



The reflections of a Hanging Drop: a microbiology learning tool for motility of microorganisms

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Dear Editor,

Reflective practice has long been considered a method to encourage deep learning, not only by educationalists and philosophers of yore, but also by contemporary ones. Rabindranath Tagore, for one, believed that the freedom to learn generated knowledge and enabled self-realisation and self-improvement.[1] Both these attributes are important for learners and practitioners in the health professions as recommended in the competency based curriculum.[2]

Teaching tools bridge the gap between learners and teachers, but they are unable to communicate with us directly. In this letter, I take the liberty of giving one such tool the capability to communicate, and I present its reflections as though it were talking to us. The tool is the 'Hanging drop' which, in Microbiology, is used to demonstrate motility of microbes to the second year undergraduate students of medicine and dentistry.

The reflections of the drop begin with self-realization of how it came to be, and continue

to elucidating its content and usefulness to learning the science of Microbiology.

"A stunning discovery I made today is that my existence coincides with that of the dreaded disease, cholera. We both belong to the tropics, and our origins are rooted in a culture broth of the organism known as *Vibrio cholerae*. This organism causes the disease I mentioned earlier, cholera, which results in mayhem if not managed in time. As for me, if treated with respect, I am not so dreadful as to cause disease. Quite the contrary. Listen to the rest of my story.

The process of my origin is a little watery though an interesting one. To create me, a culture broth was first made by using sterile peptone water and inoculating it with a suspected growth of *Vibrio cholerae*. Four hours later, during which time there was ample multiplication of the organism, we entered into the log phase of what is called the bacterial growth curve. This growth curve is an important component of the physiology of bacteria. Thereafter, an inoculating loop was sterilised by dry heat [by flaming], then cooled and inserted into the broth. Following

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this, I was scooped out, very carefully, by my friend - the inoculating loop - and placed with the utmost care on to a coverslip. In the meantime, a ring of clay was placed on a glass slide and the slide was inverted on to the coverslip. The entire contraption - slide, ring, coverslip - was turned over and, to my surprise, I metamorphosed from just a drop to a hanging drop suspended from the coverslip.

My obvious questions to the powers that be were: 'Why? Why am I here? Why in this position?'

I was placed on the stage of an instrument called 'microscope'. Looking up warily, I saw three noses - which I later learned are called 'objectives' - looming above me. The low power objective first focussed on the edge of me, and then the high power objective took a look. I felt ticklish and I soon discovered why: the tiny microbes of *V. cholerae* were darting through me to my edges, drawn towards the air surrounding me, so hungry were they for oxygen! So fast was their movement, I was perplexed. It then dawned on me that they had polar flagella and were using them to great advantage.

I was not the only one fascinated by the 'darting motility' of the organism. Big saucer-like eyes of human learners peered at me through the microscope and they began oohing and aahing at all that was going on inside of me. Their excitement was palpable at the sight of an upside-down drop and the

microbes dancing merrily inside. I was impressed by their diligence and caution in handling the microscope and in performing hand hygiene practices.

All too soon, I started feeling tired of the attention and things began to blur. To my dismay, I realised it was because I was drying up. Worse was to come: the humans slipped the slide I was on into a container of sodium hypochlorite. Apparently, I was potentially infectious to others. This was a learning point for me, as well as for the learners: infectious matter must be decontaminated by physical or chemical means, else it is a health hazard to humans and to the environment.

A short life span is all I was granted, but it was a meaningful one during which I could awaken joy and curiosity amongst learners, even though I was upside down."

The hanging drop's reflection, [Dear Editor](#), reminds me of a quote by Rumi:

"You are not a drop in the ocean; you are the entire ocean in a drop."

I feel that reflections of a non-human entity such as the one reported here, can help learners appreciate the significance of Microbiology. Learners could be encouraged to develop more of such narrative tools which could then be played out in classrooms as role plays or as solo acts. Their development and their use by students may result in deeper engagement and deeper learning.

References

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