Scientific Abstracts

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IMRD

The Abstract summarizes each part of a paper. Each section answers a different question:

Introduction: What do you know?

Methods: What did you do?

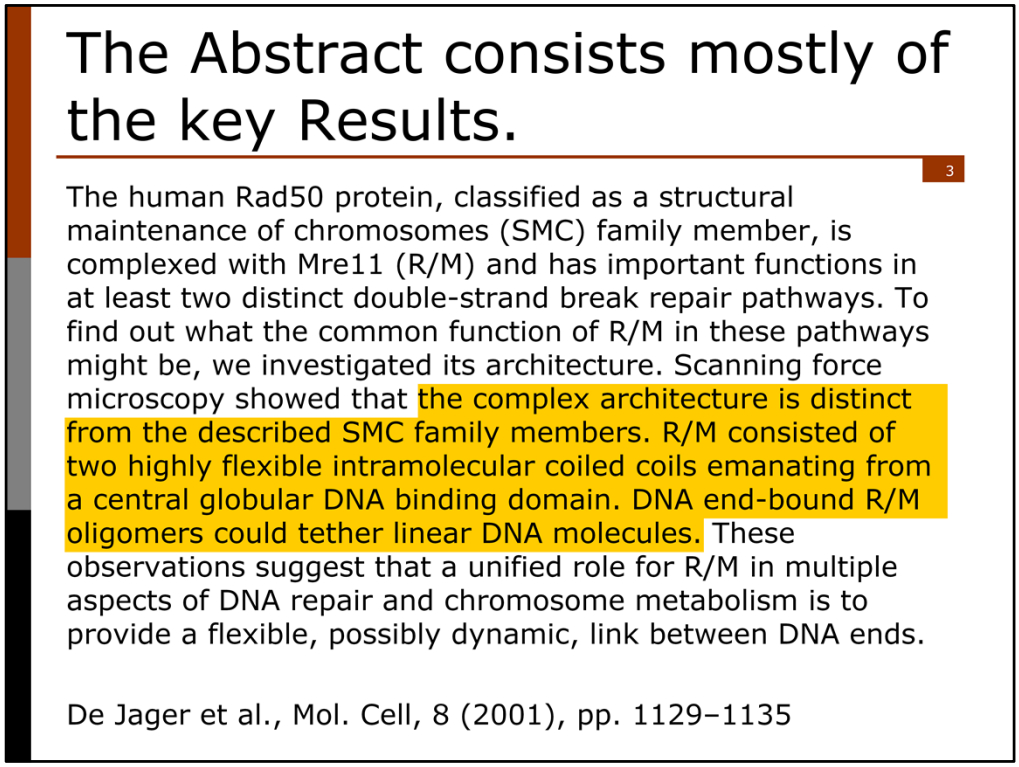
Results: What did you see?

Discussion: What does it mean?

The scientific abstract concisely summarizes a research paper, but is mostly devoted to the Results; only one sentence each describes the Intro and Discussion. Methods usually does not get a full sentence, or they are described with the Results. Therefore, a scientific abstract is like this three-paneled Rothko painting: mostly Results (yellow).

The reason a scientific abstract consists mostly of Results is because the abstract is like an advertisement: you want to highlight only what is new.

Photo: http://www.georgetown.edu/faculty/irvinem/visualarts/Image-Library/Rothko/rothko-untitled_blue_yellow_green_on_red-1954.jpg



The scientific abstract provides the key elements of each section of a research paper, but the focus is mainly on Results.

Note the number of sentences that are devoted to each section of a paper:

Introduction: 1-2 sentences that conveys purpose of work

Methods: not much; often incorporated with Results

Results: 2-3 sentences; “key” data that provide the strongest support for the conclusion.

Discussion: 1 sentence that conveys the impact of the work

Methods are often incorporated with Results.

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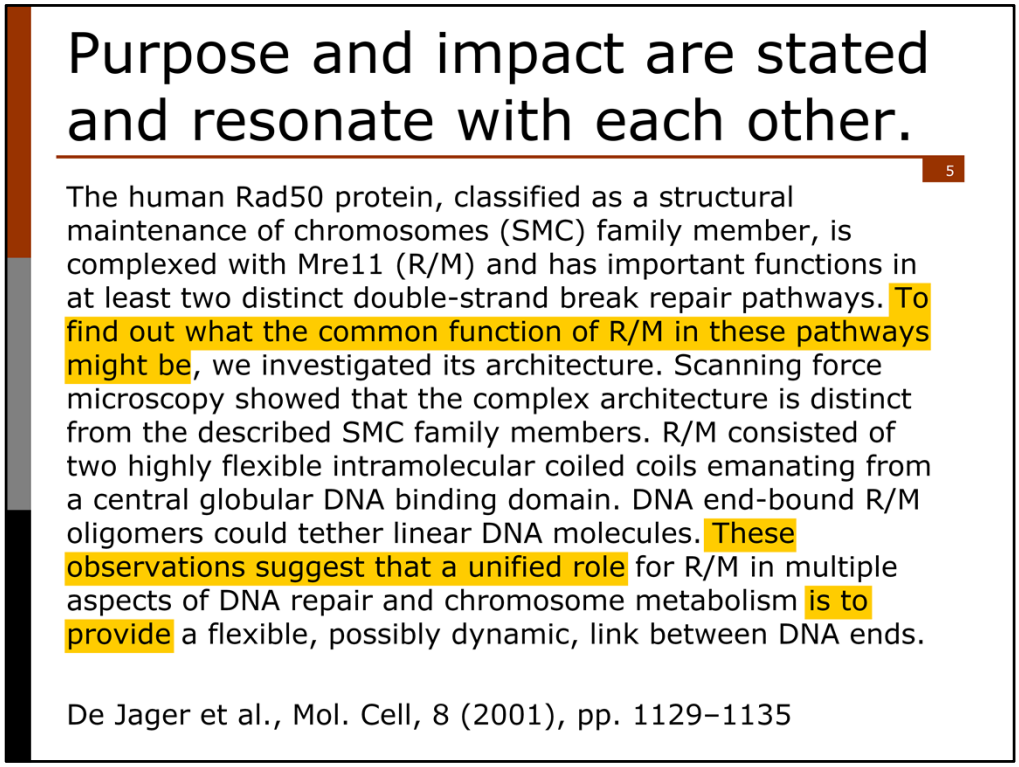
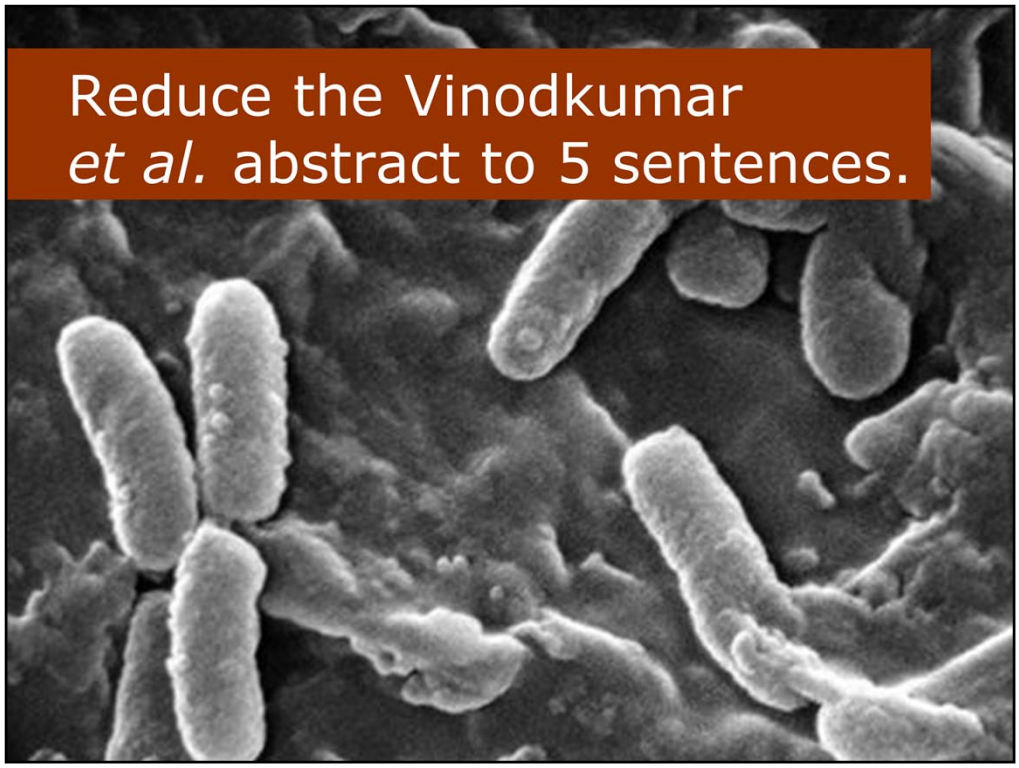
The human Rad50 protein, classified as a structural maintenance of chromosomes (SMC) family member, is complexed with Mre11 (R/M) and has important functions in at least two distinct double-strand break repair pathways. To find out what the common function of R/M in these pathways might be, we investigated its architecture. Scanning force microscopy showed that the complex architecture is distinct from the described SMC family members. R/M consisted of two highly flexible intramolecular coiled coils emanating from a central globular DNA binding domain. DNA end-bound R/M oligomers could tether linear DNA molecules. These observations suggest that a unified role for R/M in multiple aspects of DNA repair and chromosome metabolism is to provide a flexible, possibly dynamic, link between DNA ends.

De Jager et al., Mol. Cell, 8 (2001), pp. 1129–1135



The Introduction includes the purpose of work, while the Discussion conveys the impact of the work. Ideally, these two statements should resonate with each other, e.g., the impact "answers" the question posed by the purpose.



Highlight sections you would keep.

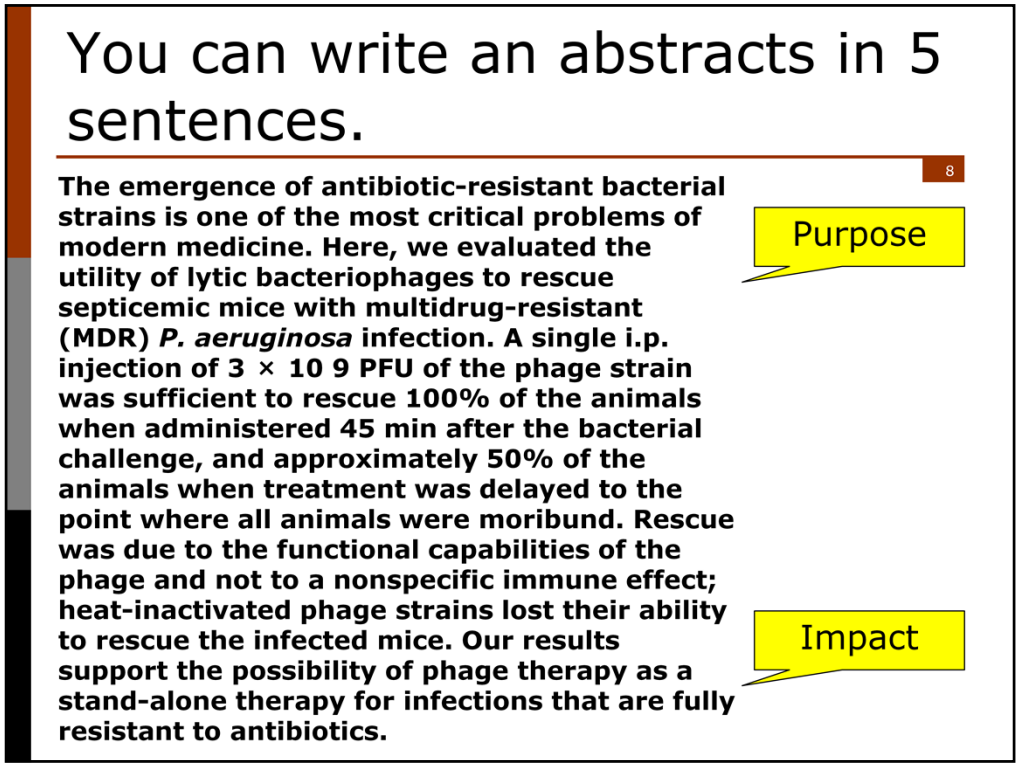
Edit and focus on results.

Drug resistance is the major cause of increase in morbidity and mortality in neonates. One thousand six hundred forty-seven suspected septicemic neonates were subjected for microbiological analysis over a period of 5 years. Forty-two *P. aeruginosa* were isolated and the antibiogram revealed that 28 *P. aeruginosa* were resistant to almost all the common drugs used (multidrug-resistant). **The emergence of antibiotic-resistant bacterial strains is one of the most critical problems of modern medicine.** As a result, a novel and most effective approaches for treating infection caused by multidrug-resistant bacteria are urgently required. In this context, one intriguing approach is to use bacteriophages (viruses that kill bacteria) in the treatment of infection caused by drug-resistant bacteria. **In the present study, the utility of lytic bacteriophages to rescue septicemic mice with multidrug-resistant (MDR) *P. aeruginosa* infection was evaluated.** MDR *P.aeruginosa* was used to induce septicemia in mice by intraperitoneal (i.p.) injection of 10 7 CFU. The resulting bacteremia was fatal within 48 hrs. The phage strain used in this study had lytic activity against a wide range of clinical isolates of MDR *P. aeruginosa.* **A single i.p. injection of 3 × 10 9 PFU of the phage strain, administered 45 min after the bacterial challenge, was sufficient to rescue 100% of the animals. Even when treatment was delayed to the point where all animals were moribund, approximately 50% of them were rescued** by a single injection of this phage preparation. **The ability of this phage to rescue septicemic mice was demonstrated to be due to the functional capabilities of the phage and not to a nonspecific immune effect.** The rescue of septicemic mice could be affected only by phage strains able to grow *in vitro* on the bacterial host used to infect the animals and **when such strains are heat inactivated, they lose their ability to rescue the infected mice.** Multidrug-resistant bacteria have opened a second window for phage therapy. It would seem timely to begin to look afresh at this approach. **A scientific methodology can make phage therapy as a stand-alone therapy for infections that are fully resistant to antibiotics.**

Vinodkumar *et al.* Indian J Pathol Microbiol 51: 360 (2008).

I put in gray information I consider to be extraneous: a lot of background, some results, and some discussion.

Of the results, I kept some numbers because they are very specific – remember that an abstract is a stand-alone advertisement, so if you have quantitation, include it. I also kept some control experiments that I thought were important.



Not all data is described. And the data description is specific: note the inclusion of numbers.

Introduction: state purpose of your project

Results: the data most relevant to your goal, or the strongest evidence for your overall argument.

Discussion: implications of your data; should also resonate with the problem you set up at the beginning of the abstract

In sum, the Abstract advertises your work.

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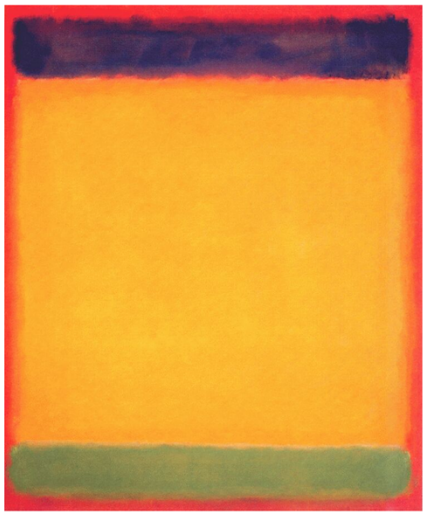

-Key findings

-Purpose & impact

-Concision