the science of overcoming failure

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ISEH Headquarters July 14, 2016

Research: the science of overcoming failure

"*Perceived failure can become the catalyst of profound re-invention*"
Conan O'Brien

On a cold Spring Sunday morning in western New Hampshire, Conan O'Brien, a Harvard alumnus, stood in front of 1,700 Dartmouth students for a commencement address. After initially teasing them about having an inferiority complex (as part of the Ivy League Colleges) he then said something that was as unexpected as it was wise, "Whether your fear it or not, true disappointment will come, but with disappointment comes clarity, conviction and true originality." For those who are not familiar with O'Brien's work, he is not a scientist, although his speech seemed to be tailor-made for research. He is a very famous comedian that experienced failure shortly after reaching his lifetime goal (O'Brien became the host of the Tonight Show but was fired soon thereafter).

Scientists face disappointment and/or failure on a daily basis; a failed experiment, a rejected paper or grant. However, failure does not naturally lead to clarity, conviction and true originality; you have to make it happen. For young students, failure can sometimes lead to the premature departure from graduate programs, changing careers or even depression. Those who have walked the scientific path long enough have learned that failure is just a step along the path to success and that overcoming failure is an essential part of your training. So as a young scientist, try to embrace your failures and, as Dr. Peter van Galen, suggests, revel in the brief successes to get you through the low points, "It is pretty rare for an experiment to confirm your hypothesis, so you have to savor the times that it happens. The percentage of experiments that yield 'publication quality' data is probably less than 10%, and it's these rare events that have to keep you going for months of disappointments."

Dr. Hector Mayani, remembers that as a student and a young investigator, failure was depressing, but after 20+ years as an independent scientist he learned how to manage it. As he stated, "failure still knocks at my door every now and then. I still do not like it, but the difference is that I have learned how to handle it." We should not fear failure, but change our paradigm about it; for Dr. Sean Morrison, failure is an opportunity, he recognized that "You learn more from the failures than from the successes. Failures aren't fun but the experiences can make you a better scientist."

It's not personal, it's…. science

Being positive about facing failure does not mean that failure or rejection will not affect you,

but the advice of Dr Fernando Camargo, is to not take it personal, which he admits “it is very difficult." Dr Hal Broxmeyer, agrees that “No one appreciates or likes to receive a rejection, be it a submitted manuscript or grant application. I doubt that there is anyone, regardless of status or position, who at one time or another has not had a rejection letter," he continued, “the key is to move on and to try deal with and learn from the process."

Minimizing our chances for failure

As a student and young investigator, your first “failure” is at the bench, and no matter what you do, you will eventually have to face failure, but it is also true that you can “minimize” your chances by following the advice of Dr. Toshio Suda who recommends:

1. Re-read your protocol again and create a checklist before experiments.
2. Remember that preservation of samples are always a part of the experiment protocol and label them accurately.
3. Simulate your experiment like a surgeon before conducting it.
4. Write a detailed record on your lab notebook; maybe even jotting down the weather or events of that day may help reviewing the record in the future.

After overcoming and conquering your bench work, the next step is to publish it and we asked Dr. Hal Broxmeyer for advice on this matter, “My advice to young investigators in my lab or who I have mentored is not to send a piece of work out until it is ready to go. If rejected, fix it perhaps with advice and help from others, and send it out again to another journal. I would hope that the new investigators won’t have too many rejections, but rejections are inevitable."

Tips on how to overcome failure

Dr. Margaret Goodell, shared her five tips on how to overcome failure:

1. Wallow in self-pity for 24 hours if it is an R01, or a whole weekend (not more) if it is a bigger grant. Similar when your papers get rejected. Keep your chin up and use your humor for your trainees who are feeling even worse.
2. Don’t take it personally - take the high road and try to forgive your Luddite reviewers (even when you are “certain" you know who they are). Even the most successful investigators have been dragged through the mud on numerous occasions, so take comfort that you are in great company.
3. Don’t over-analyze the reviews. If you can address the problems and get the grant or paper accepted, then do so. Otherwise, move on, submit elsewhere or write another grant. Don’t let any single event have too much importance.
4. Success in science is a marathon, not a sprint. So continuing to move forward in the face of little setbacks will win the game in the end.
5. Make sure there are other things in your life to make you happy when you are miserable with your science!

After receiving the notice of a rejected paper, Dr. Hal Broxmeyer's advice is "to read the critique to see why the paper or grant was rejected, and then put the critique away for a few days and try not to think about it. Once you have "cooled off", try to re-read the critique with an open mind. Usually, but not always, the critique will contain constructive comments that may help you to revise the paper or grant to make your body of work better. This may take extensive additional thought and experiments and many months of work but it is usually worth the effort. Then, send it out again to another journal or granting agency, unless the journal or agency that rejected it seems to be willing to see a revised work, I know a number of investigators who have fought rejections, but this has not worked well for me."

Don't fight your data

When you feel that you reach an "ending point" with you data, Dr. John Dick, mentioned in an interview[2] that "You have to go forward" and that you should have to be careful about your results and what is "an experiment telling you and what it isn't." You have to analyze your results and be honest with your findings. Dr. John Dick advises to analyze and think, "This is the result that I found, and this is how I did my assay, and this is what I think I can interpret, and this is what I think I can't." Peter van Galen adds "Although endurance is very important, it is also crucial to know when to quit. If your project is not going anywhere, don't hang on to it for too long."

Conclusions

Your scientific career will be built on both failures and successes. As scientists, we overlook failure and even try to avoid it at any cost, when we should actually be trying to learn from it and accept it as "part of the job". Science is not an easy path to walk, and no matter how much experience you may have, you will continually have to battle failure throughout your career. So you always have to remember why you are doing science, as Dr. John Dick mentioned in an interview[2], "You should be doing experiments because you want the answer. You shouldn't be doing it looking over your shoulder that someone might beat you to the answer," sometimes that answer will not lead you to success, or may contradict your hypothesis, "but if an experiment is worth doing, it's worth doing even if there are a number of people also trying to get the answer. If someone else gets there first, it just means that you can go on faster to the next question."

Acknowledgments

We want to thank all our interviewees that shared their advice for the elaboration of this article (in alphabetical order):

- Dr. Hal Broxmeyer, Distinguished Professor, Mary Margaret Walther Professor Emeritus, Professor of Microbiology/Immunology, Program Leader, NCI-Designated Indiana University Simon Cancer Center, Program on Hematopoiesis, Heme Malignancies, and Immunology;
- Dr. Fernando Camargo, Associate Professor at Boston Children's Hospital and Harvard University Department of Stem Cell and Regenerative Biology;

- Dr. John Dick, Canada Research Chair in Stem Cell Biology and Senior Scientist, Princess Margaret Cancer Centre, University Health Network , Professor, Department of Molecular Genetics, University of Toronto Director and Program in Cancer Stem Cells, Ontario Institute for Cancer Research (OICR);
- Dr. Margaret Goodell, Professor and Director of the Stem Cells and Regenerative Medicine Center at Baylor College of Medicine, in Houston, Texas;
- Dr. Hector Mayani, Professor and Head of the Oncological Research Unit at the Mexican Institute of Social Health, Mexico City;
- Dr. Sean Morrison, Director of the Children's Medical Center Research Institute at UT Southwestern, the Mary McDermott Cook Chair in Pediatric Genetics and Investigator of the Howard Hughes Medical Institute;
- *Dr. Toshio Suda,* Professor, Department of Cell Differentiation, Graduate School of Medicine, Keio University;
- Dr. Peter van Galen, Postdoctoral Research Fellow at Massachusetts General Hospital

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