at Mayo but expanded them into assessment of the new continuous-monitoring blood culture instruments while at Washington University and Barnes Hospital. During the middle of his career, he became more and more interested in cutting-edge, new technologies for organism detection and identification while retaining the basic precept of studying significant numbers and making sure that the devices were clinically relevant." Mel Weinstein, M.D., concurs. "I first became aware of Pat when he was at Barnes, or maybe Mayo, when he was starting his blood culture work. As a clinical investigator, he was extremely productive." Just as he encouraged graduate students to pursue a career in microbiology, so did he mentor the technologists in both his clinical and his research laboratories. Ann Niles reflects, "As his research technologist for approximately the first 20 years of his career, I was able to benefit from his knowledge of microbiology and the new technology and antimicrobials that were being introduced during those years. Because of my previous work experience, I was allowed to work independently on most projects, which shows how Dr. Murray was able to delegate work and still oversee the results produced. As his expertise in the field grew, Dr. Murray was a sought-after speaker who could make microbiology understood by all audiences. I thoroughly enjoyed my years with him as my boss and was so sorry to see him leave Washington University. I am still looking forward to seeing the 'coffee table book' he talked about writing. Because of Dr. Murray's ability to explain the technical side of microbiology in layman's terms, such a book would be entertaining and informative." Dr. Murray's contributions to research were further acknowledged by the American Society for Microbiology (ASM) when he was chosen in 1993 to receive the prestigious Becton Dickinson Award for Research in Clinical Microbiology.

In 1999, Dr. Murray became the director of clinical laboratories at the University of Maryland Medical Systems and professor in the Department of Pathology at the University of Maryland. Although his tenure there was short, his impact was substantial and continued after his departure, as evidenced by the numerous University of Maryland distinguished teaching awards he accumulated (from 2002 to 2011) as an adjunct faculty member.

Recognizing the opportunity to have a broader impact on advancing novel technologies in the clinical care of patients, Dr. Murray was actively recruited and accepted the position of senior scientist and chief of the Clinical Microbiology Service for the Clinical Center at the National Institutes of Health (NIH), Bethesda, MD, in 2002. He also was director of the NIH Fogarty Microbiology Postdoctoral Fellowship Program. Dr. Anna Lau was one of Dr. Murray's fellows. She recounts her trepidation at meeting such an international icon: "As a 24-year-old graduate student from Australia, I was quite nervous about meeting Dr. Patrick Murray, an international giant in our field, for a CPEP fellowship interview. But I honestly had nothing to worry about. Dr. Murray has this wonderful ability to make everyone feel comfortable and to draw out and harness the best qualities in his colleagues and staff. Despite his heavy workload and various commitments, Dr. Murray always made time for people. I always enjoyed our chats, which were generally a mixture of great microbiology teaching mixed in with stories of travel and weekend shenanigans. I particularly loved traveling to his house on the island, which was an eye-opening experience for a foreigner and made for good stories to tell back to people in Aus! Even though I only had 6 months' overlap with Dr. Murray before he left the NIH, he has continued to be an incredible mentor to me, as he is always available to offer advice, support, and encouragement whenever needed."

Dr. Susan Harrington was also one of the fellows who benefited from Dr. Murray's mentorship. Susan recalls, "At the NIH, Dr. Murray's goal was to transform the Clinical Center microbiology

lab into a lab that not only met the needs of a complex patient population but was more active in bench-to-bedside research. Under his leadership, Dr. Adrian Zelazny and technologists developed a novel sequencing target and databases for bacterial identification, and his clinical lab was the first in the United States to implement matrix-assisted laser desorption ionization–time of flight mass spectrometry (MALDI-TOF MS) for bacterial identifications using their own databases (2, 3). Dr. Murray believed the role of the government-funded lab is to contribute to development of methods for broad clinical application." His dedication and drive to pursue innovation led to the discovery and characterization of a novel species, *Granulibacter bethesdensis* (4).

As if clinical service, mentorship, and research innovation were not enough, beginning early in his career and continuing into his years at the NIH, Dr. Murray garnered a reputation for his amazing editorial contributions. This writer, as well as most readers of this biography, associates the name Patrick Murray with the *Manual of Clinical Microbiology* (MCM). Pat began his involvement with the textbook in 1989 as the aerobic bacteriology section editor for the 5th edition and continued as editor in chief of MCM for editions 6 to 9! Authors and junior editors alike benefited from his talents. Mike Pfaller adds, "I must always credit Pat with providing me opportunities in the publication process, notably through the ASM *Manual of Clinical Microbiology* and the medical student text *Medical Microbiology*, now in its 8th edition." James Jorgensen, who served as volume editor of MCM with Pat and later coeditor in chief of MCM with Mike Pfaller, concurs with Mike's comments. "During his academic life, he was the most prolific editor that I have ever known. He was single-handedly the editor in chief of several editions of the *Manual of Clinical Microbiology* and several other microbiology texts. He would normally rise at 4 a.m. or earlier and edit manuscripts before making the 50-mile drive from his home in Baltimore to the NIH through the teeth of some of the worst traffic in the United States. I know personally that he wore out two really nice cars by driving all those miles each day."

Dr. Adrian Zelazny and Laura Ediger, MT(ASCP), reflect on other aspects of Dr. Murray's tenure at the NIH. Pat was never one to allow administrative or other constraints to stand in the way of progress. They note, "He gathers information, makes connections, sees what's possible, and proposes a plan; he connects people (basic researchers, clinicians, commercial enterprises) for the benefit of diagnostics and patient care. He was not afraid to tackle big collaborator projects with many people."

It was Dr. Murray's notable skill at the NIH as a "big-picture person" capable of connecting people that attracted Becton Dickinson (BD) to pursue him for a leadership position. Currently, Dr. Murray is the worldwide director of scientific affairs for BD, a position he has held since 2011. At BD, this position requires working closely with executive leadership of various teams, from Medical Affairs and Regulatory Affairs to the Innovations and Diagnostics groups. Outside the organization, Dr. Murray interacts with hospital officials, professional societies, and government agencies. He travels the globe, giving lectures and visiting hospitals. He has led market development for many BD diagnostic platforms in Latin America, the Middle East, Asia, and Australia. Rick Ivey, MEA, worldwide vice president for R&D Diagnostic Systems, BD Life Sciences, emphasizes the value and depth of knowledge that Dr. Murray has brought to the organization. "As the R&D leader in BD Diagnostics, I have come to depend on Pat as a trusted confidant who is always open to assist in the 'what if's' of ideation and innovation or just plain straight debate and dialogue on what will or won't work in a lab or clinical setting. His logical arguments help us to get to optimal solutions quickly. All on our teams look to him for fundamental guidance and direction. Pat has also taken several strong positions on direction for our technologies or product development options while at BD, enabling our teams to drive to an optimal solution quickly. This has been extremely invaluable to our company." Such comments are echoed by Celine Roger-Dalbert, Ph.D. (microbiology), at BD, who describes discussions with Pat as "a learning experience," while Pat himself recognizes that he is still learning from colleagues in the business environment.

For all of these phenomenal contributions to the discipline of clinical microbiology and for tremendous service to the American Society for Microbiology through committee work other than the editorial contributions, too numerous to list here, Dr. Murray has been honored with many awards. Just a few will be mentioned. For leadership in clinical microbiology, he received the ASM bioMérieux-Sonnenwirth Award in 2002, one of the most prestigious awards bestowed upon clinical microbiologists. Also from ASM, Pat received the Founders Distinguished Service Award (2007) and the TREK Diagnostic ABMM/ABMLI Professional Recognition Award (2011). Finally, the Illinois Society of Microbiology chose Dr. Murray for its annual Microbiology Pasteur Lifetime Achievement Award in 2007.

No biography is complete without mention of life outside the profession. Pat Murray is married to Melissa Murray, an artist, and they have five children and 10 grandchildren. Pat and Melissa live on the beautiful Gibson Island in the Chesapeake Bay, where he relaxes, pursuing hobbies such as fly fishing, designing gardens, and photography.

In summary, it is clear that Dr. Murray enjoys life and the practice of clinical microbiology in whatever setting this occurs, and he is very skilled at sharing his passion with others, whether through his writing or through orations. Susan Harrington well encapsulates his expansive career as follows: "His depth of knowledge of practices of the past seems to provide him with perspective on present methodologies and keeps his eyes on the needs of the future." As Anna Lau concludes, we are all "looking forward to seeing the next whiz-bang contributions that Dr. Murray has in store for the clinical microbiology community in the years to come!"

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