Omicron, or B.1.1.529, is the newest SARS-CoV-2 variant of concern. First detected by South Africa’s Center for Epidemic Response and Innovation, B.1.1.529 was classified as a variant of concern and dubbed omicron by the World Health Organization on November 26, 2021. It has now been detected in several countries outside of South Africa, including the U.S.

Fred Hutch experts in viral evolution, immunology and epidemiology are among the researchers worldwide racing to learn how the new variant might affect us. Crucially, they are looking at whether omicron is more severe, more transmissible, or more likely to bypass our immune defenses than previous variants.

What do we know about how omicron differs from other variants?

Omicron’s 38 mutations in the spike protein dwarf the 8-10 mutations seen in previous variants, including delta. Its unusual mutational profile also makes tracing its lineage more difficult, according to Hutch viral epidemiologist Dr. Trevor Bedford. How omicron arose is not yet known and not relevant at this time.

How much risk does omicron pose compared to other variants?

It’s unclear. Though omicron has many mutations, we don’t yet know how they work in combination.

It will be a few weeks before scientists can determine whether omicron is more transmissible and/or more dangerous than other variants. To do this, they are monitoring hospitalization rates and spread in other countries and paying attention to the vaccine and previous infection status of people who are infected and hospitalized. In lab settings, they are measuring omicron’s ability to avoid detection by immune cells from vaccinated and recovered patients.

Scientists are considering many factors, including:

- The sharp rise in the number of cases of infection by omicron detected in the last few weeks. This rise could be due to sampling bias as researchers ramped up the search for omicron, increased transmissibility, or an increased ability to escape immunity.
- The slight increase in hospitalizations in South Africa. Though most hospitalized people appear to be unvaccinated or singly vaccinated individuals, it is still too early to draw any conclusions from these numbers.
- The impact of omicron’s wide variety of mutations. They may work with each other, or against each other.

Among omicron’s constellation of mutations are a few that Hutch computational biologist Dr. Jesse Bloom identified as those which could potentially help SARS-CoV-2 variants evade prior immunity. There are three particular mutations in omicron that could make it more difficult for targeted immune proteins called antibodies to block, or neutralize, the virus.

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“What that’s going to mean for how likely people are to get infected, even if they’ve been vaccinated, it’s too early to say,” Bloom said. “But having a drop in the antibody neutralization is never a good thing.”

Based on this work, Bedford theorizes that immune escape — as opposed to an increase in transmission — is the major factor behind the spike in omicron cases. Bloom doubts that these mutations will completely abolish immune protection. His work suggests that omicron will remain susceptible to some monoclonal antibody treatments.

**Do we know whether vaccines and boosters protect against omicron?**

It’s too soon to know how vaccines will perform against omicron. The delta variant remains our country’s biggest concern. The current U.S. delta wave has led to over 90,000 cases per day and an uptick in hospitalizations, according to Ourworldindata.com. With only 53% of eligible people fully vaccinated, the U.S. ranks below the top 50 most-vaccinated countries and remains vulnerable to waves of infection. CDC data also suggests that about six months after vaccination, immunity wanes for all age groups. After this, though vaccinated individuals may begin to see an increase in symptomatic infections, vaccines continue to protect against hospitalization and death. This data suggests a critical need for us to increase both our vaccine and booster uptake.

Vaccines will probably continue to provide some level of protection against omicron. Vaccines elicit a range of immune responses, and even if some mutations dampen the activity, other responses may still provide some benefit. We are also making significant strides in devising antivirals that can target all variants of the virus. At Fred Hutch’s COVID-19 Clinical Research Center, we currently have multiple trials open to find treatments that can reduce the symptoms of COVID-19 to the level of seasonal flu.

**Do PCR or rapid antigen tests detect the new variant?**

Both rapid antigen tests and PCR can detect infection, but only the PCR test can detect if infection is with omicron. The PCR test detects three gene fragments of most variants of SARS-CoV-2, but only two of omicron. One mutation in omicron prevents detection of the spike protein gene fragment (called the S-gene dropout). This characteristic result should make it relatively easy to detect omicron and track its spread.

**What can we do?**

For now, we should increase protection in our community through new vaccinations and boosters, and continue masking and social distancing while indoors. Additionally, if someone experiences symptoms such as a cough, fever, runny nose, loss of smell, fatigue or diarrhea, they should get tested for COVID-19.

**How long will it take for us to have more confident answers to top questions?**

According to scientists at the Hutch and elsewhere, it will take a few weeks to a month before we have the data we need to understand how much omicron is spreading, how sick it makes people, and whether we should push for a variant-specific vaccine.

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**Where do we go for more information?**

Fred Hutch researchers and sites:
- For understanding spread: twitter.com/trvrb
- For understanding the impact of mutations: twitter.com/jbloom_lab
- For new trials and studies: fredhutch.org/ccrc
- For all conversations between hutch researchers and the media: fredhutch.org/en/news/media-coverage.html

External scientists who also explain the science well:
- Eric Topol, founder and director, Scripps Translational Institute: twitter.com/erictopol
- Zeynep Tufekci, sociologist and writer: twitter.com/zeynep

To keep up with rates in Washington and Seattle:
- doh.wa.gov/emergencies/covid19/datadashboard
- kingcounty.gov/depts/health/covid-19/data/daily-summary.aspx
- A great resource for convincing people about vaccination effectiveness: kingcounty.gov/depts/health/covid-19/data/vaccination-outcomes.aspx