

aspects of the life sciences is so well established that to question it would be the height of heresy! Still, this should not lull us biochemistry educators into complacency. From time to time, we should question our approach to the subject matter, course content, and strategies. We should also examine how we rate our curricula.

Is it enough that students retain much information in their short-term memories? Or should we strive to make our students acquire the ability to use biochemical information, techniques, and thought in subsequent courses or in independent work in medicine?

I think you know the answer.

## ON BEING A GRADUATE STUDENT

Ramonesa R. Ricardo

*There are many reasons for going into graduate school. Some are discussed here. Also discussed is the curriculum on M.S. Biochemistry offered by the Department of Biochemistry and Molecular Biology, University of the Philippines, College of Medicine, Manila.*

"They say a road goes somewhere. It is not so. It is we who make the move. The road stops when we stop. It only carries us to where we want to go." I forgot now where I heard these words. I think it was a late night showing of *The Twilight Zone*, when all was quiet except for the television set and I was half-listening to it and half-thinking of what I had been doing with my life for the past two years, and why.

Two years ago, I enrolled in the M.S. Biochemistry program of the Department of Biochemistry and Molecular Biology of the College of Medicine, University of the Philippines. My reasons then were practical. Proud as I was of my alma mater, I had been hearing that UP was something else. I had been at a UP unit some years back, but had been at the other end of the red pen and outside the teacher's

record book. I wanted to find out how it was on the other side. UP Manila was in my favor, distance-wise, because I would be commuting everyday; and its tuition fees were affordable, as the only scholarship I could get was that which my husband financed. While I could have gone somewhere else with a Bachelor's degree in chemistry, I convinced myself that the trend, even in industry, was along the life sciences. Besides, I had been interested in biochemistry ever since I could remember.

My warehouse of self-confidence was not fully stocked at the beginning. Not after four kids and five years of

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The author holds a B.S. degree in Chemistry from the University of San Carlos at Cebu. She taught in the University of San Carlos, Central Mindanao State University at Bukidnon, and UP at Cebu. She is currently a full-time graduate student.



keeping house. I needed to go back to school to find out if I could still understand serious talk.

As I discovered later, my classmates had other reasons for being in graduate school, some definitely nobler than mine. They were sent by their schools to upgrade themselves, to add to their knowledge of the subject, or they needed the degree for whatever positions they occupied. One wanted to be a doctor but could not afford medical school, so he thought the closest he could get to being one was to be a biochemist. A semester in the Program was just a steppingstone for some. For others, it might have been a detour.

The M.S. Biochemistry curriculum requires 24 units of course work, at least 18 of which are in biochemistry, and 6 units of research. Up to 6 units of biochemistry, offered by other colleges of UP may be accepted, subject to evaluation. If one works fast enough and is lucky enough, one can finish in two years. The core courses for all masteral students add up to 8 units.

The *General Biochemistry* lecture (Biochem. 201.2, 4 units) is an eye-opener. It is divided into four sections: proteins, energy metabolism, nitrogen metabolism, and special topics like hormones, acid-base balance, blood, and immunochemistry. The volume of material to be learned in such a short time forced most of us students to rethink our motives and reweigh our options. I wonder what Michaelis, Eadie, Krebs, Watson, and that little carbon atom which started all these reactions would have to say if they knew that they caused increased metabolism, hyperventilation, and sleepless nights.

The laboratory portion of the course (Biochem. 201.3, 2 units) focuses on design and execution of a protocol, as well as the presentation and interpretation of results. We extracted glucose-6-phosphatase and glutaminase from rat liver and kidney, and purified these by gel filtration and

disc gel electrophoresis, among others. It was tedious, fun at times, but worth it.

To complete the 8 units of core courses, a student is required to enrol twice in *Seminars in Biochemical Literature* (Biochem. 299, 1 unit). One reports on a published paper twice: the first time on its objectives, experimental design, and results; the second time, on its merits and demerits. I had moments of knee-shaking and sweating, and had butterflies in my stomach, but who wouldn't? Especially if one is grilled while one is reporting. But I enjoyed the course. I learned to dissect a paper and understand the work better. Somehow I found it encouraging to know that even guys who get their work published make mistakes sometimes.

The Department offers a lot of other courses which one can choose from. I learned that eating the right amount of protein is not as good as eating the right kind in *Nutritional Biochemistry* (Biochem. 230, 2 units). A discussion here of protein-calorie malnutrition made me aware of our less fortunate neighbors.

"Suicide" is a term I never thought I would meet here, but it is a fitting description of what happens to some enzymes when they catalyze their own destruction while processing certain compounds, aptly called "suicide substrates." The medical applications are far-reaching. This and other aspects of enzyme regulation are taken up in *Biochemical Catalysis* (Biochem. 226, 3 units).

Thermodynamics is an old favorite of mine, but tackling topics as heavy as membrane equilibria, enzyme kinetics, and optical methods was at times overwhelming. Yet, I could not help smiling to myself when, after barely passing *Physical Biochemistry* (Biochem. 224, 3 units), I found I could understand the journal articles much better than I used to.

*Proteins, Carbohydrates, and*



*Lipids; Structure and Function* (Biochem. 222, 3 units) gives more details and more chemistry on each of these macromolecules.

*The Biochemical Basis of Some Clinical Problems* (Biochem. 235, 3 units) is a mix of lectures and lecturers, all tops in their fields, on topics ranging from inflammation to hyperammonemia, cancer and immune disorders. Being a doctor was never one of my dreams, but after this course I wondered if it would be possible to choose, as a biochemist, between being a "general practitioner" and an oncologist.

If one were interested in Watson and Crick's problems, one could enrol in *The Chemical Basis of Genetics* (Biochem. 221, 3 units).

A student may enrol in *Advances in Biochemistry* (Biochem. 240, 1 unit) up to four times, since a different topic is discussed each time - like radiation biochemistry, lipid chemistry, principles of gene cloning, and other topics of current interest. In addition to biochemistry courses, a student may enrol in cognate subjects like nutrition, biostatistics, physiology, etc.,

chosen for their use or interest, in the College of Medicine or in other colleges of the University of the Philippines.

When 18 units of course work are done, a student may tackle the *Master's Thesis* (Biochem. 300, 6 units) to do experimental work on a particular biochemical problem. I am at this stage. I can take this as a chance to further my interest in biochemistry, be a little nobler and work on something that benefits the community, review topics covered in the courses I have taken, and read more.

Learning is one road that leads to many places and has no end. For the past two years, I have been walking along this road and every step - be it on jagged rock or soft grass - has had its value. I have learned many things and I have also benefited greatly from the realization that I still know very little. I have my own ideas of where I want to go. I have found a road, and I walk on.

# WANTED:

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articles