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**Why do people with diabetes develop more severe symptoms of COVID-19?**

**Provide detailed explanations for your answers.**

Diabetes often causes long-term effects and damage on the bodies of those that suffer from the disease. These effects include weakened blood vessels throughout the body, particularly in the extremities and critical regions rich in blood vessels including the kidneys and the eyes. Because we know that immune cells of the body primarily circulate through the body by the circulatory and lymphatic systems, damage in the blood vessels can inhibit the ability for immune cells such as macrophages, lymphocytes, and antibodies to reach areas with damaged blood vessels. This can cause the SARS-CoV 2 virus to proliferate in these areas uninhibited.

In addition, people suffering from diabetes have chronic, low-level systemic inflammation. This can lead to endothelial dysfunction, or poor functioning of the linings of blood vessels. This can lead to coronary artery disease, stroke, or peripheral vascular disease. We know that COVID-19 can cause inflammation in parts of the body, exacerbating any existing inflammation already in the blood vessels. This can worsen any existing disease of the arterial or vascular blood systems.

Another cause appears to be an enzyme called SETDB2, this enzyme is associated with inflammatory wounds that do not heal in diabetic patients. An experiment found that SETDB2 can reduce immune cells, called macrophages, from mice infected with coronavirus. They later found the same decrease in macrophages in the blood of diabetic and COVID-19 patients.

Another reason is due to diabetic patients having a higher number of ACE2 receptors. Since these receptors are what SARS-CoV-2 virus binds to, having more receptors would increase the binding points, increasing the sensitivity and thus allowing more viruses to enter the cells. This will have a direct consequence on diabetic patients who are exposed to SARS-CoV-2.