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HOW DOES THIS VACCINE WORK? By Naheed Ahmad, OD

One of the questions I'm being frequently by my patients asked is, "How does this vaccine work?" The fact that it is based on mRNA has some people scared. This is what I tell my patients; and of course, I try to use fewer medical terms and am simplify the explanation for better understanding.

mRNA is already present in our bodies and helps give the body the recipe for proteins that the body needs. Once the protein is made, the mRNA breaks down since it is not useful after that.[1]

Most microorganisms that cause disease, in this case, COVID 19, have proteins on their surface.

Some of the most important ones are called spike proteins. These allow the virus to bind to our cells, enter the cells and reproduce many thousands of copies of the virus. The cells are then usually destroyed and the new virus copies are released to infect more of our cells. If the spike protein is targeted by our immune system, the virus can't enter our cells, can't reproduce and we don't get sick.[1]

This vaccine is a small strand of mRNA that codes for the spike protein. It is encapsulated by a lipid, or fatty layer so that it can enter the body without the mRNA being attacked, since our body is not used to seeing mRNA strands outside of the cells. Once the vaccine is in the body, dendritic cells will absorb or eat the globules of vaccine. Dendritic cells sit in the body and wait for trouble and are commonly found throughout the body, especially under the skin, and around muscle tissue.[1]

In the case of this vaccine, once the dendritic cells absorb the vaccine, they use the mRNA to make the numerous copies of the spike proteins and display these proteins on their surface. This process is much more efficient than the previous types of vaccines, since they are only making the one antigen or protein. The dendritic cells then head to the lymph nodes, which is considered command central for the immune system. There, they alert a collection of varied immune-cell types, which launch a synchronized attack on anything possessing the spike proteins, including making antibodies that bind to the spike protein and do not allow it to bind to our cells.[1]

The DNA of cells that consume the vaccine mRNA are not changed. The mRNA introduced by the vaccine only needs to get to the cytoplasm, not to enter the cell nucleus -- where the DNA resides -- to produce antigenic material. Even if the vaccine mRNA did get into the nucleus, our cells are not able to convert mRNA into the DNA that our genes are made of, so no this vaccine doesn't change our DNA.[1]

My feeling is that if we want to get ahead of COVID19 and get back to a semblance of our normal lives, whatever that was, we need to be proponents of this vaccine and be an example by getting this vaccine.

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