

nature cell biology

Deep impact?

“They are very important because people think they are important”

The first impact factor for *Nature Cell Biology* has just been received: 11.939 for the year 2000. But how important are impact factors? The frequent response that they are very important ‘because people think they are important’ reflects the vast influence impact factors can have on scientists’ careers, and at the same time hints at its intrinsic limitations.

The impact factor is provided by the Institute for Scientific Information (ISI), a commercial company based in Philadelphia (<http://www.isinet.com/isi/>). The 2000 impact factor reflects the total number of citations in 2000 of articles published in a particular journal in 1998 and 1999, divided by the total number of articles published in that journal for that period. For *Nature Cell Biology*, launched in May 1999, the first impact factor has, therefore, only taken into account the papers published between May and December 1999.

Journal impact factors were invented in the 1960s as a way to help librarians evaluate journals. But perhaps more than anything they are used to evaluate academic performance, and have significant weight in decisions on funding and recruitment. Authors are therefore often painfully aware of how important it is to publish in journals with a high impact factor. This is based on the assumptions that the number of citations a paper receives reflects its importance, and that a journal’s impact factor mirrors the scientific impact of the articles published in its pages. But despite the fact that impact factors are a useful piece of information, it is important not to overrate them and to take into account their shortcomings.

Caveats and health warnings

One of the most obvious limitations is that within the same journal some papers will receive many more citations than others, and individual papers can therefore have a big influence on the overall impact factor of a journal. According to ISI, the majority of citations reflect a rather small number of articles. Even though there is probably an overall correlation between a journal’s impact factor and the importance of the papers published, it may say very little about an individual paper. Ultimately, it would be highly desirable to have citation data available for individual papers, paper-by-paper impact factors.

Furthermore, some disciplines produce more citations than others simply because there are more researchers working in and more papers produced in those fields. Indeed, the most highly cited papers are generally the more molecular ones, and the real ‘blockbuster’ papers that win the ‘most cited biology paper of the month competition’ are frequently from fields such as genomics or apoptosis. It is important to keep this caveat in mind, even though ISI compares journals’ impact factors by discipline as an attempt to counterbalance this weakness. Even within fields such as cell biology, various sub-fields inherently produce widely varying numbers of citations. A journal’s impact factor is therefore to some extent a reflection of the disciplines and sub-disciplines it covers.

Another limitation is the fact that the impact factor does not distinguish between primary research and review articles. According to ISI, review articles “are generally more frequently cited than typical research articles because they often serve as surrogates for earlier literature.” For this reason, review journals very often are found on top of each ISI category, and separate figures for reviews and original research might represent valuable additional information.

Many scientists *Nature Cell Biology* has spoken to feel that impact factors can have an undue influence on their career prospects, because too often the shortcomings are not taken into consideration. So, although we are happy on this occasion to announce our first impact factor, it is worth repeating here ISI’s wise health warning: “users may be tempted to jump to ill-formed conclusions based on impact factor statistics unless several caveats are considered.” □