# Pandemic Special

## *- Grasp and Understand -*
## Mutations

Source: https://www.youtube.com/watch?v=KlMgSo3-2R8

→ **Virus-mutations can occur in a pandemic - what does 70% more transmissible mean?**

*During the Covid-19 pandemic virus-mutations occurred. One mutation of the SARS-CoV-2 concerned countries worldwide. It was called B117 and was first discovered in the UK.*

*Many countries closed its borders to the UK temporarily and introduced other measures to contain the rapid spread of the mutation as much as possible[1]. German virologist Christian Drosten assumed, that the virus was about 50% more transmissible[2]. He elaborated on why more stringent measures would be needed due to the mutation: If the reproduction rate during a partial lockdown was 0.8 (decreasing infection numbers), then it would be 1.2 (increasing infection numbers) with the mutation. His colleague Alexander Kekule[3], on the other hand, said, that in an environment without measures, the reproduction rate would increase from 3.0 to 3.5, and we could protect ourselves*

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**Infobox**

The repoduction rate of the variant was said to be $1,5^3$ and $1,75^5$ times higher, respectively. That is, if conditions persisted such that each infected person infected approximately one other, then one person with the mutation infected approximately 1 · 1.75 = 1.75 persons.

If conditions prevailed in which each infected person infected 2 persons, the new variant would have infected approximately 2 · 1.75 = 3.5 persons on average from each infected person.

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## Grasp and Understand

1) Think about whether one of the virologists was right, or even if both were right.

Simplification option: Instead of calculating with the value 1.75, you can also calculate with the value of 2 and check whether one of the virologists is more likely to be right than the other.

2) Without countermeasures, one assumes a reproduction rate of 3. That is, each infected person infects about 3 other people.

   a) Using the checkerboard from Maths and Corona Task 1, consider how many people are infected after 4 rounds of infection if one person is infected at the beginning.

   b) Calculate the reproduction rate of the mutation under these circumstances.

   c) Using the same checkerboard, consider how many people are infected with the mutation after 4 rounds of infection if one person is infected at the beginning, and compare your result with the value from 2 a).

3) Assume the reproduction rate is approx. 0.9. There are 20,000 people infected every day.

Carry out the considerations of tasks 2a) - c) with this reproduction rate. Alternatively, research for your own country what it was like in the Covid-19 pandemic, when the B117 mutation broke out and base your calculations on it.

Sources:

[1] https://www.washingtonpost.com/world/2020/12/20/countries-across-europe-halt-flights-britain-over-concerns-about-coronavirus-mutation/

[2] https://www.ndr.de/nachrichten/info/coronaskript256.pdf

[3] https://www.mdr.de/nachrichten/podcast/kekule-corona/kekule-corona-kompass-einhundertachtunddreissig-100.html