

An occasional column, in which Caveman and other troglodytes involved in cell science emerge to share their views on various aspects of life-science research. Messages for Caveman and other contributors can be left at caveman@biologists.com. Any correspondence may be published in forthcoming issues.

Journal of Cell Science 115, 2253-2254 (2002)
© The Company of Biologists Ltd



How long does it take to train a scientist?

How long does it take to train a scientist? OK, one answer is 'a lifetime'. While true, that was not the answer that I was looking for. Another possibility, just to get it out of the way, is that training in science should begin as early as possible (in kindergarten and elementary school, for example) and continue through school, undergraduate training and beyond. True, an equally valid answer.

No, I was thinking about a more defined period when learning and training begin to take on the added weight of an approaching decision about a career. Enough of being the perpetual student, time to go out and get a real job. This period starts with graduate school and continues through one's time as a postdoc up until entry into a position of... well let's call it responsibility. How long should that period of training be? Can a time frame be assigned to it? Should one consider it as two separate periods, each with a time frame? Or, should they be considered together, as one continuous period, with each part focusing on a specific aspect of training - for example, an apprenticeship during graduate school and learning independence as a postdoc?

I think that entering graduate school makes a statement about what you want to do for a career - science, research,

teaching, training, project leadership. However, I wonder how many graduate students take that step with that decision in mind - I am pretty sure that I did not. Perhaps it is only in retrospect that one appreciates the type of decision that this is, considering the time commitment in the US, for example, is 5-6 years on average. But, even in the UK, three years is a considerable amount of time devoted to the detailed analysis of one problem (thesis) in one environment (thesis laboratory) with a small (and unchanging) group of people (lab head and lab mates).

But I digress. What about the time frame for a postdoc? Well, let's see. Most postdoc fellowships are of 2-3 years duration. Hm? Does this imply that the time frame for postdoc training is 2-3 years. OK, time for a quick, cheap survey. Hands up how many of you completed a period of postdoc training in 2-3 years. Yes, as I thought, not many (for what it's worth, my hand was down). No, I think that the average is more like four years, and there are quite a few around at year 5 and beyond (my hand is still up!). Is that an appropriate time? Is it too long, or too short? Should there be flexibility in this time period? With the longer periods of 'training' are there problems of postdocs getting too comfortable with the position (you might argue that the answer is 'hardly' - what with the amazingly high salary,

benefits and independence) and exploitation (more on that in a later Sticky Wicket)?

OK, so these are the data. Three to six years for graduate training and, let's be optimistic, 4 years for postdoc training: a grand total of 7-10 years (I'm not going to add any extra time for some who have to pass a habilitation!). Yikes! Now remember we are talking about training here, and the outcome is not a cake-walk in terms of job security, prestige, free time or, potentially, job satisfaction. It is not as if you come out of this as some super-skilled glass blower that will have employment for life as a sort-after artisan. No, your first grant application will probably be triaged at review, and the papers that you got into top journals as a postdoc now plumb the depths of journal recognition and respectability.

So, does this time frame make any sense? Hm? Think about it. OK, that's enough time. The answer is no! Why? If the answer was yes, then there would have to be strong indications that this training period was structured appropriately to require this amount of time (yes, I know it isn't, but humor me here). There would have to be some sort of master plan, a blueprint for 'Training to be a Scientist'. Graduate and postdoc training would be integrated with definitive milestones and outcomes. Different stages of training would be

assigned sequentially, and transition to the next level would require assessment that the appropriate milestone had been successfully reached. Mentors involved in different stages would also have to receive some training to make sure that they were aware of what the student had accomplished and what was expected in the next period of training and how that would be assessed. The student would know where they were in their training, what was expected in the next stage, how much more they had to learn and that there was a definitive outcome, a product - 'the Trained Scientist'.

Now, to be fair, there are some milestones and points of assessment in the present method of training. Usually, early in graduate school there is some sort of assessment that you have reached a certain level of knowledge and competence in 'sciencekraft' (a qualifying exam). Further milestones? Publications, I suppose. At the end of graduate training there is an assessment through a written thesis and an oral thesis defense, in most cases. Transition to a postdoc lab usually requires an initial assessment in the form of a visit and, usually, an informal seminar. Further milestones for postdoc training? We should consider fellowship applications, in some cases, publications, and presentations at scientific meetings. Of course, the final assessment of this period of training is the successful job application.

But does this present method really constitute a blueprint for 'the Trained Scientist'? I suppose an argument is that it has turned out instantaneously some very good scientists. One could even add that the 'average' scientist is pretty competent and might mature into one of the greats over time (recall, training as a scientist takes a lifetime). But was this really by design? Or, was it happenstance? A test of the trainee's luck, perseverance, hard work, (lack of other options), pig-headedness - that the trainee finished despite the system and the lab heads?

I don't think that is good enough. Do you? After all, if the product is 'the Trained Scientist', I think that there should be more structure, more appreciation of what it takes to complete training. More attention should be paid to assessment of stages in training, not so much in the form of 'tests' but that the trainee has some idea where they are in the process, what they have to accomplish, what their deficiencies are. Perhaps the assessments during graduate school are about right, but what about during postdoc training? A simple addition is to have meetings with postdocs on a regular basis to give honest, critical feedback on their performance and progress - i.e. a good dose of mentoring!

Caveman

Letters

JCS welcomes correspondence provoked by articles in all sections of the journal. Responses to articles in the Sticky Wicket section should be sent directly to Caveman (email: caveman@biologists.com). Correspondence relating to Research Articles, Commentaries and Cell Science at a Glance should be addressed to the Executive Editor and sent to

***Journal of Cell Science,
140 Cowley Rd,
Cambridge,
CB4 0DL,
UK.***