This is the first of three my posts on the Corona virus and disease to the Efrat English email chat list.  The original version was posted around 11 December 2020, and subsequently was corrected and edited a bit for re-postings elsewhere in English. This is the final version.  If you have any questions, please do not hesitate to ask.  You can also feel free to pass it on to others, if you want.  
  
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P.S.  It is meant to be read, not skimmed.  
  
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Russian Roulette

I rarely post to my local (Efrat) chat list and haven't commented on anything I've read there for many years (10? more?) but given the some of the recent postings on Covid-19 and new vaccines, I think that a number of misconceptions need to be responded to.

For the record I am not an MD, but I do have a PhD in molecular biology and genetics.  Before coming to Israel I was a scientist in a private company that developed reagents and instruments for the FISH technology used to detect various chromosomal aberrations associated with various cancers and birth defects.  Since coming to Israel (over 25 years ago) I  worked as a patent attorney focused exclusively on biotech IP and as such have been exposed to many cutting edge developments in the world of therapeutics and diagnostics based on biotechnology.

First of all, the Wuhan virus and the associated Covid 19 disease are real, very real.  True, many of those infected are asymptomatic or have relatively mild symptoms. But many also have more severe symptoms and end up hospitalized in special Covid 19 wards or in the most severe cases, in the Covid ICUs.  Speak to any nurse or physician who treats these patients, especially in the ICU and they will tell you how these patients suffer even if they ultimately recover.  The son of some friends of ours is a medical ICU doc at a major Israeli hospital who is in charge of one of the Corona ICUs there.  He noted that generally most medical ICU patients are usually out within a week or so either recovered or having died.  The Corona ICU patients generally are there for about 6 weeks, suffering,  and then recover or not.

In addition, recovery is sometimes complete but sometimes is not, even with mild disease. Lingering symptoms (sometimes for short periods, sometimes indefinitely) include muscle aches and pains, disabling fatigue, pulmonary problems, cardiac inflammation, neurological problems including cognitive issues, and others.  A study out of the TAU Medical School / Sheba Hospital reviewed and combined a number of studies from around the world indicating that male survivors of Covid-19 often have a lower sperm count and poorer sperm “quality" with all the attendant fertility problems. This is a bit soon to tell if this effects real world male fertility, but clearly is enough of a concern that it warrants serious follow-up.

Even those who are asymptomatic or have mild symptoms often (but not always) have lingering problems of severe fatigue.

Why?  This wide diversity of problems is not surprising in view of the fact that the infamous Covid spike protein initiates the transport of the virus into cells by binding to the ACE2 receptor on the surface of many types of cells.  Specifically, the ACE2 receptor is found on (among other tissues) lung tissue, heart tissue, intestines, blood vessels, brain tissue, and testicles.  Hence the virus has an available doorway to the cells of the major tissues of these critical organs so that it can enter the cells and proceed to do its dastardly deeds.

So why is there so much variability in the how the viral infection manifests itself clinically if at all?  There are all kinds of theories but nobody really knows for sure.  But the possible symptoms and their consequences are nonetheless very real.  I am certain that the virus and the disease will continue to be a subject of much research for a long time to come, even after the pandemic subsides, if for no other reason that there are many other Corona viruses out there, and in all events it is a very interesting molecular biological problem.

Some comments on the Pfizer vaccine (and mostly the Moderna one as well) and vaccines in general:

These vaccines are based on a new technology which is based on "instructing" cells to make the spike protein as it would in a real viral infection by transporting a modified messenger RNA (mRNA) into the cells that encodes said spike protein.  The "taxi" for the spike mRNA is a spherical (sort of) bag made of a lipid (fat) bilayer called a liposome or lipid nanoparticle.  The lipids are the same as or very similar to that of cell membranes so that they can merge with the cell membrane and dump their contents -- the spike mRNA in this case -- into the cell.  The mRNA contains the proper signal sequences so that it is shuttled to the protein synthesis machinery in the cell which then "reads" the instructions encoded in the mRNA to make the spike protein with all the requisite modifications (mostly glycosylation -- the attachment of many sugar molecules to the protein) and shipping it through the cell’s outer membrane and out of the cell.  The immune system then recognizes the spike as foreign and activates the necessary defenses and offenses to destroy the invader.  Certain key immune system cells -- the memory cells -- are then "charged" with "remembering" the invader so that the next response can be faster, stronger and even more effective.  In particular, the tip of spike protein is targeted, as that is part that recognizes and binds to the ACE2 protein receptor on the cellular surface.  It's also the most accessible part of the spike (the heavy glycosylation along the spike can interfere with antibody access to that part of the protein) and hence is the Achilles heel of the Covid virus, at least from the perspective of an immune attack.

This is basically how the Pfizer and Moderna vaccines work.  The technology is new but has been in development as a clinical tool for at least 7 years or so.  As a research tool, it has been around far longer.  The other vaccines in the pipeline -- notably the Astra Zeneca and IIBR vaccines -- use a different technology based on highly engineered viruses as vectors to carry the spike protein gene.  These technologies  and viruses do not cause diseases in humans and have extra safeguards engineered into them.  But enough of this for now.

Important Note:  mRNA molecules of all kinds are actually quite fragile and actually turn over very rapidly in cells which contain various enzymes (RNAses of various sorts) whose job it is to degrade the mRNAs.  This is a normal part of gene and cellular regulation.  So the spike protein mRNA will not hang around all that long (both Pfizer/BioNtech and Moderna technology a slightly modified version of the mRNA so that it does "live" a little longer (about 48 hours) but not by that much).  The cell's genetic information is encoded in the DNA of the chromosomes and is packaged in the cell's nucleus. The spike mRNA cannot enter the nucleus and even if it did, it would not integrate into the DNA or otherwise "change" the genetic info encoded therein. It probably would be chewed up.

Some have claimed that the spike protein shares some similarity with the Syncytin-1 protein which plays an important role in placental function, and hence antibodies raised against the spike protein would result in infertility.  First of all the shared similarity is tiny, if at all, and doesn't seem to be immunologically significant.  If this were a problem then this would have been detected among those women who have had Covid 19 and recovered, and especially among those that carried the anti-Covid 19 antibodies.  The only Covid 19 impact — of the virus, not of the vaccine — that we know of on fertility apparently is in males presumably because of the presence of the ACE2 receptor on the testicles.

Some have noted a few cases (*e.g.*, two nurses in Britain) of a severe allergic reaction (anaphylaxis) to the Pfizer vaccine.  The FDA has long recognized that this is a possibility with vaccines in general and allows for a low rate of such incidents on the grounds that the benefits outweigh the dangers.  That is why when getting a vaccine, a patient is asked to wait for about 20 minutes or so to make sure there is no untoward reaction. In Britain, they are now advising those with a history of anaphylaxis to hold off on getting the Pfizer vaccine for now, until the matter is clarified. Anaphylaxis can be triggered by all kinds of substances, including something as "natural" as lentils.  Just ask my wife who had anaphylactic attack to lentils.  Nonetheless, she safely got her first corona vaccine injection after consulting with her physician!   BTW, the nurses who had a reaction are fine now.  And they indeed had a history of anaphylaxis and carried Epipens with them all the time because of that.

Lastly, one of the major reasons for the increase in the average lifespan over the past 150 years or so is development and widespread use of vaccines, both against bacterial and viral pathogens.  If they were all so dangerous, we should be living shorter lives, not longer ones.  Hear of any smallpox cases lately?

In the Covid 19 case many are arguing that given that many of those infected are asymptomatic or have mild symptoms why bother, especially for the younger segments of the population.  Give the vaccine just to the elderly  (like yours truly) for whom the disease is more of a problem.  More of a problem, yes.  The only problem, no.  There have been plenty of younger people who have caught the disease and suffered as a result, some moderately some severely and some lethally. Some continue with difficult symptoms long after they recovered, even with the greatly improved treatment of the disease.

In short if you want to rationalize not taking the vaccine by thinking that the odds against dying from Covid are sort of in your favor, or that if you do get sick and recover, you will not be plagued by the residual post-disease complications, you could do so, and you might even get away with it.  The term for that is Russian Roulette.

Food for thought. I hope.

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