In this next module, I'm going to edit for you a student essay from a,previous course.,This person responded to the prompt onsa assignment to describe a hot paper in their field.,What I want you to do now is to pause the video, read through the essay at least once or twice, and then re start the video, and,I'll walk you through it. I've also provided a text file if you'd rather read the essay there, and if you have time, you might even try editing it on your own.,So this paper is on a biological topic.,It describes, describes a key paper that found a new role for reactive oxygen species.,The essay has a lot of strength.,It has some nice language. The author also did a great job of getting across the main point very quickly in the essay.,So in this 1st paragraph, last sentence in the landmark study published in the journal Plant Cell, ,tanaka and colleagues recently uncovered an additional role for ros as regulators of symbiosis.,So that's a beautiful summary of exactly what this essay is about.,And the readers told very early on what this paper is going to be about.,The essay is also very well organized.,It flows nicely and logically. We start with an overview, then we get some background, then the experiments, then the results, then the the questions coming out of those results.,So I'm not going to do any rearranging of sentences or paragraphs in this essay.,I'm mostly going to focus on a little nip and tuck, kind of a few spots where we can take out some unnecessary details and trim some extra.,So starting with the 1st paragraph here, 1st sentence Reactive oxygen species, ,or os are highly reactive chemicals, often associated with escalating warfare between pathogens and their hosts.,That's a really nice, vivid sentence.,It draws the reader in. I'm not even exactly as it is.,Most people today have probably heard about reactive oxygen species.,They're widely talked about in the popular media.,Most people know they're bad players.,And that's a nice metaphor. With the warfare here, ,I'm going to make one little change to the 2nd sentence, so that sentence reads fine, except at the very end we get this to ward off microbial infections. It's just kind of, that's just kind of hanging there.,It's just a little bit, um awkward.,It said there's an easy fix, though.,All we have to do is add some dashes.,We're going to set off the examples of the biological defenses with dashes here, so I can say, put those examples right in dashes, uh, here?,And then we get at the end another dash.,So e.g. R-O-S are integral to biological defenses, such as, example, example, ah.,And then we have to change the two to it that that ward off my chrobial infection, setting it off in dashes just makes that whole thing easier to read, ,makes the connection between the beginning and the end of the sentence more clear.,I'm going to also change to ward off microbial infections to microbial invaders.,It's just a slightly stronger word there, and it goes along with this theme of warfare.,One tiny change I'm going to make in the last sentence.,In a landmark study, this was the author uses the term recently.,It's not exactly a recent study.,If you look at the reference, it's a 2006 study.,It's not totally recent. So I'm going to say, any landmark 2006 study, let's just specify the date, rather than saying recently.,Moving on to the 2nd paragraph.,The 2nd paragraph gives some background.,The author goes into a little bit of technical detail about words to describe the fungus.,In the context of this essay, I don't think those are necessary, because, remember, this essay is about the reactive oxygen species.,It's not really about the fungus.,So I'm going to believe some of the technical terms here, e.g., in the 1st sentence, we get that the grass and the fungus, the fungus, leaves indophytically, I-E inside the grass.,Let's just say that the grass, that the fungus lives inside the grass.,We don't need that technical word there.,Then we don't really need to hear about the mycelium of the fungus.,Let's just say the fungus, again, is not important to give the technical term in this particular context.,So the fungus, and then we can get rid of this composed of cells called hype. Again, I don't think we need to know the technical term for the cells.,Is not really important for this particular essay.,So let's say, and then this sentence.,A 2nd sentence was a little bit long, and the most important point is really at the end, the fungus grows in perfect synchrony with the leaves of its plateau.,So I'm actually going to rearrange the sentence just slightly by moving up that last thought to the beginning of the sentence.,The fungus rose in perfect synchrony with, uh, the plant.,And I'm even going to delete the leaves.,The leaves will come next with the plant.,So we get right away the the idea of this symbiosis.,It grows in perfect synchrony with the plant.,And then we can go right into this idea of colonizing, colonizing all its leaves.,We can say it's rather than repeating of the plants, of colonizing all its leaves.,But, and then the hype ice sprouted,only sparsely in tissue. We don't need all of that.,I think we could just go right into but never breaching it.,Sell walls or membranes that,we can end the sentence there, so it's just a little bit streamlined.,The fungus grows in perfect synchrony with a plant colonizing all its leaves, but never breaching,its cell walls, embrace brains. And the next two sentence is the author uses the term harmonization.,Uh, that's a nice word, but I'm, I don't think we need it twice.,So I'm going to delete one of those instances of harmonization.,And in this next sentence, I think we can just say directly that exactly what happens.,So the grass directs resources to the fungus, the fungus produces a toxin that helps them both.,I think we can be a little more direct.,So I'm going to delete this exquisite harmonization of the fungus and the plant and just say the plant.,And then we get a couple of nouns that could be verbs here.,So we get the the the plant grow um growth directs resources to the production of fungal toxins, right?,Growth and production. Those could be verbs.,So I think we can just say the plant.,We could even just delete the plant with the plant directs resources to the fungus, which produces we don't need fungal toxins. We could just say toxins, which produces toxins that protect the symbiosis from herbivores, The symbiosis.,A lot of people may not have heard of symbiosis as a now, and like I think it might be a little more clear to say that protect the toxins that protect both species from urivores.,I also added in this sentence, we were kind of talking about the role of the fungus.,And the previous sentence for a little transition here, I added the plant in turn directs resources to the fungus, which produces toxins that predict both species from divorced.,Finally, in this last sentence, I'm just going to read it here.,But how this harmonization has achieved and what its underlying mechanisms are have remained a mystery.,Notice, it's a little awkward to say R and then have notice also that we get how the harmonization is achieved and what its underlying mechanisms are.,Those are kind of related concepts.,It's a little bit repetitive, so I think we can cut one of those and just talk about the underlying mechanisms.,So I'm going to say the other thing is, I'm going to add a but until Tonaka here, because remember, this is a 2006 paper.,Up until Tonaco, it was a complete mystery.,TONAKA actually maybe solve some of that mystery, so I think we have to acknowledge that here.,So, but until TONAKA, uh, the mechanisms underlying this habit, we say exquisite harmonization.,We don't really need that word exquisite, but the author had used that term exquisite harmonization before.,It just kind of shows the appreciation that the author has for this symbiosis.,So I'm going to put it in there.,Um the mechanisms underlying this harmonization just have remained a mystery.,And that will end that paragraph.,So we get a nice summary of the background, and then we have a lovely transition.,Here we get, we're presented with a question What are the mechanisms?,And then the next paragraph starts to address this question.,So the reader write knows really right away we're we're going So to address this question to NAKA and coworkers. Now we get a whole bunch of details about random, how they generated random mutants of the fungus.,I think the 1st sentence and 2nd sentence of this paragraph can actually be combined into one.,It's a little repetitive, and we, uh probably can put it all into one.,So we get that they generated random, uh, mutations in the 1st sentence, and then we get how they did in the 2nd sentence.,I think we can combine those by just saying that to knock at and coworkers.,How about randomly, randomly inserted pieces of DNA into the fungal genome?,And then we can put in paren'theses what the name of that method is.,It's good to have that in there, but it's probably extra information.,They randomly answered pieces of DNA into the fungal genome.,And then why did they do that?,In the hopes of disrupting and then we get a gene resulting in observable growth changes in some biosis.,This is a little wordy. How would if we just say, in in hopes of just disrupting genes, probably more than one gene might be involved?,Genes involved, your genes, critical, too, critical to the symbiosis.,And I think the reader can infer that if you disrupt those genes that are critical to this symbiosis, you would observe changes.,So we don't need to spell that out so much for the then we get They indeed found a mutant showing a highly unusual growth pattern, nicer to look coal in here.,To say exactly what that growth pattern is, I'm going to just make one tiny change.,I just prefer,Indeed, they found rather than they indeed found at personal preference.,Both are fine. Indeed, they found a mutant.,And I think I'm going to say, I'm mutant strain, mutant strain showing, uh, I think we could say where they highly, I slightly prefer with the highly unusual growth pattern here.,And then we get this, call it now, we get this unlike the synchronous growth of the wild type fungus.,Well, we've already talked about the synchronous growth of the wild type fungus in the previous paragraph.,I actually don't think we need to repeat that.,I think we can just go into right away what's different about the mutant. So we can just start with what's different about the mutant?,Uh? We don't necessarily need that hype again, the technical term for the fungal cells, I think we can just say, mutant fungal cells.,It's not important, UH, to get the technical term again in this context, since the essay is mostly about reactive oxygen species, so just newton fungal cells.,And then we get a showed profuse and abundant proliferation.,So this was one of those entered instances where we've got a noun that could be a verb.,So showed proliferation, we could just say proliferate.,And even simpler than the word proli proliferate, how?,But if we just say group, so, rather than showed proliferation, how?,But proliberated, or grew? Uh? And then we can say they grew profusely and abundantly, but actually profusely and abundantly are kind of the same thing.,So I'm just going to say, group profusely throughout the grass, and then I am going to wrap this last sentence into the previous sentence.,So they grew profusely throughout the grass.,Whereas then, now, let's say what happened to the plants?,Whereas the plants or the we could say that we are as infected plants.,There is infected plants, and we don't have to say that they were infected by the mutant that's implied.,We're as infected plants. And now we get another showed growth, which could be just grew, right?,It's another instance of a nounding turn verbing turned into a noun.,So let's turn it back to the verb.,So rather than showed poor growth, how about we were poorly and often died?,All right, so we trim that a little bit.,Uh, go on to the next paragraph.,Now, what's interesting is this other does a great job with the, uh, the logic in the flow.,Again, they actually almost give too many transitions that aren't really necessary.,So notice in this next paragraph, it starts this at the stage for the next step, finding the genetic changes that it caused these aberrations.,I'm actually going to delete that entire sentence.,The author here has a tendency to want to start every paragraph with a little guide post, a sign post for the reader to tell the reader exactly what's coming up in the paragraph. That's a good instinct, but in fact, the logical flow is so nice here that the reader doesn't need this kind of handholding.,You can just go right into how the researchers figured out what the genetic change was.,The reader doesn't need that entire sentence.,So trust your reader a little.,They don't always need to handle them.,Sometimes explicit transitions like that are unnecessary if you've got good logic.,So we're going to get rid of that.,We're going to go right into using genetic tools.,The researchers homeed in on the gene, the DNA insertion had disrupted.,Uh surprisingly, only a single integration event had occurred.,Noticed the use of insertion and integration.,Probably that's a little repetitive. I think we can just combine this all into one using molecular tools.,The researchers found that, um, I'm going to say, um, an insertional event, stick with insertion, an insert insertional event in a single gene.,I think that's the idea here.,In this social event in a single gene, had caused the aberrant growth, or the abnormal growth, ,since I deleted aberrant above in the one of the sentences above, I'm going to say had caused the, like that word, average growth.,And then we can just end up there.,So they found that in an assertional event, in a single genome, caused the aberrant growth.,And now I'm going to make a really small sentence, a really short sentence sentence.,The researchers name the gene knox A.,Sometimes it's nice to just throw in a short sentence.,It kind of adds to the sentence variety, the stems of structure variety here.,Its kind of punctuates this finding a little bit.,So think about that Occasionally throwing in a short sentence like that has a nice a.,Now I have a really short paragraph here, so I'm going to fold up this paragraph here in with the next paragraph.,These can be brought together. So using licular genetics tools, the researchers found that an insertional event in a single gene had caused the aberrant growth.,The researchers name the gene knox A.,And now we get this again. The author wants to kind of tell the reader exactly what's happening next to get an idea of what that protein does, ,the the protein made by the gene does The team did X-Y and Z-I think we can actually jump right into what the team did and what they found all in one ,and get rid of this little sign post here.,So I think we can just say when they compared.,We've all just recently talked about the researchers, so we the the days assumed to be the researchers when they compared it's sequence.,we've just said the gene, so it's OK to say its sequence will know we're referring to the gene when they compared its sequence with those of enzymes with known activities.,And then let's just fold that right into the next sentence.,What What did they find? They noticed that knox A was very similar to uh N-A-D-P-H oxidases, enzymes that are often involved in generating OROS.,And cells, I think we can say, just shorter than that, enzymes that generate R-O-S.,And I don't think we need the in cells there that generate R-O-S.,And then I'm actually going to end this new paragraph right there, set off another paragraph.,And the reason I'm ending there is to kind of punctuate this finding.,This is where the researchers realized the link to ros So this is wrapping us around to the beginning of the the essay, to the main point of the esay.,So I'm going to punctuate that by ending the paragraph right there.,And the next paragraph now starts with, indeed, the The author here likes this um transition word, indeed, and we've already used it one So I think we'll get rid of that.,Uh? And actually, we can probably saying, well, when they next did this, they observe this, we can probably just go right into what they observe.,IM going to say Further testing revealed that, r OS accumulates implants infected by the wild type fungus, ,but not those infected by the knocks a disrupted Newton, I think we can say the shorter, but not those infected by the knox A mutant.,I think that would be sufficient there in loxey mutants. Uh? This confirmed. Now, I'm actually going to change the confirmed that to, uh, the researchers concluded that, or the scientists, the scientists concluded that.,The reason I'm not going to leave confirmed in here is because this is a really novel discovery,, I think, and so confirmed implies like other people had suspected it before, but this, I think, is really novel, ,and so I'd rather say that they concluded that it's a new, totally new thing, as opposed to a confirmation, ,and then that Noxa is involved in r OS production required for proper functioning of the symbiosis.,I don't think we need all that.,I think we can just say that r OS is a critical player in this symbiosis.,That's the key finding. And we can end it there.,Finally, this last paragraph, we again, kind of get a transition sentence.,Well, this raises tantalizing questions. Instead of doing that, let's just go into right away.,What is the open question? So how are os enables Symbiosis remains an open question.,And notice I've put that in the present tense.,I'm assuming that even today, seven years after Tonaka studied that this is still an open question.,We haven't solved it yet, and then we can talk about I might repeat Tanaka, see my deleted here, the reference to Tnoka again.,So maybe I'll say, tanaka's team suggest now this is a they probably suggested or speculated about this in the past when they publish their paper.,So I think it should be a past tense they they speculated back then when they published that paper that R-O-S could be involved.,I'm going to changes to maybe be involved, just because the next sentence has a may play a role.,I want those verbs to be parallel.,So may be involved in establishing physical connections between the cell walls of the plant and fungus.,Alternatively, R-O-S may play a role in symbiotic signaling.,I'm going to change this coal into a semicolon.,It's just, I think, slightly better to have a semicolon here, because the 2nd half of the sentence doesn't amplify the 1st half.,It really is just kind of another idea. Uh, I could go either way on that.,Either a coleman or semi colon is probably fine.,I slightly prefer a semi coal in there a new idea.,So their short half life predisposes them for cellular communication, perhaps facilitating an interspecies morse code.,That's kind of cool. Language. Uh?,Is their short life, but maybe we can say a little shorter.,Uh, how about their short life?,Their short have like, makes them perfect candidates.,Foreign inter species, morse code. And then we don't need that helps maintain the symbiosis.,We don't need to repeat that, because we already know that.,We're in a paragraph about how this imbiosis is maintained.,So we can get rid of that extra completely.,The reader doesn't need that. If so identifying the plant sensor and signaling pathways, how about if we just say,, if so, breaking the code, kind of playing on the Morse code idea from the previous sentence.,If so, breaking the code could provide deeper insights into how plants recognize and interact with beneficial symbiance, and can distinguish them.,Notice the lack of parallelism they recognize, interact and distinguish.,If we put can distinguish, it's not parallel, eliminate that can.,And then finally, I feel like we need to add a little tiny paragraph at the end here, just to, uh, provide a nice conclusion to wrap back to the beginning.,Remember, the focus of this paper is this new discovery that r os aren't always bad players.,So I feel like we need a little wrap up here.,So I was going to suggest to the to the author, something like, to knock us paper fundamentally changed scientists view, uh, scientist views, or view of R-O-S.,Major shift here. These chemicals are not only weapons of biological warfare.,I'm rapping now, wrapping back now to the metaphor that was given at the beginning,, but also agents of peace and cooperation, sometimes it's nice to, if you start with kind of a metaphor, a nice, vivid idea, to wrap back to that at the end of the piece.,And then I'm going to ask the author of this piece to me me think about, are there any wider implications for biology? Of the fact that r os are not always bad players?,Are there any wider implications for biology, even beyond symbiosis?

在下一个模块中， 我将为你编辑一篇学生在上一门课程中的论文。 这个人回应了 作文作业的提示，描述了他们所在领域的一篇热门论文。 我现在要你做的是 暂停视频， 至少通读一两次文章， 然后重启视频， 我会带你看一遍。 如果你想在那里读这篇文章，我还提供了一个文本文件。 而且，如果你有时间， 你甚至可以尝试自己编辑它。 因此，这篇论文是关于生物学主题的。 它描述了一篇关键论文，该论文发现了活性氧物种的新作用。 这篇文章有很多优点。 它有一些不错的语言。 作者在 文章中快速阐述要点方面也做得非常出色。 因此，在第一段最后一句话中， “在 发表在《植物细胞》杂志上的一项具有里程碑意义的研究中， 田中及其同事最近发现了活性 氧作为共生调节剂的额外作用。 因此，这是对这篇文章的确切内容的精美总结 ，读者很早就被告知了这篇论文的内容。 这篇文章也井井有条。 它流畅且合乎逻辑。 我们从概述开始， 然后获得一些背景， 然后是实验，然后是结果， 然后是这些结果中出现的问题。 因此，在这篇文章中，我不会对句子或段落进行任何重新排列， 我主要将重点放在一些小小的片段上，在这些 地方，我们可以 删除一些不必要的细节然后修剪一些多余的单词。 因此，从这里的第一段开始。 第一句话，“活性氧（ROS）是 高活性化学物质，通常与 病原体与宿主之间不断升级的战争有关。” 这是一句非常漂亮、生动的句子。 它吸引了读者。 我要保持原样。 “当今大多数人可能听说过活性氧。 它们在大众媒体上被广泛讨论。 大多数人都知道他们是坏球员。” 这是一个很好的比喻，我们可以在这里使用。 我要对第二句话做一点改动。 所以这句话读起来不 错，唯一的不同是最后我们得到了 “抵御微生物感染”。 这有点悬而未决。 只是有点尴尬。 相反，有一个简单的解决方法。 我们所要做的就是添加一些破折号。 我们将在这里用破折号举出生物防御的例子。 所以我可以说，把这些例子用破折号放在这里。 然后，我们最后再冲一次。 因此，举个例子，“ROS是生物防御不可或缺的一部分 ，例如，然后，我们必须将 “to” 改为 “to”。 “这样可以抵御微生物感染。”用@@ 破折号将其设置只会使整件事更易于阅读。 使句子开头和结尾之间的联系更加清晰。 我还将把 “抵御微生物感染” 改为 “微生物入侵者”。 这只是一个稍微强一点的词， 它与这个战争主题相吻合。 我将在最后一句话 “在一项具有里程碑意义的研究中” 中做一个微小的改动。 作者使用了 “最近” 一词。 这不完全是最近的一项研究。 如果你看一下参考文献，那是 2006 年的一项研究。 这不是最近的，所以我要说 “在2006年的一项具有里程碑意义的研究中”。 让我们只指定日期，而不是说 “最近”。 转到第二段。 第二段提供了一些背景信息。 作者详细介绍了描述这种真菌的词语。 在这篇文章的背景下， 我认为这些是没有必要的，因为请记住， 这篇文章是关于活性氧物种的。 这与真菌无关， 所以我将在这里删除一些技术术语。 例如，在第一句话中， 我们得到的是草和真菌， “真菌在内生中生活，即在草丛中”。 假设真菌生活在草丛中。 我们在那里不需要那个技术词。 那么，我们真的不需要听说真菌的菌丝体。 比方说，“真菌”。 同样，在这种特殊背景下给出技术术语并不重要。 所以 “真菌”，然后我们可以摆脱这种 “由称为菌丝的细胞组成”。 再说一遍，我认为我们不需要知道细胞的技术术语，这对于 这篇特定的文章来说并不重要。 然后，第二句话 有点长。 而最重要的一点实际上在最后。 “真菌的生长与其植物的叶子完全同步。” 因此，我实际上要稍微重新排列这句话 ，将最后一个想法向上移到句子的开头。 “真菌与植物完全同步生长” ，我甚至要删除 “树叶”。 接下来是 “树叶”，“和植物在一起”， 所以我们马上就有了这种共生的想法。 “它与 植物完全同步生长” 然后我们可以直接谈谈殖民的想法。 “殖民所有树叶”。 我们可以说，“它的”，而不是重复 “植物的”，所以 “在所有树叶上定植”。 但是，“然后菌丝只在组织中稀疏地发芽”。 我们不需要所有这些。 我想我们可以直接进入 “但永远不要突破它的细胞壁或膜”。 所以我们可以在那里结束句子。 所以它有点精简。 “真菌与植物完全同步生长，在 所有叶子上定植，但从未突破其细胞壁或膜。” 在接下来的两句话 中，作者使用了 “协调” 一词。 这是一个不错的词，但我认为我们不需要两次； 我将删除其中一个 “协调” 实例。 在接下来的这句话中， 我想我们可以直接说出到底发生了什么。 因此，“草将资源引导到真菌身 上，真菌会产生一种对它们都有帮助的毒素”。 我想我们可以更直接一点。 所以我要删除这个 “ 真菌和植物的精致协调” 然后说 “植物”， 然后我们得到几个名词，这里可能是动词， 所以我们得到 “植物的生长将资源引导到真菌毒素的产生”。 对，“增长” 和 “生产”， 它们可能是动词。 所以我想我们可以说 “植物”。 我们甚至可以直接删除 “植物生长”。 “植物将资源引导到产生的真菌上”， 我们实际上不需要 “真菌毒素”，我们可以说 “毒素”， “它产生的毒素可以保护共生体免受食草动物的侵害”。 “共生。”很多人可能没有听说过 “共生” 作为这样的名词。 我认为说 “保护两个物种免受食草动物侵害的毒素” 可能会更清楚一些。 我还在句子中补充说， 我们在前一句话中谈到了真菌的作用。 为了稍作过渡， 我补充说：“反过来，植物会 将资源引向真菌，真菌 产生的毒素可以保护两个物种免受食草动物的侵害。” 最后，在最后一句话中，我只想在这里读一读。 “但是，这种协调是如何实现的，其基本机制是什么 ，仍然是个谜。 请注意，说 “是” 然后说 “有” 有点尴尬。 还要注意，我们得到 “如何 实现协调” 以及其基本机制是什么。 这些都是一些相关的概念。 有点重复。 所以我认为我们可以削减其中的一个然后只谈谈潜在的机制。 另一件事是， 我要在这里加一个 “但直到田中”，因为请记住这是一篇 2006 年的论文。 直到田中，这完全是个谜。 田中实际上可能解开了其中的一些谜团， 所以我认为我们必须承认这一点。 所以 “但是在田中之前， 这是其背后的机制”， 我们说 “精致的协调” 怎么样。 我们并不真正需要 “精致” 这个词， 但是作者以前使用过 “精致协调” 这个词。 这在某种程度上表明了作者对这种共生关系的赞赏， 所以我要把它放在那里。 “这种协调背后的机制仍然是个谜。” 那段就结束了。 因此，我们得到了一个很好的背景摘要。 然后我们在这里有一个不错的过渡。 我们遇到了一个问题， “机制是什么”， 然后下一段开始讨论这个问题， 因此读者可以立即真正知道我们的前进方向。 因此，为了解决这个问题， “田中和同事”，现在我们得到了一大堆 关于他们何时以及如何生成真菌随机突变体的细节。 我认为 本段的第一句和第二句实际上可以合并为一句。 这有点重复，我们也许可以把所有内容都写成一句话。 所以我们知道他们在 第一句话中产生了随机突变， 然后我们明白了他们在第二句话中是如何做到的。 我认为我们可以通过说田中” 和同事” 来将它们结合起来， “将 DNA片段随机插入真菌基因组” 怎么样。 然后我们可以在括号中加上该方法的名称。 把它放在里面真是太好了，但可能还有额外的信息。 “他们将DNA片段随机插入 真菌基因组中” 然后，他们为什么要这样做？ “希望能 颠覆”，然后我们得到了 “一种在 共生关系中导致可观察到的生长变化的基因。”这有点罗词。 如果我们只说 “希望 破坏基因”，可能涉及多个基因，“涉及的基 因” 或 “对共生关系至关重要的基因”，该怎么样。 而且我认为读者可以 推断，如果你破坏那些对共生至关重要的基因， 你就会观察到变化。 因此，我们不需要为读者详细说明这一点。 然后我们得到 “他们确实发现了一个显示出非常不寻常的生长模式的突变体。” 很好地用这里的冒号来准确地说出那种生长模式是什么。 我只想做一个小改动。 我只是更喜欢 “他们确实找到了” 而不是 “他们确实找到了” 个人偏好。两者都很好。 “事实上，他们发现了一个突变体” ，我想我要说 “一种突变菌株”。 “一种突变菌株的表现”，我想我们可以说 “高度的”， 我稍微更喜欢这里的 “生长模式非常不寻常”。 然后我们得到这个结肠。 现在，我们明白了。 “与野生型真菌的同步生长不同。” 好吧，我们在 上一段中已经谈到了野生型真菌的同步生长。 其实我认为我们不需要重复。 我想我们可以马上探讨突变体的不同之处。 因此，我们可以从突变体的不同之处开始。 我们不一定需要那种菌丝，这是 真菌细胞的技术术语。 我想我们可以说 “突变真菌细胞”。 再说一遍，在这种情况下，获得技术术语并不重要， 因为这篇文章主要是关于活性氧物种的， 所以只是 “突变真菌细胞”。 然后我们得到了 “显示出大量和大量的扩散”。 因此，这是我们有一个名词可以是动词的例子之一。 所以 “显示扩散”，我们可以说 “扩散”，甚至比 “扩散” 这个词更简单，如果我们只说 “增长” 怎么样。 因此，与其说 “显示扩散”，不如说 “扩散” 或 “生长”， 然后我们可以说它们 “大量生长”， 但实际上 “大量生长” 和 “丰富” 是同一回事， 所以我只想说 “在草地上大量生长”。 然后我要把最后一句话换成前一句话， “所以它们在草地上大量生长， 而”，现在让我们说说植物发生了什么。 “而植物”，我们可以说 “而受感染的植物”。 “虽然受感染的植物” 我们不必 说它们被突变体感染，这是暗示的。 “虽然受感染的植物” 现在我们又有了另一个 “显示出生长” ，可能只是 “生长”，对， 这是动词变成名词的又一个例子。 因此，让我们回过头来看动词。 因此，与其说 “增长不佳”， 不如说 “生长不佳，经常死亡”。 好吧，所以我们稍微修剪了一下。 转到下一段。 有趣的是，这位作者再次在逻辑和流程方面做得很好。 实际上，它们几乎给出了太多不是真正必要的过渡。 因此，请注意，在下一段中，它的开头 是：“这为下一步奠定了基础。 寻找导致这些异常的遗传变化”， 实际上是要删除整句话。 这里的作者倾向于在每个段落的开头都有一个小 路标，这是读者告诉读者该段落中到底发生了什么的路标。 这是一种很好的本能，但实际上， 这里的逻辑流程非常好，读者不需要这种牵手。 你可以直接了解研究人员是如何弄清楚遗传变化是什么的。 读者不需要整句话。 所以，请稍微相信你的读者。 您并不总是需要手持它们。 有时， 如果你有很好的逻辑，那么这样的显式过渡是不必要的。所以，我们要摆脱这个问题。 我们将直接讨论 “使用遗传工具， 研究人员对DNA插入破坏的基因进行了磨练。 令人惊讶的是，只发生了一次创新事件。” 请注意 “插入” 和 “集成” 的使用。 可能有点重复。 我想我们可以将所有这些合而为一。 “使用分子工具，研究人员发现”， 我要说 “插入事件”， 让我们坚持使用 “插入”， “单个基因中的插入事件”。 我想这就是这里的想法 “自从我在 上面的一句话中删除了 “异常” 以来，单个基因中的插入事件导致了异常生长或 “异常生长”， 我要说 “造成了”，比如那个词 “异常 生长” 然后我们就结束了， “所以他们发现单个基因中的原始事件导致了异常生长”。 现在我要在这里说一句很小的句子， 一句非常简短的句子。 “研究人员将该基因命名为NOxA。 有时候把这句简短的句子放进去真是太好了。 它在某种程度上增加了这里的句子多样性。 这有点突显了这一发现。 所以想一想。偶尔放 一句这样的简短句子效果不错。 现在我这里有一段很短的段落，所以我将把 这个段落与下一段一起折叠起来。 这些可以汇集在一起。 因此，“使用分子遗传学工具， 研究人员发现，在单个基因中插入会导致异常物生长。 研究人员将该基因命名为 “NOxA”。 再说一遍，作者想告诉读者接下来会发生什么。 为了了解这种蛋白质的作用， 基因产生的蛋白质的作用，研究 小组做了 X Y 和 Z。我想我们 实际上可以直接进入研究小组的所作所为和他们发现的东西， 全部合而为一，然后把这里的这个小路标清理掉。 所以我想我们可以说 “当他们比较的时候”。 我们最近刚刚谈到了研究人员，所以当 “ 他们比较序列” 时，假设 “他们” 是 “研究人员”，我们只是说 “基因”，所以可以说 “这是序列”， 我们就知道我们指的是基因。 “当他们将其序列与具有已知活性的酶的序列进行比较时”， 然后让我们直接将其折叠到下一句话中； 让我们听听他们的确发现了什么。 “他们注意到，NOxA与任何 经常参与在细胞中产生活性氧的NADPH氧化酶非常相似”。 我想我们可以说比这更短， “产生活性氧的酶”，但 我认为我们不需要 “产生活性氧的细胞中”，然后 我实际上要在这里结束这个新段 落，再开一段。 我到此结束的原因是为了突出这一发现。 这就是研究人员意识到与ROS的联系的地方。 因此，这使我们走到了文章的开头 ，到文章的主要内容。 所以我要用标点符号来结束这段话。 下一段现在以 “Indeed” 开头， 这里的作者喜欢这个过渡词。 “的确，” 我们已经用过那个，所以我想我们会把它丢掉的。 说得不错，当他们下次这样做时，他们会观察到这一点。 我们也许可以直接了解他们所观察到的情况。 我要说：“进一步的测试表明，活性氧会积聚在被 野生型真菌感染的植物中，但不会积聚在被 NOxA干扰突变体感染的植物中”。 我想我们可以说得更短”，但不能说那些被NOxA突变体感染的人”。 那就足够了，“NOxA 突变体。 这证实了这一点”，我实际上要将 “已确认这一点” 改为 “研究人员得出结论” 或 “科学家得出结论”。 我之所以不打算在这里证实， 是因为我认为这是一个非常新颖的发现。 所以 “已确认” 意味着就像其他人 以前所怀疑的那样，但我认为这确实很新 颖，所以我宁愿说他们得出的结论 是，这是一件全新的事物，而不是确认。 然后，“NOxA参与了 共生关系正常运作所需的活性氧的产生”。我认为我们不需要所有这些。 我想我们可以说 “ROS 是这种共生关系中的关键参与者”。 这是关键发现 ，我们可以到此结束。 最后，在最后一段中， 我们再次得到一句过渡句 ：“好吧，这提出了诱人的问题”。 与其这样做，不如 立即讨论悬而未决的问题是什么，所 以：“ROS如何实现共生仍然是一个悬而未决的问题。” 注意我用现在时说的。 我假设，即使在今天， 在田中说了七年之后， 这仍然是一个悬而未决的问题，我们还没有解决这个问题。 我可能会重复我在这里删除的 “田中团队”， 再次提及田中，所以也许我会说， “田中的团队 建议”，他们过去可能在发表论文时曾提出过或猜测过这一点， 所以我认为应该是过去时。 当时，当他们发表那篇论文时，他们猜测 “ROS 可能参与其中”， 我将把它改为 “可能参与其中”，只是 因为下一句话有一个简洁的游戏规则。 我希望这些动词是平行的，这样 “可能参与在 植物的细胞壁和真菌之间建立物理联系”。 “或者，ROS可能在共生信号传导中发挥作用。” 我要把这个冒号改成分号。 我只是觉得这里有分号稍微好一点， 因为这句话的后半部分不会放大前半部分。 这实际上只是另一个想法。 无论哪种方式我都可以这样做， 要么是冒号，要么是冒号，可能没问题。 我稍微更喜欢那里的分号。 所以一个新的想法，所以，“它们短的半衰期使它们容易进行细胞通信， 也许可以促进物种间的摩尔斯电码”，这是 一种很酷的语言 “是它们的短暂寿命”，但也许我们可以说短一点。 “它们短的半衰期使它们成为 种间摩尔斯电码的理想人选” 怎么样。 然后，我们不需要 “有助于维持共生关系的东西”。 我们不需要重复，因为我们已经知道我们在 一段关于如何维持共生关系的段落中， 所以我们可以完全摆脱这种多余的东西。 读者不需要那个。 “如果是，请识别植物传感器和信号通路”。 如果我们只是说 “如果是这样，就破解密码”，有 点像玩弄前一句话中的摩尔斯 电码概念，“如果是这样，破解密码可以更深入地了解植物如何识别有益共生体并与之互动并能够区分它们”。 请注意那里缺乏并行性，即 “识别、 交互和区分”，如果我们把 “可以区分” 放在上面呢。 它不是平行的，所以我要消除那个 “可以”。 然后，最后，我觉得我们需要在这里的结尾处添加一个小段落， 以便提供一个很好的结论来总结开头。 请记住，本文的重点是这个新发现，即ROS一直是坏玩家。 所以我觉得我们需要在这里总结一下。 所以我要向作者提出这样的建议， 田中的论文从根本上改变了 科学家对活性氧的看法。 这里的重大转变。 这些化学物质不仅是生物战的卑鄙武器，我现在在说唱， 现在回过头来谈一 开始给出的那个比喻，还是 “和平与合作的推动者”。 有时候这很不错， 如果你从一个比喻开始，那么 在文章结尾处总结一下这个好主意。 然后我要请这篇文章的作者考虑一下， ROS 并不总是坏玩家这一事实对生物学有什么更广泛的影响？ 除了共生之外，对生物学还有更广泛影响吗？ 如果在那里添加它可能会很不错。