

Word for Word

Summarizing and paraphrasing

Whether you are establishing a gap in knowledge, comparing your results with those of others, passing along an insight, or providing an overview of an extensive topic, scientific writing requires that you present the ideas of others without giving the impression that they are your own. Two critical techniques for doing so are summarizing and paraphrasing. Both techniques require you to express someone else's ideas in your own words, and both must be used in combination with citation of the source material.

A summary condenses a large amount of information down to its essence, omitting details that are not needed to understand the central message. To summarize a piece of writing, put the main points in your own words. Often, summaries take the form of one sentence stating the key results of a study.



Example:

In the United Kingdom National Cancer Research Institute (NCRI) AML17 trial, 1206 adults, most of whom were younger than 60 years of age, were randomly assigned to first induction therapy with daunorubicin at a dose of either 60 mg per square meter of body-surface area or 90 mg per square meter; no significant difference was shown with respect to the rate of

complete response or the rate of overall survival.²⁵ –Döhner et al., *N Engl J Med* 2015; 373: 1136-1152

Here is an example of an original paragraph and its summary. Repeated terms are bolded to show how the original content was shortened in the summary.

Original:

“Formation of the premetastatic niche has been shown to enhance the establishment and growth of metastatic foci (Kaplan et al., 2005), and we have identified [**lysyl oxidases (LOX)**] as a tumor-secreted protein that is critically involved in premetastatic niche formation (Figure 4D). Our data show that LOX secreted by **hypoxic** primary tumor cells accumulates with fibronectin at sites of future metastasis, **crosslinks collagen** IV in the basement membrane, and **increases adhesion** of CD11b+ cells. Adherent CD11b+ cells produce MMP-2, which degrades collagen IV, increasing CD11b+ cell invasion into the lung tissue and releasing chemoattractive collagen IV peptides. The collagen IV peptides enhance further recruitment of CD11b+ cells, generating a positive feed-forward loop for increased accumulation of BMDCs, increased extracellular matrix remodeling, and creation of the premetastatic niche. Importantly, formation of the premetastatic niche is critically dependent on the accumulation of enzymatically active LOX. Taken together, our data demonstrate a **crucial role for LOX secreted by hypoxic tumor cells in formation of the premetastatic niche** and in the enhancement of metastatic tumor growth.” –Erler et al., *Nat Rev Cancer* 2009; 19: 9-31

Summary:

“Following extravasation, several mechanisms within the pre-metastatic niche facilitate DTC colonization. **Hypoxia** in the primary breast tumour induced by elevated levels of HIF1 α triggers expression of **lysyl oxidases**, which systemically **crosslinks collagen** in the lungs, **increasing the adhesion** of myeloid cells to **generate niches that support colonization**.⁹⁶ –Altorki et al., *Nat Rev Cancer* 2019; 19: 9-31

Like a summary, a paraphrase expresses information in your own words, but it uses a level of detail similar to that of the original statement. A paraphrase is often only a little shorter than the original. Here is an example:

Original:

“. . . non-transformed **MCF10A mammary epithelial cells** were used as an *in vitro* culture system, and were subjected to a starvation protocol, thereafter simply referred to as 'starvation', that **deprived them simultaneously of serum and growth factors** (EGF, insulin) for 24 h (Supplementary Table 1). This starvation protocol resulted in **decreased uptake of nutrients, including glucose and glutamine** from the media . . .” –Muranen et al., *Nat Commun* 2017; 8: 13989

Paraphrase:

“Indeed, **uptake of glucose and glutamine was reduced in MCF10A cells** when **serum and growth factors were withdrawn**.²⁵” –Finicle et al., *Nat Rev Cancer* 2018; 18: 619-633

Summarizing and paraphrasing may feel like a chore sometimes, but they are ethically necessary, and they result in more cohesive, coherent writing. Think of summarizing and paraphrasing as an opportunity to show the reader your perspective and synthesize different ideas into your own argument.

Bibliography

Hodges JC, Horner WB, Webb SS, Miller RK. Hodges' Harbrace Handbook. 13th ed. Fort Worth, TX: Harcourt Brace College Publishers; 1998.

--Sarah Bronson, ELS

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