

## Why We Keep Losing Excellence in Young Scientists?

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(Received 2006-08-20; accepted 2006-08-25; published 2006-09-30\*)

### HIGHLIGHT

Young scientists are now facing increasing difficulty to gain their early financial independency in research. However, more harmful threat to their innovative spirit is the life-long conceptual constraints placed on them by the various dogmas enforced by a rigid seniority hierarch and the corrupted research value of chasing citations rather than discoveries.

### ABSTRACT

A Leading Edge Commentary in *Cell* pointed out the loss of a generation of biomedical researchers on the ground of delayed age for starting independent research as reflected by the increasing age of the R01 awardees. However, history has shown that we had already lost at least one generation of excellence in young scientists based on the fact that Nobel Prizes for biomedical research are now mainly obtained by our scientific fathers or even grand fathers who made their discoveries generations ago. What were the true or main causes for this to happen? Are we doing the right thing to prevent it from continuing?

### KEY WORDS

Scientific innovation, Scientific career, Generation loss, Corruption in science, Citation chase

Weinberg's Commentary on a lost generation of biomedical researchers (Weinberg, 2006) provided some insightful thinking on the causes and consequences of the current organizational models and funding mechanisms for biomedical research. I admire very much his frankness and sharpness in criticizing those powerful and influential for losing sight on some simple truth and thus having contributed to the creation of a deplorable state that stifles small group- or individual investigator-initiated discovery research.

However, I do not think that granting more big projects alone actually contributed significantly to the "aging" of the first R01 awardees. My observations also suggest that some best and brightest young people still place biomedical research as a top career choice despite the deem

hope for getting funding support for their truly independent and thus likely ground-breaking researches at their scientific peak times.

I believe it is the unscientific and unfair evaluation system that has prevented young investigators from getting necessary financial support for their early start of an independent career. This system heavily favors the established and thus often old scientists by emphasizing publication records, citation counts, research skills, laboratory conditions, and even collaboration connections in assessing the credibility and practicability of a grant application. On the contrary, innovative ideas which young people often tend to have (either due to their less entrenched in dogma or simply having a fresh

mind) are often discounted in value or even discouraged for R01 type grant.

It is no longer a secret that reviewers like those grant applications filled with some preliminary data much better than those proposing novel ideas. However, preliminary data in biomedical research is often difficult to obtain without a funding support. So getting the first R01 is very tough for young investigators and is even tougher for young investigators wishing to try their very brilliant ideas first (outrageous claims demands outrageous proof and without money many such proof is impossible).

In fact, I have found that the early revelation of some brilliancy may be a detrimental behavior and a risk factor to the career of young investigators. If an idea contained in a data-unsupported grant application that is aimed at overthrowing some dogmatic views held by the authorities in the same research fields, the application may not be awarded with any money but a “death” sentence to the just career of the applicant. This is not an over exaggeration. It is based on my personal experience.

In my view a delay in obtaining R01 grant and thus being late in gaining financial independence may just be a minor adverse consequence of the modern scientific establishment. A life-long mind control on young (junior) scientists by old (senior) scientists is in fact more harmful to scientific research and discovery. This is because a mind-tied researcher may not make any break-through discovery even if his/her hands are set free.

I have pointed out that, likely due to the above mind constraint, we have already lost at least one generation of excellence in young scientists (Liu, 2005b). The increasing trend of finding only our father or even grand-father generation scientists to receive Nobel Prize suggest that either young generation scientists are less capable of making great discoveries or discoveries made by young scientists are some how under appreciated (Liu, 2005a). I believe that the former may be more

likely to be true or may account for more of the cases.

In the end I agree with Weinberg that the vast majority of scientific leaps have come from small research groups and young scientists exploring the outer boundaries of existing understanding. If people pay attention to what kind discoveries that Nobel Prize has favored one may even find that many of the later acclaimed great discoveries were actually initially treated as nonsense and were not even close to the mainstream and heavily funded researches (Liu, 2005a).

The awarding of 2005 Nobel Prize in medicine to a relatively young researcher for a discovery on a small bug (Liu, 2005d) and the repeated failures of many “citation laureates” including human genome mapping for securing this prize (Liu, 2005c) should sever young scientist a bright light tower for a correct career direction.

Let’s working together to create a truth-seeking rather than a publication-seeking research environment that reward more for innovation than citation. I believe that this environmental change will be more effective than just some funding increase for young scientists in fighting the “aging” problem in modern research community.

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\* The publication here contains the original content as submitted to *Cell* on 2006-08-20 but was rejected. Highlight, abstract and keywords are added now for satisfying the consistency of this journal.