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Commentary

A festschrift for J. Martyn Bailey, a biochemist extraordinaire

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Abstract

A festschrift for Dr. John Martyn Bailey, Professor of Biochemistry and Molecular Biology was organized by the Biochemistry department of the George Washington University School of Medicine and Health Sciences on December 4–5, 2006 to honor his 48 years of contributions. He made important contributions in the areas of essential fatty acids, prostaglandins, thromboxanes and lipoxygenase metabolites.

Keywords: Prostaglandins; Essential fatty acids; Cholesterol metabolism; 15-HETE; Lipoxygenase; Atherosclerosis; Astronomy; Reverse transcriptase; Mutarotase; Sugar metabolism; Cyclooxygenase; Non-steroidal anti-inflammatory drugs; Aspirin; COX-2

A festschrift for Dr. John Martyn Bailey, Professor of Biochemistry and Molecular Biology was held at the George Washington (GW) University School of Medicine and Health Sciences on December 4–5, 2006 to honor his 48 years of contributions. The symposium was organized by Dr. Allan Goldstein, Chairman of the Department and Dr. Jack Y. Vanderhoek, a former postdoc of Bailey who is also a colleague at GW. Current members of the GW faculty, students as well as Bailey lab alumni attended this event. In his long, distinguished career, Martyn made numerous contributions to the areas of essential fatty acids, prostaglandins, thromboxanes and leukotrienes, in addition to his pioneering work on cholesterol metabolism.

Martyn Bailey received his early scientific training at the University College of North Wales in the United Kingdom. He received his Ph.D. degree in 1952 and was later awarded the D.Sc. degree. His thesis project in the lab of WJ Whelan was on the biochemistry of sugar metabolism. Later, as a postdoctoral fellow with George Gey at the Johns Hopkins University in the late 1950s, he applied the then cutting-edge technique of tissue culture to understand biochemical mechanisms related to sugar metabolism. After establishing his own lab at GW, Bailey continued to use tissue culture methods to demonstrate that cells can sense the level of cholesterol in their environment by using "receptors" for lipoproteins. He further described the mechanism of regulation of *de novo* cholesterol synthesis by exogenous lipoproteins [1–4]. This work laid the foundation for eventual discovery of LDL receptors and mechanisms of cellular cholesterol mechanism by Brown et al. [5], work that eventually was recognized by a Nobel prize (http://nobelprize.org/nobel_prizes/medicine/laureates/1985/brown-goldstein-lecture.pdf).

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He went to GW as an Assistant Professor of Biochemistry in 1959 and established a highly productive laboratory that tackled several areas of contemporary biochemistry. Bailey made important contributions in the area of sugar metabolism and published a series of definitive papers on mutarotase, an enzyme involved in the isomerization of hexoses [6–10]. He is best known, however, for his work in the field of lipid mediators particularly work related to essential fatty acids, eicosanoids and vascular biology. His lab was the first to describe the production of thromboxane by cultured lung fibroblasts [11–13]. In addition, in a series of papers, he systematically described the potential regulatory role of prostaglandins and thromboxanes in atherosclerosis [14–17], at a time when inflammatory theory of atherosclerosis was not in vogue! The mechanistic studies on aspirin and vascular cells in the regulation of prostanoid synthesis also appeared prescient as this work was done prior to the widespread clinical use of this drug as an anti-thrombotic medication to prevent heart attacks and stroke [18]. Interestingly, before complementary and alternative medicine became popular, his lab described studies on the inhibition of platelet function and phospholipases by natural products derived from garlic, onion and feverfew [19–23]. Later on his lab described some of the first studies on the growth factor regulation of inducible cyclooxygenase [24,25], inhibition of the inducible cyclooxygenase by glucocorticoids [26], effects of lipoxygenase metabolites on immune cells [27–29] and molecular studies on the cyclooxygenase enzymes [30]. Such studies were all carried out by a cadre of students and postdoctoral fellows who were stimulated by Bailey's intellect; together they defined important problems and sought mechanistic solutions to bring a clarity of understanding to complex physiological and pathological processes. In recent years, he has focused his attention to theoretical studies on RNA and the homochirality of amino acids in proteins [31–33], touching on subjects such as the origin of life and the RNA world.

Bailey is a true renaissance man of science. His ability to tackle seemingly unrelated areas and make important contributions were noted by several of his former colleagues. While working on eicosanoids and atherosclerosis, he shifted gears and focused on developing inhibitors of the reverse transcriptase of HIV in the 1980s just as the virus was being discovered. Bailey made some interesting novel compounds and managed to get extramural support for this new project [34–37]. Most notably, his interest in classical Copernican astronomy which began as a hobby at the Georgetown observatory led him to develop several important concepts on the relationships between different planets of our solar system, and resulted in a publication in Nature [38]!

The festschrift began with a keynote speech by, Professor of Pharmacology at the University of Pennsylvania. He spoke about the pharmacology of COX-2 inhibitors (so called Coxibs) and the putative mechanisms involved in their pro-thrombotic side effects. This cutting-edge work, which is of great clinical interest, was especially appropriate for the festschrift in light of Bailey's pioneering work on prostaglandins and thromboxanes in the cardiovascular system and their roles in atherosclerosis. Indeed, Bailey showed that non-steroidal anti-inflammatory drugs that inhibit COX enzymes have complex roles in animal models of atherosclerosis as described above.

The remainder of the program was composed of a series of talks by former graduate and post-doctoral students from Bailey's lab whose training spanned in time from the Eisenhower presidency to the time of Ronald Reagan's 2nd term. Dr. Lala Dunbar, from the Louisiana State University School of Medicine eloquently spoke of her personal reminiscences of Bailey's mentorship. Dr. Peter Fishman, a senior investigator at the NIH, gave a historical account of his work on mutarotases and spoke of his recent work on the dynamics of intracellular trafficking of β-adrenergic receptors. Dr. Barbara Howard of the Medstar Research Institute spoke of the genetics of cardiovascular disease and diabetes in American Indian and Alaskan Eskimo populations, especially dealing with the issues of dietary $n-3$ essential fatty acids and heart disease. Dr. Steven Feinmark of Columbia University related his recent work on potassium channel signaling in cancer and to the early training he received from Bailey on prostagladins in virally transformed cells. Timothy Hla of the University of Connecticut Health Center picked up on this theme and spoke of the role of COX-2 in cancer and tumor angiogenesis, as well as the sphingosine 1-phosphate receptor regulation of angiogenesis. The final words of the festschrift were given by Dr. Jack Vanderhoek, a former Bailey postdoc and a long-time collaborator. Jack read the poem "Ode to Bailey" which he authored for the occasion.

The celebration of the scientific career of Martyn Bailey which spanned nearly five decades reinforced his contributions in the areas of prostaglandins, thromboxane, leukorienes and essential fatty acid metabolism. In addition, the key roles played by these mediators in human physiology and disease were emphasized and Martyn's contributions that added significantly to our knowledge of biochemical mechanisms were recognized. The importance of this field in human pharmacology, as illustrated by the current controversies surrounding NSAIDs, aspirin and the coxibs highlights how much work remains to be carried out by future scientists in the field. The path for this future work has been blazed by a 48-year trail of biochemical findings presented to the field in Bailey's numerous publications.