

An occasional column, in which Mole, 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 mole@biologists.com.

Any correspondence may be published in forthcoming issues.



The more the merrier

In the early part of the 17th century, the painter Jan Brueghel the Elder (son of Pieter Brueghel the Even Elder, and father of Jan Brueghel the Much Younger) admired the work of Peter Paul Rubens so much that he invited him to collaborate on a series of paintings. Brueghel was widely known for his lush, miniature landscapes, replete with peasants, pheasants, and other paraphernalia, while Rubens was famous for his sculptural, voluptuous figures that filled his huge canvases. The collaboration of these two titans was a great success, against most expectations, and the elite sought out and paid top dollar (or top guilder) for these creations. These were much more than a two-for-one (technically called a 'twofer' in the jargon) as they were actually terrific paintings.

While collaborations continue to be rare among artists, they are ubiquitous in science. If you're involved in biomedical

research (if you aren't, why are you reading this?) it is not only likely that you widely collaborate with other scientists, but also highly probable that such collaboration is essential for your successful career. Don't get me wrong; it is possible to have a successful career without collaborating, just not a successful *scientific* career. So if you hate working with others, you may still have a great future as an accountant, with the advantage that you won't have to write any papers.

Collaborations between laboratories are vital for a number of reasons, the foremost being expertise. If, in the course of your work you find that the phenomenon in which you are immersed involves nerves, and you aren't an expert on nerves, you have three choices: (a) become an expert on nerves, (b) find and collaborate with an expert neurologist, or (c) work on something else that doesn't involve nerves. The last establishes you as a wuss. The first is

good, but takes more time than you might have – when you finally are an expert, your competitors who have taken the middle way will have hugely scooped you.

Which brings us to the second reason to collaborate – time. Two labs with overlapping but distinct interests can accomplish more than the sum of each lab alone in a given period of time, and everyone benefits. This is especially true if their grants are reviewed by separate committees.

But perhaps the best reason to collaborate is that a great partnership can be hugely fun as you synergize to think about and discover new things. There is a fantastic excitement when the light of new knowledge suffuses your work, making it shine. As with Rubens and Brueghel, beautiful red-hued nymphs may frolic in your deep green landscapes, to everyone's joy (even reviewers). Okay, most of us don't study nymphs in lush forests, but bend with me here, I'm waxing poetic-like. Collaborations can be fulfilling. They are, in fact, twofers. Or even more-fers.

Or not. Some collaborations are disasters. A century before Brueghel and Rubens, Leonardo da Vinci and Michelangelo Buonarroti collaborated on a battle scene on the walls of the Palazzo della Signoria in Florence, and reportedly hurled insults and paint at each other in a scene that was famously recreated in *The Three Stooges in the Renaissance*.

So let's talk about how to do collaborations that will end in bliss and not paint-fights. A few simple rules will help here.

Rule 1. Agree on who leads. Generally, the leader will be the one who initiated the work, and to do this, a bit of a dance ensues. It goes something like this. "Hi, this is Mole, is this Professor Vole? We've made some interesting observations you might find, um, interesting." "Well, hello Mole! I love your columns, although the one on sending dead fish in the mail was a bit over the top. What did you find?" "Well, we found something very cool. But I think we need your help. Want to collaborate?" "Love to, but what did you

find?" "Are we collaborating?" "Tell me what you found." "Not until you say we're collaborating." "Sorry, but I have someone in my office who wants to show me his scar, so maybe we should talk some other time."

Not good. So let's try again: "Hello, is this Dr Hyrax, the nymphologist? This is Mole. We've discovered some red nymphs in your green forest." "Thanks, Mole, we'll work on them now. We'll make sure to mention you in the acknowledgements. See you."

Okay these didn't go well, but perhaps you see the problem. We don't want to just *give away* our exciting new finding, unless we've already enlisted, and trust, our collaborator, and we can't enlist or trust them (unless we're already trusted friends) without telling them what we've found. So we have to either only work with our friends (which is fun) or decide to tell our secrets (a bit) on faith. The trick, of course, is to give away a little and hold the best stuff (like how to do it) back. It's doable, and in fact, there are very few Hyraxes out there. Most folks love a good collaboration, and won't steal it away. If you don't know if you can trust a potential collaborator, ask someone you *do* trust who might know them. A bit of research here can put your mind at ease.

Supposing you've enlisted a collaborator, the next bit (Rule 1) is to make it clear that it's your lead. You'll work together, and they get to be involved, because you both have something to offer. And what you're going to do is the *reserve*. In collaborations among artists, the reserve is the first sketch, the layout. Before you initiate the collaboration, or at least early in the interaction, you need to have a good idea of what the outline of the work will be, the broad sketch. As we'll see, this is fluid, and must be, because you don't know yet how it's going to turn out. Be flexible, but also have a plan, and lay this out with your collaborator. This includes authorship, of course, but don't be coy – make sure this is all agreed in advance, at least in principle.

Rule 2. Agree on the work, and who will do what. This has to be done in advance, for a couple of good reasons. The main

one is that nobody likes to collaborate with someone who doesn't actually do anything. You have to bring work to the negotiating table, and agree to do more, and they have to similarly agree to help in the ways you suggest. This could be as simple as providing technical advice, or as complex as providing resources, hands, and space. But as long as this is agreed up front, there shouldn't be any nasty surprises, as in, "Hey, we did *all* the work and you think it's *yours*?"

The key here is flexibility. When Brueghel the miniaturist worked with Rubens the maximalist, they agreed on mid-sized canvases. For Brueghel these were huge; for Rubens they were tiny, but it worked. Rubens often painted out parts of Brueghel's reserve, and Brueghel returned to paint in some of the bits that had been painted out. But they were flexible, and the result was success. Rigidity is not an option in a good collaboration.

Rule 3. Discuss the possible outcomes in advance, and what you'll do if it doesn't work as you both expect. We're used to this in science, this "hey, that isn't what was supposed to happen" thing. Sometimes the simple answer is: well, if it doesn't work, we'll stop there. But often, of course, the unexpected can be more interesting – again, be flexible. This isn't a work-for-hire, it's a collaboration.

Rule 4. Share. Once you engage in a collaboration, you must share your reagents and expertise. They might want to watch how you do it. Hey, you're partners now. Be generous. And most importantly, share information. When you get a result, tell your collaborator (and ask that they do the same). Many potentially good collaborations fail on this bit – if they don't hear from you, they might think that you aren't working on it, or worse, that you *are* but you aren't sharing your results. Collaboration cannot thrive without trust, and trust requires openness. If that isn't your style, then don't collaborate. And if you don't want to collaborate with anyone, then remember to brush up on your accounting skills.

Remember, even if a collaboration is temporary, your life in science (hopefully) is not. A successful,

fulfilling, and *published* collaboration leaves the door open to future collaborations. You might think that you'll never need that other lab's expertise again, and that could be true, until the next time you do. If the collaboration went well, that lab could be an invaluable resource in the future: you trust them, they trust you, you each know how the other one works, and things will go smoothly in the future. And you might even have made a friend.

When I evaluate an applicant for a faculty position, I look to see if they have a history of collaborating. Why else would we want someone to join our department, unless there's a good chance that the cool things they do are likely to find their way into the research that my colleagues and I do?

As it happens I have had terrific collaborations with Vole, Hyrax, Skunk, and many others. Weasel and I discuss

our results even when we aren't collaborating, and I do the same with Fox, Otter, and Squirrel (even though she's a bit squirrel-y at times). I look forward to more. We have a small lab, but it's pretty big when I count my friends. Let me know if you've got something you want to try – the more the merrier.

Mole

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Commentaries

JCS Commentaries highlight and critically discuss recent exciting work that will interest those working in cell biology, molecular biology, genetics and related disciplines. These short reviews are commissioned from leading figures in the field and are subject to rigorous peer-review and in-house editorial appraisal. Each issue of the journal usually contains at least two Commentaries. JCS thus provides readers with more than 50 Commentaries over the year, which cover the complete spectrum of cell science. The following are just some of the Commentaries appearing in JCS over the coming months.

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Although we discourage submission of unsolicited Commentaries to the journal, ideas for future articles – in the form of a short proposal and some key references – are welcome and should be sent to the Executive Editor at the address below.

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