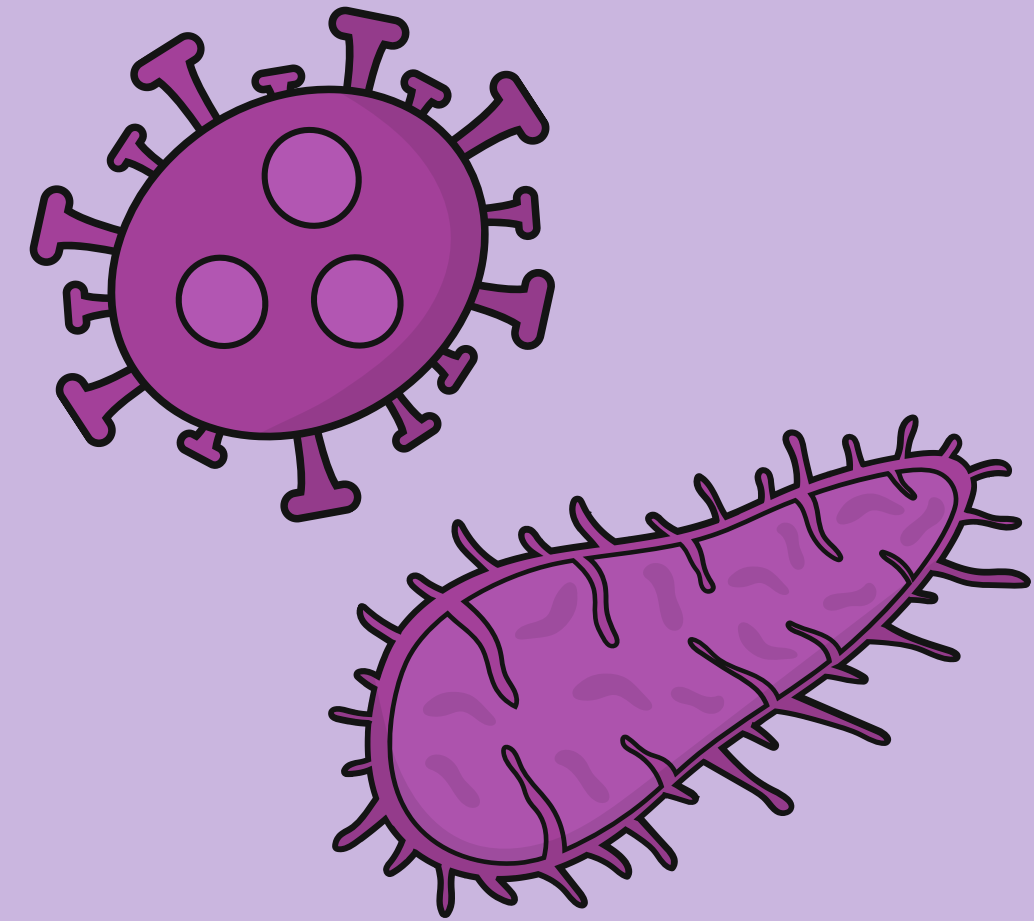
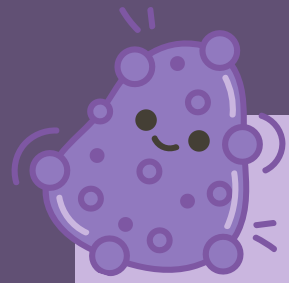


# **Should GOFR (Gain- of-Function Research) Still Be Continued?**



**By Gabrielle Victoria Dizon**

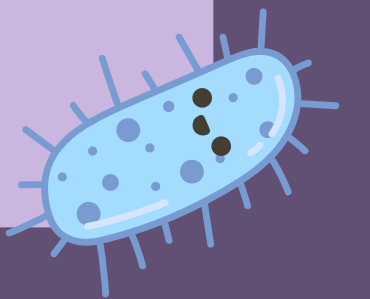


# Intro

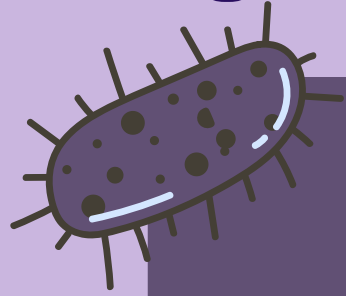
**For this presentation I will need to condense the information I have obtained as much as possible so I can't be showing everything. But, if you want all the information, it'll be in the online portion, and in the in-person judging. This presentation is a brief look/summary of my project.**

# Contents

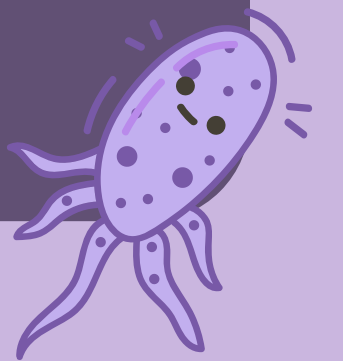
- 1. Problem**
- 2. Background Research**
- 3. Data and Next Steps**
- 4. Conclusion**
- 5. Sources**



# Problem



The problem my project is trying to sort out is whether we should continue Gain-of-Function Research. The reason why I even came up with trying to “determine” whether we should continue this method of research was because in the microbiology field, Gain-of-Function Research is a hotly debated and controversial topic.



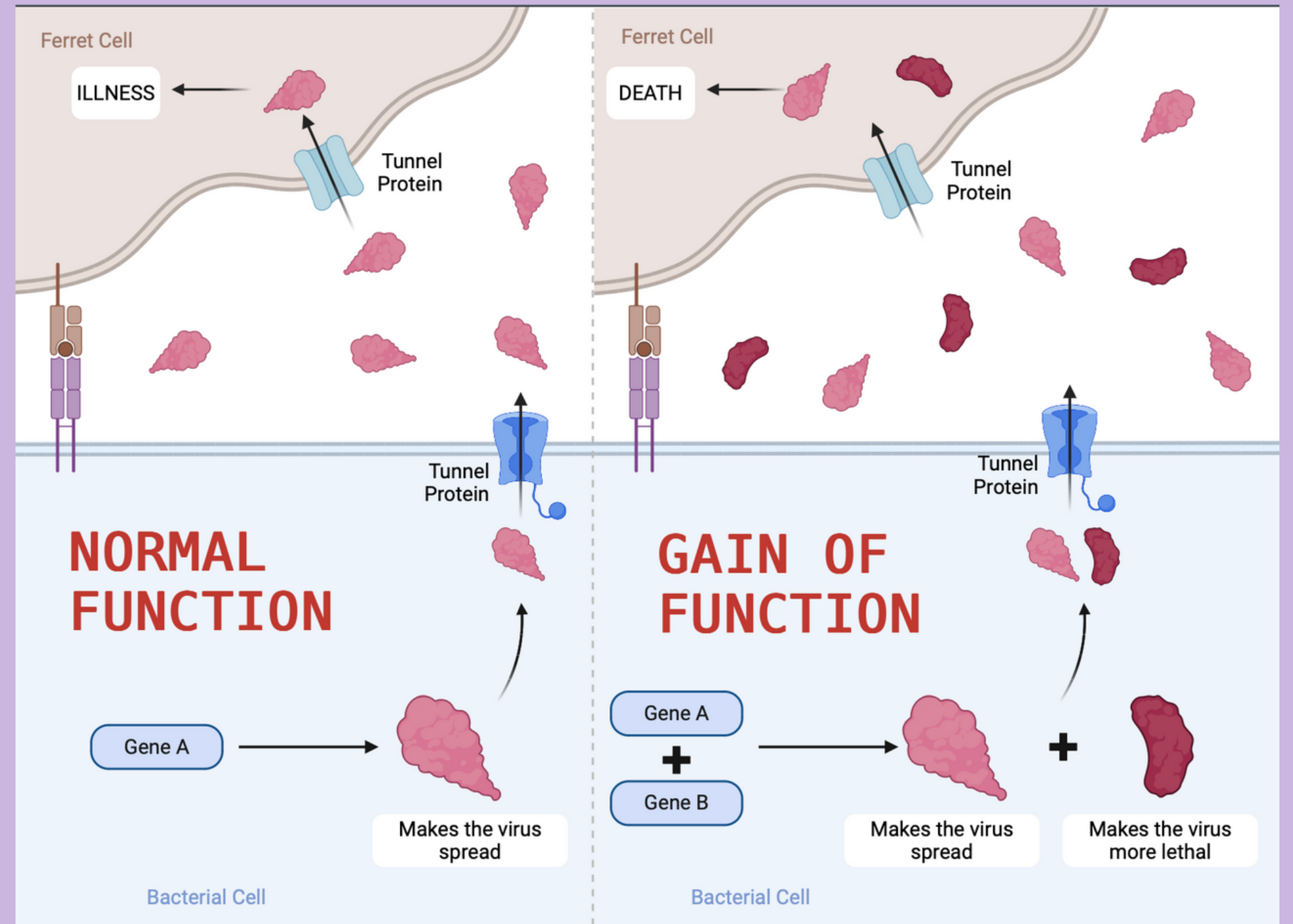
# Background Research

## What is GOF and LOF Research?

GOF stands for Gain-of-Function and LOF stands for Loss-of-Function (If you see LOF or GOF with an R in front, the R stands for research.)

## What are ePPPs/PPPs?

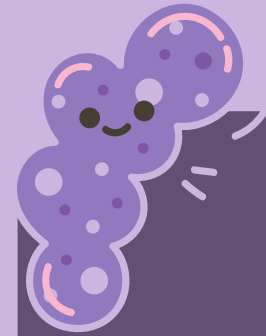
PPPs stand for; Potential Pandemic Pathogens and ePPPs stand for; Engineered Potential Pandemic Pathogens. Although, the 2 terms are usually regarded as the same thing so I've use the 2 terms interchangeably.



Normal pathogen cell without GOF vs. Pathogen cell with GOF



# More Background Research/Info



## GOFR's Contributions and Benefits (pros)

GOFR has been as influential in research as much as its counterpart LOFR. It has contributed to helping us understand CoVs better, (coronaviruses) before the pandemic. It has also determined what vaccines to stockpile on.

**Gain-of-function research is more than just tweaking risky viruses – it's a routine and essential tool in all biology research**

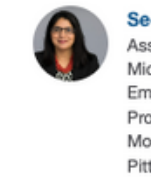
Published: May 8, 2023 8.18am EDT

Gain-of-function experiments in the lab can help researchers get ahead of viruses naturally gaining the ability to infect people in the wild. KTSD Library via Getty Images

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The term "gain of function" is often taken to refer to research with viruses that puts society at risk of an infectious disease outbreak for questionable gain. Some research on emerging viruses can result in variants that gain the ability to infect people but this does not necessarily mean the research is dangerous or that it is not fruitful. Concerns have focused on lab research on the virus that causes bird flu in 2019 and on the virus that causes

Authors



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**Gain-of-function research can't deliver pandemic predictions. Are there alternatives?**

By Simon Wain-Hobson | June 27, 2022

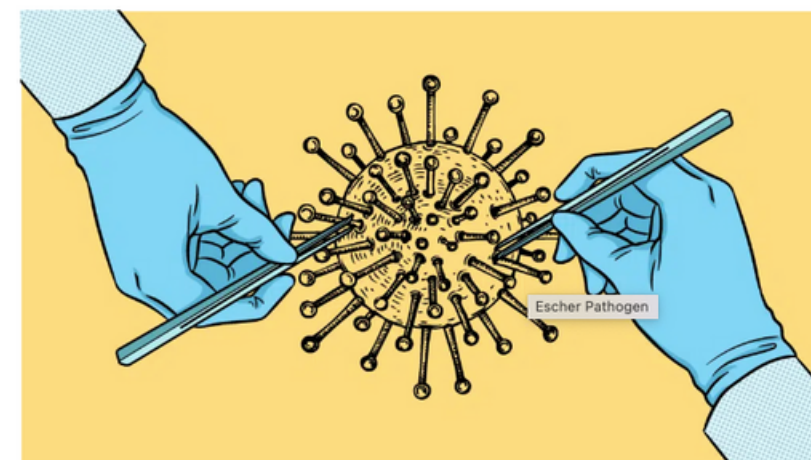


Illustration by Erik English.



**Simon Wain-Hobson**

Simon Wain-Hobson is an emeritus professor at the Institute Pasteur, Paris, from which he retired in 2021. He and his colleagues were the first to... [Read More](#)

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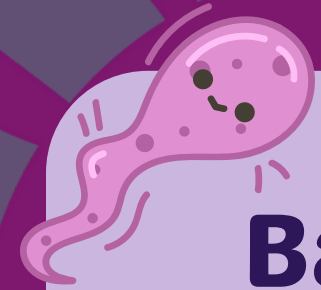
## GOFR Cons

GOFR obviously has its cons. The most obvious of these cons would be,

1. The amount of controversy that surrounds it
2. The government is a bit iffy when it comes to funding such projects
3. if a lab leak were to happen it'd be disastrous
4. If someone with malicious intent finds out how to conduct such experiments, that'd also be disastrous

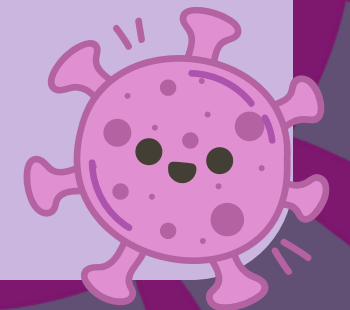


## My Thesis/Argument About GOFr



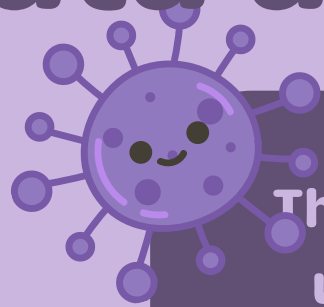
**Basically, I think that we should still continue with this research because at the moment, we are a long ways from discovering any alternatives whatsoever. And this is one of the only forms of research we have to answer certain questions we have about pathogens. It's also a big factor on how we know so much about coronaviruses which has probably helped scientists deal with COVID-19 more easily than some other pathogens we haven't conducted GOFr on.**

**So, for now, we should continue GOFr.**





# Data and Opinion



The chances of accidents occurring while undertaking GOFR are extremely slim. Trained professionals are working with these projects and these projects have to be done in level 3+ safety labs.

Personally, I think that the risks of GOFR are over exaggerated. And some people have to deal with that this one of the only forms of research we have that can answer a very specific set of questions.



## BSL3 (WITH RISK-BASED ENHANCEMENTS)

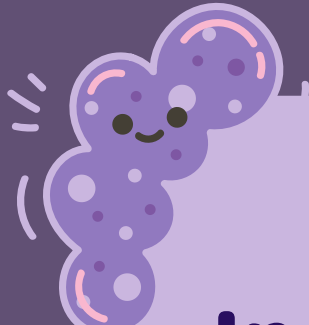
AIR TIGHT (WHEN DISINFECTING)

AIR TIGHT (WHEN DISINFECTING)

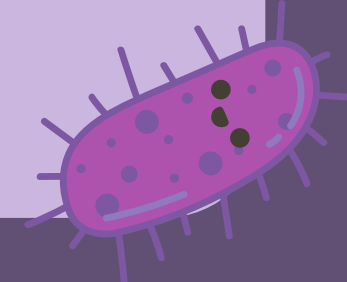
### BSL3

- 1 self-closing, double-door access
- 2 controlled access
- 3 personal shower out
- 4 sharp hazards warning policy
- 5 hand washing sink
- 6 sealed penetrations
- 7 physical containment device
- 8 powered air purifying respirator
- 9 laboratory bench
- 10 autoclave
- 11 exhaust HEPA filter
- 12 effluent decontamination system

# Next Steps



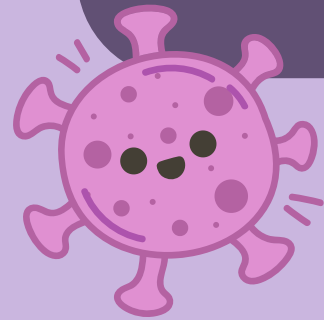
**In order to better determine whether GOFR is both useful to the public and safe, we should bring this topic into the public spotlight because a huge reason why GOFR is done is to benefit public health. We can introduce public forums and outreach events to further engage the public in such discussions. For this to be successful, scientists should engage in knowledge translation to make their work more accessible to the public, and insert their own opinions into the matter.**





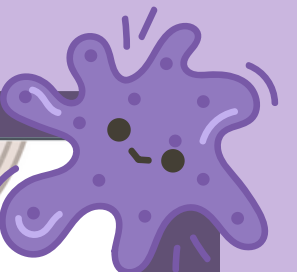
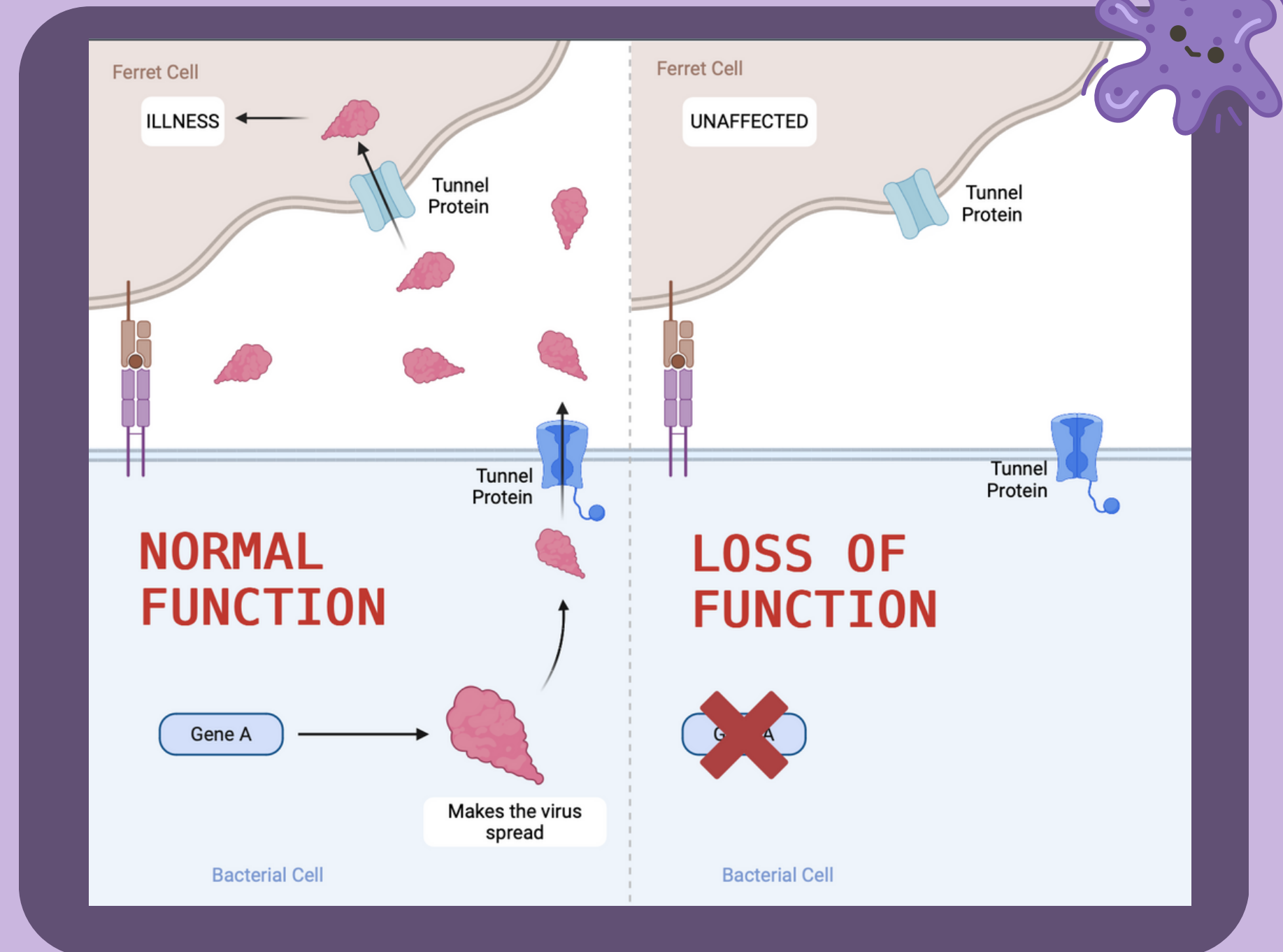
# Narrowing Down The Term GOF and Discovering Alternatives

We don't really have any solid alternatives right now. But some have proposed an alternative in the models used for research. A way I have thought about it myself is computer generations. Others have proposed loss-of-function research (LOFR) due to its relative safety compared to GOFR



We could narrow down the term by simply dividing it into subtopics. For example, what family of viruses is GOFR being conducted on? Is it being conducted on bacteria or viruses? Do we have a focus on what we want to enhance? and much more could be ways we could break it up.

## Simple diagram describing how LOF works



# Conclusion

**Researchers and the government need to take more safety measures and to have more specific terminology when it comes to GOF research. Like what family of viruses they're researching, how mutated the pathogen is, if they're working on a bacteria or virus, etc.**

**Researchers could also strive to achieve some solid research alternatives as well. So, my conclusion is that for now, we should continue GOF research.**

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