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Clinical Metabolomics is the Next Step in Clinical Biochemistry

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Abstract

Clinical biochemistry is a field that primarily relies on biochemical analyses of various body fluids, the most important of which are urine, blood, and cerebrospinal fluid. Centuries of scientific advancements have paved the way for the relatively recent significant advancements in this field. Standard analytical chemistry in the clinical setting has seen decades of significant advancements thanks to technological innovation and the introduction of cutting-edge instruments. Clinical biochemistry was founded on primitive methods like Richard Bright's (1789-1858) test for proteinuria in cases of suspected renal disease, in which a candle flame heated a tablespoon of urine. The beginning of the twentieth century could only be traced to minor technological advancements. In 1920, "a centrifuge, a urinometer, two monocular microscopes, two small substage microscope lights, a Bunsen burner, a Dubosq colorimeter, a basal metabolic rate machine, an electro-cardiograph, a microtome, a knife, a paraffin bath, a few antisera and an assortment of test tubes, beakers, and pipettes" were among the items in the clinical pathology laboratory.

Keywords: Biochemistry of nutrition • Comparative biochemistry • Biochemistry techniques

Introduction

For teachers of biochemistry and molecular biology in secondary-level science classes, the interdisciplinary field of agricultural biochemistry can offer a wealth of didactic opportunities. This is especially true in today's world, where virtual-learning strategies have taken over in-person instruction and modern methods are required to engage students in relevant science applications. This communication discusses how combining daily lessons in agricultural biochemistry with periodic use of e-notebooks improves this strategy by encouraging content retrieval and providing educators with cost-effective and easy formative feedback on student progress [1].

Throughout his entire life, Prof. Xu was also concerned about public health. Prof. Xu presented his findings to the general public and debated the rationality of exercise dosage in the early 1980s by monitoring enzyme changes in athletes during exercise. He discovered in 1986 that as boys entered adolescence, plasma testosterone concentrations increased. In addition, androgenic hormones increased androgenic hormone secretion, which in turn increased boys' exercise capacity. Girls' androgenic hormone levels, on the other hand, remained virtually unchanged as they entered adolescence, which contributed to the explanation of differences in exercise capacity between boys and girls. The theoretical basis for different gender groups participating in various forms of physical exercise was established by this significant discovery. Since the 1990s, there has been a strong belief that playing sports can slow down aging and reduce the number of diseases that cause more problems, like tumors. In an effort to change this biased view, Prof. Xu published a paper titled Rehabilitation and Immunity of Geriatric Diseases. In it, he argued that excessive exercise could have unfavorable effects, such as making it harder to detect tumor onset or accelerating the progression of a disease. As a result, he suggested that individuals select appropriate exercises based on their particular circumstances [2].

Methods

This conflict between biochemistry and molecular biology could easily be dismissed as nothing more than a dispute over territory, journal space, or grants, but I believe it was and is more than that. After all, molecular biology is exactly what it says it is: a study of molecules, just as biological chemistry is about the chemistry of those molecules-with all due respect to the Journal of Biological Chemistry, whose contents transcend its title. The dynamics and interactions of molecules are what biochemistry is all about, and neither mentions them. Sir Frederick Gowland Hopkins, who won the Nobel Prize for his discovery of vitamins and was a professor of biochemistry at Cambridge in the 1920s and 1930s, is the charismatic figure whose classic definition holds the key. "Life is a dynamic equilibrium in a polyphasic system," he stated. That definition does not take into account the fact that the equilibrium point changes over time, which is why I prefer the term "homeodynamics" rather than "homeostasis." Death is in stasis [3].

Many biochemists and molecular cell biologists found that their initial interest in biology was sparked by firsthand experience. The majority of young children observe the sprouting of seeds, plant a small garden, or conduct the experiment with colored water on celery; Some might help deliver a calf or a litter of puppies or make a pH indicator out of purple cabbage. As a result of these experiences, I frequently required a trip to the neighbourhood library or the removal of a dusty college book from the living room shelf in order to answer questions about natural phenomena, most of which concerned biology. Interests grew by middle school, and it was amazing to learn about and draw atomic orbitals. With one exception, the subsequent high school foundations in math, chemistry, physics, and biology were routine and lacked the excitement of previous teachers [4].

Discussion

If genetics and developmental biology hadn't split up early in the 20th century, developmental biologists would have been able to tell them that if life wasn't in the gene, it had to be in how the gene is read during ontogeny. As a result, Waddington's epigenetics has been rediscovered, as has another proclaimed new field known as "evo-devo," or evolutionary developmental

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biology. Ann McLaren, Waddington's student and the first woman to hold the position of Foreign Secretary of the Royal Society, once stated, "I thought that's what we'd been doing all along." However, there are trends in terminology. It appears that this is the reason why, in addition to our genome, we also have an epigenome. Indeed, we have an entire "omes" wardrobe. Signalosomes, proteomes, transcriptomes, and even enviromes all exist. The fact that each of these "omes" appears to be essentially static compilations presents a challenge for a biochemist; a list of all the molecules or systems that are available and can be condensed into a trendy portmanteau term. Understanding their metabolism-their dynamic interactions-is required to bring them to life. As is customary, we have a brand-new term for it: the metabolic genome However, is that not what biochemists have been studying all along, as Hopkins would have pointed out? If molecular biologists start studying metabolism now, they might want to think about Chargaff's comment and make sure they have permission to do so [5].

Conclusion

As a senior taking AP Biology or AP Chemistry, I was immersed in hands-on activities that included everything from animal dissections and enzyme assays to pH curves and active discussions of how and why by teams of students. This laid the groundwork for my choices and college programs because it helped me identify my interests.

Acknowledgement

None.

Conflict of Interest

None.

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