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# Equal contribution means that the contribution is equal

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In a previous editorial [1], I have argued that assigning authorships, and particularly determining the order of authors, is among the grimmest chores that a principal investigator needs to perform, only slightly more pleasurable than root canal treatment. This prompted a rebuff by my PhD student Alex Küffer, who holds a doctorate in Dental Surgery and pointed out that properly performed dental root therapy does not need to be painful. Be that as it may, authorships are the currency of academia, and the order of authorships in scientific papers is a highly political and delicate exercise. In many academic institutions, the publication of a paper as a first author is a requirement for promotions, diplomas and sometimes even for being considered for a given position. Several organisations and charities that dispense postdoctoral fellowships will only consider candidates as eligible if they have published at least one paper as first author. It is therefore understandable that young scientists are anxious about their chances to publish their findings as Number One in the list of authors. The problem, however, does not end with PhD students and postdoctoral fellows. As senior scientists, we are all expected not only to contribute to other laboratories' work, but also to publish our work as corresponding or last authors. The pressure to produce such papers is dictated by funding agencies and by internal committees, which control the award of tenured positions and all steps of academic promotion – such as from associate to full professor. These pressures go well beyond the honorifics and can determine, inter alia, the salary of the persons involved.

Whether we like this situation or not, it reflects today's academic reality. Hence, authorships must be handled in a transparent, fair and careful manner. In theory, putting this into practice is very simple. The first author should be the person who did most of the work, the second author should have done the second largest amount of work, and so on. The supervisor of the work should come last, any co-supervisor would be second to last, third to last, and so on. But in real life there are huge problems with this policy. It can be impossible to determine in an arithmetically precise manner the extent of the contribution of each author to a manuscript. In order to avoid misunderstandings that may lead to long lasting rancour, principal investigators are well advised to talk to their younger coworkers openly about these issues, and ideally to lay out policies and expectations at the outset of each project.

But there is another problem that goes to the core of the authorship assignment problem. Nowadays more than ever, biomedical science has become a teamwork enterprise. Teamwork has long been a major feature of biology, and cooperation was the accelerant that ignited many of the most consequential discoveries in biomedicine. Yet collaborative science is rarely incentivised. Imagine how much more insight might have been gained by Watson and Crick if they had properly acknowledged and embraced the contribution of such a fantastic colleague as Rosalind Franklin. It certainly should be one of the goals of future academic policy to recognise that teamwork science is much more powerful than a competition of lone geniuses. The question is: how can this be reflected in our antiquated policies of authorship assignment?

In many instances, progress can only be achieved by interdisciplinarity. For example, let us posit that one person be a microscopy expert, another a data scientist and a third one a molecular biologist. Only if the three come together is it possible to produce the kind of high-throughput three-dimensional microscopy that is currently revolutionising the morphological disciplines. Such situations are imperfectly recognised by conventional authorship lists, as it may be completely inadequate, unfair and impractical to determine a meritocratically descending list of authors. Traditionally, principal investigators have solved this issue by placing an asterisk next to the last name of each contributing author, signifying that their contributions should be considered equal. The problem with this approach is that there is no mechanism for ensuring that readers will regard those contributions as truly equal. Indeed, my informal surveys indicate that most scientists believe that asterisks do not indicate true equality, and that the person that is first named is still more meritorious than the others.

This state of affairs, in the opinion of Swiss Medical Weekly, is fundamentally hypocritical. Contributions to scientific discoveries are often not equivalent to each other, and the ranking in the authorships list is a reasonable, though perhaps imperfect, manner of denoting this fact. However, if authorships are marked as equal, they should be considered equal to the fullest extent of the word. Anything

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else does not do justice to the concept of equality and does a disservice to authors. Pretending to young scientists that their contribution is considered equal – while that is not accepted by the scientific community – is a grave and inexcusable form of deception.

One way of improving fairness and transparency is to stipulate that equal-contribution authors be allowed to swap their names in any way they deem appropriate in their list of publications. And why shouldn't they? If they are truly equal, their order should be immaterial. In practice, if three authors share the notorious asterisk, it should be acceptable that each of them places him or herself in the first place of the authors list when applying for a faculty position, for a scientific prize, or for any other professional purposes. Importantly, the asterisk would have to stay: no author would be allowed to remove it and to declare him- or herself the sole first author. Yet the scientific community appears to be depressingly supercilious on this topic, to the point of refusing to accept the reality of equal contributions. I know of cases in which candidates were denied a faculty position and accused of fraud for having done exactly what I have described above. Recruitment committees acting in this way deserve to be called out as cruel, unfair and not particularly intelligent. If we ever want to truly advance collaborative science, collaborators who give their best to advance knowledge should be acknowledged and rewarded in a fair manner.

For all these reasons, Swiss Medical Weekly has decided to explicitly allow and encourage that equal contribution authors swap their respective names in documents citing their manuscripts. We recognise that we do not have jurisdiction on this matter, and that readers and institutions may continue to frown upon this practice. All we can do is to forcefully state that Swiss Medical Weekly will not participate in the condemnation of this practice, which it deems necessary for fostering truly collaborative science. It may take a long time to change the hearts of our colleagues, but we hope that our stance will make a measurable contribution towards that goal and we invite other journals to follow suit.

References

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