We Found The Coronavirus Vulnerability
Dr. Marco Ruggiero

Christine Schaffner:

Well, I'm so honored that you're here today. As everyone knows, Dr. Ruggiero is a big part of our community and we work closely with him trying to come up with solutions to help our patients. We had had this webinar planned, and Dr. Ruggiero, already being ahead of the game, gave me some topic options, and before the Coronavirus hit. We're in ground zero here in the US, where I am in Seattle, Washington, and Kirkland is a suburb very close to Sophia Health Institute. We've had to really formulate and figure out how we're going to support ourselves, our families, our patients, and give good information out there.

A big part of our goal is to educate you so you are empowered. Dr. Ruggiero is going to do a wonderful presentation, and then we'll do about 50 minutes. We'll see how that flows and then we'll save a little bit of time at the end for Q&A. I know that there's so many questions pouring in, just please write them in the chat, and we'll do our best to go over them. For you to know, this replay will be sent out in a few days and then Dr. Klinghardt is also going to give us a talk next week. We're just trying to educate you as much as we can. Just hang tight. I'll leave it to you, Marco. I will just mute myself, but if you need anything, I'm here in the wings. Thank you.

Dr. Marco Ruggiero:

Thank you, Christine. Thank you so much for this wonderful introduction. Let's start with the acknowledgements. Usually, they are at the end, but I prefer to show them at the beginning. Of course, I wish to thank Dr. Schaffner and Dr. Klinghardt for this great opportunity. I apologize in advance because this webinar contains a lot of information. Most of it is technical, difficult, sometimes controversial. Very recently, it changes by the minute and it continues to change in evolution. However, this is not entertainment, so I hope you will forgive me if sometimes this will be difficult to understand, but you can replay this talk of mine, and of course you can ask for questions. I thank you, all the attendees. Dr. Schaffner told me that there are about 80,000 people registered, so I thank you so much for your attention and for the patience that you will have to have to follow this talk.

Now before we start, it's very, very important to remember that any medical or scientific information that I present in this webinar is provided for research, educational, and informational purposes only and uniquely. It is not in any way intended or implied to be used as a substitute for professional medical advice. If you need professional medical advice, go and ask Dr. Klinghardt, Dr. Schaffner. They are the best, but not today's talk. Today's talk is not medical advice. It is not intended for treatment for or cure for any disease mentioned or implied in this study, with particular focus, of course, on the current epidemics of coronavirus. Caregivers, researchers, and interested parties should research all information given today, and actually, this is the purpose of this talk, to inspire researchers so that you can further research, further make up your mind.

Of course, standard of care for each pathology, including this epidemic, must be followed, as well as rules and regulations established by health authorities of each country. I don't know where you are on the other side of the screen, whether you are in the US or in Australia or in Italy or China, so please make sure do not run into troubles and you follow the guidelines of the health authorities of your countries. Here in the United States we follow the guidelines of the

Center for Disease Control and Prevention. This virus now is called COVID-19, coronavirus disease 19. I will mention I will call it coronavirus, but we refer not to do the general term, so the virus is called corona, we refer to this coronavirus disease 19. If we open the website of the CDC of Atlanta, we read, "There is currently no vaccine to prevent coronavirus disease. The best way to prevent illness is to avoid being exposed to the virus."

You can read. You don't need my thick accent to read for you, but I strongly recommend that you always follow the guidelines of the CDC. What does the CDC say or write about the treatment? "There is no specific antiviral treatment recommended for this virus. People with this virus should receive supportive care to help relieve symptoms," and so on. Again, my strong recommendation is always to follow the guidelines of the CDC. Now, this talk, however, tries to add some information, speculations, many times, but let's see where all this leads. My original idea was to entitle this webinar "Achilles' heel." The goal is to find the Achilles' heel of the coronavirus. What is Achilles' heel? According to Greek mythology, it's that little spot that makes vulnerable even the strongest, as the hero Achilles was in the myth, so just one little spot might make even the most powerful vulnerable.

But before we start, we should ask ourselves, "Am I qualified to talk about the coronavirus? What are my qualifications?" Because that's important as well. You can look at the 40-some years of my research activity. Just going to Google Scholar and typing my name, you can read about more than 200 peer-reviewed papers, and you may wish to know that in the year 2004, so 16 years ago, when there was the first epidemics of SARS, Severe Acute Respiratory Syndrome, I was giving lectures at University of Florence and the School of Specializations about that epidemic of 16 years ago. It's been a long time that I've been dealing with these viruses and the disease that they cause. This is an old slide I found in Italian from those old university slides. In 2009, I participated at this event sponsored by the Phoenix Stem Cell Foundation for Human Life, talking about HIV.

Please stay with me for a few moments, and then you will realize why am I talking about HIV now? In the year 2010, I was invited to present my results together with Dr. Pacini and Dr. Nobuto Yamamoto, about GcMAF and HIV, and the 18th International AIDS conference that was held that year in Austria, in Vienna. More recently, I published peer-reviewed papers in journals that specialize on HIV research, proposing a new method to enhance new responses induced by HIV vaccines. In the same year, I proposed another approach, revolutionizing the field of HIV AIDS research, and aging, with wide-ranging consequences. All these papers of mine, they are in the public domain. You can download them for free, and they are accessible to everybody.

Now, why am I talking about HIV? HIV and the coronavirus are two completely different viruses. One, HIV, is a retrovirus, and the other is not. Both have RNA instead of DNA as their nucleic acid, the seat of information, but they are different, and there is no doubt that they're different. However, they have something in common. They need certain proteins that are called spikes. Spikes are like needles that are necessary for the viruses, both of them, to attack the human cells. They also need certain enzymes that are called proteases to attack the human cells, so they have a couple of these in common, and we'll see later that they also have something more in common. They need proteins called spikes that can bind to their receptors on the human

cells, and they need enzymes called proteases for the maturation and for the formation of these spikes.

Now, this is something that goes back to my experience with proteases. Back in 1986, when, together with Dr. Lapetina, I published a paper in PNS, sponsored by Sir John Vane, Nobel Prize in Physiology or Medicine in 1982. I have some familiarity with these enzymes, proteases, that today we know are necessary, both for HIV and the coronavirus to become infectious and to attack human cells. Now, as a matter of fact, recent experiments have demonstrated that the spike protein of the coronavirus has affinity for a receptor that is on human cells. It is called ACE2 receptor, angiotensin converting enzyme 2. The point is that this strain of coronavirus that is responsible for the current epidemic has a higher affinity for the human receptor than the original SARS virus strain. This virus is particularly infectious because it has a higher affinity for these human receptors, so this makes it so much more efficient in using infection.

Now, let's find out how this coronavirus attacks the human cells, and why it is so infectious, why it is much more infectious than the other coronaviruses. Where does this peculiarity come from? You may wish to know that in the past couple of years, a new way of publishing scientific results has come out. Until then, scientists used to publish their papers in scientific journals like Nature or Science or the Lancet or the New England Journal of Medicine. This process, however, is slow, because you submit a paper, sometimes you wait months until the peer review process is completed, and the paper comes out. Nowadays, people don't have months, don't have weeks, don't have days to have their results published, so there are so-called preprint servers, servers established by major institutions, universities, or laboratories, that publish papers that do not undergo peer review.

The scientists, they produce their results in their laboratories or their observation of the bedside, wherever, and they publish them right away. In this way, the entire world can see the results in real time. Now, this server is called a China Xiv. It stands for China Archive. It is mostly Chinese, but fortunately, many papers, they are in English, and also this, of course, is in the open access, so everybody can read these. Now, this paper is particularly interesting. It came out a couple of days ago, and here, the authors that come from major Chinese institutions propose the reason why this virus is more infectious than other coronaviruses, so now we are looking at research that is performed in real time, as if, more or less, we were in those laboratories working on these viruses. Now, these researchers, they essentially demonstrated that this virus is more infectious because it is the target of a human enzyme.

In other words, this virus can be attacked by an enzyme that we all have on our cells. Unfortunately, when this enzyme of ours attacks this virus, it produces the formation of the spikes that bind it to the human cell receptor. In other words, this virus is peculiar because unlike the other coronaviruses, it can be activated by these enzymes that we have on our cells. This enzyme is called furin, and as this image from that paper shows, at variance with the original virus for the old SARS epidemics of 15, 16 years ago, now this furin can activate the coronavirus and make it much more infectious than all the other coronaviruses. This mechanism of action is not new. It's not unique for the coronavirus. Many proteins are inactive when they're first synthesized.

Many vital proteins, but also many hormones, proteins of our bodies, are inactive when they are built by the cells, and they have to have sections removed in order to become active, as if you were removing a lock or a sheet, something so that you can use a tool. These proteins have to be clipped by enzymes that are called protease. One of these enzymes is this furin that is, again, a normal enzyme that we all have. Now, furin cleaves these sections of proteins, so many proteins, and activates the proteins. Unfortunately, it also cleaves to some sections of the precursors of the spikes of the coronavirus, and unfortunately, it makes the coronavirus highly infectious. This is not unique for the coronavirus, because furin is one of the proteases that is responsible also for the processing, or activation, if you prefer, of the HIV precursors that are necessary for HIV infection.

This is all the information, as you can see, and this was published in 1992, where they were trying to inhibit or block the activity of this enzyme, furin, because furin is responsible for activation of HIV as well. As I say, this is not unique for the coronavirus. Even other infectious agents like Anthrax, that is called a bio-bacterium and not bio-virus, Bacillus anthracis, is a target of furin, and again, furin inhibits also the molecules that block furin, protect cells from Anthrax. Again, this is a very common mechanism of activation of proteins, and in the case of pathogenic agents, is also a mechanism that makes the germ, whether a bacterium or a virus, a pathogen, so there is research to block this process.

As I said, both need proteases to be activated, so you need this process of transforming an inactive protein into an active protein able to bind to the human receptor so that the virus will become infectious, and this is good for HIV and also works for the coronavirus, but let's see if they have something else in common. Let's see whether HIV and the coronavirus have something else in common, and let's take a look at the paper that was published on the last day of January of this year, so essentially just a few weeks ago. This paper was published in bioRxiv, that is a preprint server by the Cold Spring Harbor laboratory. It is a laboratory that is home to several Nobel laureates, and they have this wonderful service, this preprint server for biology. Now, this paper was published by an Indian researcher from India, from the Indian Institute of Technology in New Delhi, from University of Delhi, and other Indian institutions.

What did they write? Let's read it together and let me try to translate from technical English into something more understandable. Again, they say, "The spike glycoprotein of coronavirus is cleaved into subunits." It is processed, it is activated, from one protein you make two, and they are the active proteins. "The S1 subunit helps in receptor binding and the S2 subunit facilitates membrane fusion," so both help the virus to attack the cells and to invade those cells. They say, "The spike glycoproteins of coronavirus are important determinants of tissue tropism and host range." This means there are different coronaviruses. Some of them, they're infectious only for animals. Others are infectious for men. What makes the difference? The spikes, the spike glycoproteins. Some spike glycoproteins only bind to animal cells, so they're not infectious for humans.

Others, they bind to human cells and so they become infectious for us, and of course, spike glycoproteins are critical targets for vaccine development. "For this reason," they write, "the spike proteins represent the most extensively among coronaviruses, and we," being the researchers, "therefore sought to investigate the spike glycoprotein of the new coronavirus to

understand its evolution, novel features sequence, and structure features using computational tools." In other words, they want to understand how this virus all of a sudden, out of the blue, comes out and becomes extremely infectious for humans. The answer is in the spike protein, so what these spike proteins have that make these viruses so infectious, so efficient, to attack and infect human cells. What do they do? They compare the sequence that is the composition of the spike proteins of the coronavirus with those of HIV, and they found something very interesting.

They are identical. Actually, four tips for inserts, the terminal part of the spike proteins of the coronavirus, the new coronavirus, and HIV are identical, and they have a high density of positively charged residues, so they have a positive charge, like in a battery. You have a positive and negative pull, so also amino acids, they can be positive or negative, and both of the spike protein of the HIV and the spike proteins of the coronavirus, they have a high density of positive charges. Now, they keep on writing, "Delving deeper, we found that these insertions," so this part of the spike proteins, "were similar to HIV-1. Our results highlight an astonishing relation between the proteins of HIV and the spike proteins of the new coronavirus. The proteins," they remind us, "are critical for the viruses to identify and latch on to their host cells and for viral assembly."

These sequences are those that are responsible for the new coronavirus to attack human cells, just like they're responsible for the HIV to attack human cells, as it was known for the past five years. "Since the surface proteins are responsible for host tropism," that means which type of cell we attack, human or animal, "changes in these proteins imply a change in host specificity of the virus." These viruses were not pathogenic for humans. They were pathogenic only for animals. They have become pathogenic for humans because something has changed in these spike proteins so they thought of those that they recognize the human receptors. What has changed? The fact that now, the coronavirus has HIV portions, HIV parts. "According to the reports from China, there has been a gain of host specificity as the virus was originally known to infect animals and not humans, but after the mutations," it was after the insertion of the HIV sequences, "it has gained a tropism to humans as well."

So, now it is able to attack human cells as well. This is how they represent. This looks like an arrow, and this actually is a spike protein. This part here, one, two, and three, are the tips of the arrow, and these are the parts of the HIV. All this is the spike protein of the coronavirus, but the tip, you can think like the tip of a need or the tip of a real arrow. The tip is identical in HIV and the coronavirus. Now, they kill, scientifically speaking, themselves and their paper by writing this, "This uncanny similarity of novel inserts in the new coronavirus, a spike protein to HIV, and that is unlikely to be fortuitous. Taken together, our findings suggest unconventional evolution of the new coronavirus that warrants further investigation." Now, "This uncanny similarity is unlikely to be fortuitous" has given rise to all types of speculations.

As a matter of fact, for a scientific article, this article, it received attention comparable to Kardashian style TV shows. 100,000 people all over the world have looked at the abstract. Almost 100,000 people have downloaded this difficult, technical article, and looking at the attention that it has generated all over the world, the overview of attention for this article, it is number one out of 73,000 articles ever published in these pre-print services since the inception a few years ago. This article has been seen by hundreds of thousands of researchers, and

because of those words, "The uncanny similarity unlikely to be fortuitous," has given birth to a number of theories, essentially to conspiracy theories. I just printed these this morning. Just Google coronavirus conspiracy and you'll find 85 million results in less than a second.

Essentially, the idea is this virus has been built in a laboratory and then it has escaped, purposely or not, from the lab, because it is unlikely to be fortuitous that you find HIV sequences in a coronavirus. Now, let's see. Where does this virus come from? Let me anticipate. Nobody knows, as of today, so if you ask me, "Do you know where is this virus coming from?" The answer is, "I don't know it. Nobody knows it." I'm not a big fan of conspiracy theories, so I prefer to look at science. Now, this paper was published, again, on China Archive by Chinese researchers, just a few days ago, and they write, "Phylo Epidemiologic analyses," that is, looking at the RNA of the virus, "suggested that the source of the new coronavirus at the Hua Nan market was imported from elsewhere." Now the theory that the virus was generated into this wild animal market, poorly regulated, now it's over.

Now, the virus has been imported from elsewhere in that market. "The crowded market boosted the circulation of the virus and spread it to the whole city in early December 2019." The virus came from somewhere else. From where, we don't. This was published three days ago. It is in Italian. I couldn't find it in English, but essentially, an Italian study that has been published in the Journal of Medical Virology and immediately sent to the World Health Organization demonstrates that the epidemics began between October and November, so the theory that in January, the virus jumped from a bat or from a rat or from some other wild animal to humans in that market is overcome, so the virus came from somewhere else, and the virus was there in mid-October. You'll see, this is changing very, very rapidly, and there is more that we don't know than what we know.

Let's go back to the article of those Indian researchers. Because they used those words, "Uncanny similarity that is unlikely to be fortuitous," they were pushed or forced or invited to withdraw the article. Now, this has become quite paradoxical. The article is still there. You can see it. You can download it. You can do it right now if you like, but it has this red alert, "This article has been withdrawn." Why did the Indian researchers say they decided to withdraw this paper? Were they forced? Were they invited? Was it their own decision? Nobody knows. You can ask them. If you have any questions, please contact the corresponding author. They say, quite diplomatically that, "This paper has been withdrawn by its authors, so they intend to revise it in response to the comments received from the research community on their technical approach and their interpretation of their results."

Nobody knows who invited these authors to withdraw the paper, to retract the paper. The paper is still there. You can read it, whatever the case. It is now officially retracted. Let's try to use our head. Let's try to use logic. We have a lot of information. Interpretation can vary, so let's see if our ability to interpret things, to read the things, that helps us. Now, let's use some logic. If this uncanny similarity between the spike proteins of HIV and the new coronavirus were true, one may assume that drugs that are effective against HIV would prove useful against a new coronavirus. This would be particularly true for the HIV protease inhibitors that have been developed for the past 20 years or so. Because both the coronavirus and the HIV, they need the proteases to be activated. Is this true?

It appears to be true, because on the 27th of February, in Nature Biotechnology, so highest level of credibility, they published this article where coronavirus puts drug repurposing on the fast track, so drug repurposing means drugs that were designed for something, they are repurposed for some other goal. We see that HIV protease inhibitors are now on clinical trials for coronavirus, so they seem to be effective against the coronavirus, but also, other drugs, like Azvudine, the famous AZT, that has nothing to do with proteases, that is effective against HIV. It has a number of side effects, but there is no doubt that it is effective against the virus. Now it is on trial against the coronavirus. Apparently, what works against HIV, with or without side effects, may work against the coronavirus as well. These are the clinical trials, official trials, not alternative, no conspiracy theory, official trials. You can check the numbers.

Essentially, this uncanny similarity has prompted medical researchers to try HIV drugs against the coronavirus. Now, if the protease that is responsible for the activation of the coronavirus and makes it so infectious is this furin, as it is, these Chinese researchers, those that I have mentioned before, they found potential furin inhibitors, which might be used in the treatment of the pneumonia due to the coronavirus. Now, again, you can go and download the paper and look for yourself, so I will very rapidly go through this list of a number of things, and please remember that in China, the classification on drugs and supplements is obviously very different than from the US, so something that here in the US is a supplement over there maybe it is a drug, and the other way around. They have this table, with a number of furin inhibitors from the drug database.

You can recognize something, like folic acid, you have heard of that, or the L-Arginine or the L-dopa. Methotrexate is an anti-cancer drug, so a long list of 18 different drugs that may work as furin inhibitors, and as such, they may help in counteracting the activation of the coronavirus. You recognize the folic acid, you recognize the glutathione. Again, glutathione, in this table, is listed among drugs. Somewhere else it is a supplement, but let's not be picky about classification. Given the millennia old tradition of Chinese medicine with herbs and botanicals, they also have another table, table three, where they find potential inhibitors of this protease that activates the coronavirus from natural products. Now, I cannot even pronounce all of these botanicals.

Let me tell you, these are botanicals that you can find in many shops, and you can go for yourself and look at the source from Camellia sinensis to other herbs that, again, I have difficulty pronouncing, a long list that goes on, and this table ends with 14 different botanicals that may act as furin inhibitors, and as such, inhibit the formation of the spike proteins of the coronavirus that, in turn, are responsible for the high infectious potential of this virus. Now, the drugs and the supplements listed in the previous tables from the Chinese authors are potential furin inhibitors. What does it mean? It means that those drugs and supplements may help prevent the formation of the spikes that, in the coronavirus and the HIV as well, use to attack the human cells. In the following slides, we shall concede there are other approaches that neutralize the spikes.

In other words, once the spikes have been formed, can we neutralize them so to prevent the attack of the virus onto their targets on the human cells? Can we block, somehow, those spikes? Can we put a tip, or like a safe, on top of those spikes so that they do not bind to their

receptors, and the viruses are not infectious any longer? As this slide says, now this cartoon is about HIV, but we have seen that the mechanism action is the same. The tips of the spike proteins, you remember those very colorful arrows that are the binding sides might be there for another potential target for inhibiting the binding of the new coronavirus or the HIV to their targets on cells. Now, I don't know if you remember, but those tips, they show a peculiar concentration of positive electrical charges, and this is what was written by those India researchers in the paper that has been withdrawn.

You see the tips that are the same in HIV and in new coronavirus, they have a high concentration, a high density, of positively charged residues. You may wonder, "Am I basing all the hypotheses on an article that has been retracted?" Not actually, because a couple of weeks after that article, from Cornell University, authors published in another preprint server. This is called arXiv, "Structural modeling of the new coronavirus," and if you want to lose your eyesight, you can go and look at the sequence of the amino acids, and you will find the exact identical sequence to that. It's around here. You can go and look at exactly identical sequence as that shown by the Indian researchers in their withdrawn paper. In other words, the sequences are for real. They are there, and there is no doubt that the tips of the spike proteins of the new coronavirus, they have a high density of positively charged residues.

Now, if you wish to neutralize something that has a high positive charge, you need something with a high density of negative charges, and fortunately, this is something that happens to be a subject of my research since 1984, when I was studying glycosaminoglycans that are a kind of sugar, so polysaccharides, and that are extremely rich in negative charges, like heparin or chondroitin sulfate. They are the biomolecules with the highest density of negative charges in the biological world. This is the chemistry of the chondroitin sulfate, and it is highly negative because of the presence of carboxyl and sulfur groups, with sulfur, that are highly negative. We now have compounds that are highly charged with negative charges that could bind to the tips of the spike proteins or the new coronavirus, and HIV as well, and therefore, to neutralize those tips, to prevent the attack of the virus onto the cells.

Again, let's use some logic. If these were true, chondroitin sulfate would be an inhibitor of HIV infectivity. Let's forget about the new coronavirus for a moment, because nobody has tried it as yet, but if the coronavirus and the HIV, they have the same tips, positively charged on the extremities of their spike proteins, and if all this is true, then chondroitin sulfate, that is negatively charged, should attack, should bind those tips and prevent the infectivity, because as I said, the HIV has the same positively charged tips on the spike proteins. Now, this happens to be true and to be known since 1998, when it was published. You can retrieve this paper in PubMed, that chondroitin sulfate and carrageenan, so other polysaccharides that are highly negative, are potent inhibitors of HIV.

Before this publication, there were two patents identified in 1986 from a Japanese pharmaceutical industry where they propose polysaccharides like chondroitin sulfate for treatment of diseases, plural, caused by retroviruses, plural, and this other patent, the application was filed one year later, in 1987, by Luitpold Pharma, a big pharma from Germany. Again, chondroitin polysulfate for the treatment of immunodeficiencies caused by retroviruses. It is well accepted that now for more than 20 years, that chondroitin sulfate, and because of the

negatively charged molecules, the high density of negative charges can block the infectivity of HIV. Could it block the infectivity of the coronavirus as well? No experimental data as of today, but at least theoretically, it could.

As a matter of fact, it does, against other viruses, so it is not specific for HIV because other viruses as well, they use positively charged molecules on their surface to attack their hosts, whether the hosts are humans or plants. This paper was published in 2005. Chondroitin sulfate is a potent inhibitor of herpes simplex, or chondroitin sulfate against tobacco, mosaic virus. Apparently, this is a universal mechanism. If you have something like chondroitin sulfate that has a high density of negative charges, it can block all those viruses that use tips with positive charges. Could it work against coronavirus? Again, no experimental data, but theoretically, it could. Talking about chondroitin sulfate, we recently described a novel type of chondroitin sulfate that is the product of microbial fermentation. In other words, does not derive from animal sources like shark or bovine cartilage.

You can go back to this talk of mine that I gave for the Sophia Health Institute that was on the 3rd October, 2018, so it was one and a half year ago, where I describe in detail this new chondroitin sulfate that has the great advantage of coming from microbial fermentation, and also by having a much higher density of negative charges. This is the original paper published in 2014, where these researchers, they demonstrated, and this microbial chondroitin sulfate is three times more efficient than the animal derived, and it reduces the level of a pro-inflammatory cytokines in the human plasma. Are you afraid of cytokine storms? This could be good, because it has been clinically demonstrated to reduce the mathematical levels of pro-inflammatory cytokines.

Another paper published in April 2019 on the same topic states that the chondroitin sulfate from microbial fermentation, possessing a lower molecular weight than an animal derived sample, produces a greater chondroitin sulfate concentration for a more prolonged period of time in plasma, and most important, an increase in charge density of endogenous plasma chondroitin sulfate. Then you can ask Dr. Schaffner where you can find a decent microbial chondroitin sulfate or you can go back to that talk of mine that I gave in October of 2018. Now, let's leave the chondroitin sulfate for a moment, because in addition to chondroitin sulfate, where else can we find naturally produced molecules with a high density of negative charges that can neutralize the tips of the spikes of the viruses? Again, microbial fermentation gives us an answer.

As you may know, we have been working on microbial fermentation with the goal of producing immune stimulating molecules, DBP-MAF, or GcMF, if you prefer, since 2018. This is our first paper published in 2018, where we demonstrate how microbial fermentation leads to the production of GcMF that in turn can rebalance and stimulate the immune system. More recently, I would say just a few weeks ago, we published a paper demonstrating that microbial fermentation leads to the molecules that are hundredfold more efficient than purified DBP or GcM-MAF in attacking nagalase. Another time, we can talk about nagalase, but you can go to my archive and download this paper of ours, where we demonstrate that the product of fermentation is about 100 times more efficient against human nagalase than purified GcMF.

Now we have, thanks to microbial fermentation, these molecules that are 100 times more efficient than GcMF. These molecules, they show a peculiar concentration of negatively charged residues in correspondence of the sequences that bind virus. Stay with me for a few more minutes. I'm very close to the end. I know this is extremely complicated. Now let's talk about another virus. We have seen that many viruses, they use the same mechanism to enter into the human cells. This is the hepatitis B virus. The hepatitis B virus binds to these sequences of its receptor. It is called NTCP, stands for sodium taurocholate cotransporting polypeptide. Don't worry. This receptor is very similar to GcMF, and GcMF, in this region, has a high concentration of negatively charged residues.

In other words, it may block the tips of the spike proteins so that they cannot bind to their receptor on human cells. Other options, rapidly. We have been talking about neutralizing the spikes. We have been talking about preventing the formation of the spikes. How about stem cells? You remember I was working on this topic in 2009. Actually, our observations were then published by Nature, and be sent for Nature Publishing Group, so it is a journal of the Nature Publishing Group, and I don't know if this is available online. If it is not, please ask, and I will send you a reprint of this paper. This comes again from the China Archive a few days ago, "Clinical remission of a critically ill coronavirus patient treated by human umbilical cord mesenchymal stem cells." They used stem cells from the umbilical cord, and they observe clinical remission of one patient.

You may say, "Well, one patient? Good for him, but is this clinically relevant? And by the way, all this research comes from China, only one patient in China, treated by Chinese researchers, so very interesting, but can this stem cell treatment be generalized?" Well, let's see. Now, this is another paper, "Transplantation of stem cells from the umbilical cord improves the outcome of patients, plural, with the coronavirus pneumonia." Long list of authors, and you can recognize many of these authors, they don't have a Chinese name, because they come from Paris, France. They come from Tel Aviv, Israel. They come from Fort Worth, Texas. They come from Hong Kong. They come from Russia. They come from Spain. They come from India. They come from United Kingdom. They come from South Korea, and even from Palermo, Italy.

This is a multi-center study with researchers coming basically from all over the world, reporting the same excellent results, treating patients with mesenchymal stem cells. This is the conclusion of this paper, "Ultimately, the patients with severe coronavirus pneumonia survived the worst condition and recovery." I realize that their English is as good as mine, but I think it is understandable. "Therefore, the fact that transplantation of mesenchymal stem cells improved the outcome of coronavirus patients may be through regulating inflammatory response and promoting tissue repair and regeneration." Again, we go, and the inflammatory responses that we have seen in another paper, in another study, with a chondroitin sulfate. For those of you who are interested in images, you can see the beautiful difference between before and after, so you see the deep pneumonia, the lungs are completely cleared after this approach with mesenchymal stem cells.

Now, we are at the end, and I think that the word that the Secretary of Defense, Donald Rumsfeld, pronounced in 2002 in a completely different setting, are perfectly appropriate. "What is the message here? The message is that there are no knowns. There are things that we know

that we know. There are things that we now know we don't know, and there are many. There are things that we do not know we don't know," and also this, I am afraid there are many. When we do the best we can, and we pool all this information together, we then say, "Well, that's basically what we see as the situation that is really only the known knowns, and the known unknowns." The Secretary of Defense was mocked because it seems not understandable, but actually, that's the reality. There are many things that we know, many things that we don't know, and also many things that we don't know that we don't know.

The conclusion here is that it's an evolving situation, and we are learning every day thanks to this new way of communicating a scientific result in real time. We are learning from what they are doing in some laboratory in China, in India, in Italy, in United Kingdom, and now, of course, United States, in real time, and this is a wonderful advantage that maybe will change forever the way science is communicated. I truly hope so. We cannot wait for months for results to be published, so we cannot wait any longer, and so what's the message here? The message here is, of course, to always, always, always, follow the guidelines, and refer to competent and highly professional doctors like those that you can find at the Sophia Health Institute. It has been a pleasure, an honor, and a privilege talking with you about all these things today. I stayed within the time limit. I hope that at least something was understandable. If it was not, please go back and replay this talk, or feel free to ask Dr. Schaffner or myself. I thank you so much.

Christine Schaffner:

Thank you so much, Marco. That was incredible, and is making me think about a lot of different angles for treatment and prevention, and I'm going to have to listen to this one more time. Do you have a few minutes for questions?

Dr. Marco Ruggiero:

Absolutely.

Christine Schaffner:

A lot of gratitude. People are really grateful for your presentation and your time. Let's just go through, and everyone remember, we're going to send out the recording, so don't worry if you had to hope off or joined this a little late. We will send the full recording. Okay, so lots of questions rolling in. I guess, taking a moment about the chondroitin sulfate, so we know people are asking about what products or any microbial fermentated products that have the chondroitin sulfate. We do have our Sophia flow cream that has this in that. Also, the Bravo probiotics. The Immuno, would you consider that a product to have the right chondroitin sulfate as well, Marco?

Dr. Marco Ruggiero:

Yes, the Immuno has the microbial chondroitin sulfate, and so it has this high density of negatively charged particles, and so might be useful. Again, there are no data demonstrating that the chondroitin sulfate that works against the coronavirus, but all previous data accumulated in the past 20 years or so against a number of other viruses seem to point into that direction.

Christine Schaffner:

It was interesting to see the mechanism of the furin inhibitors. A lot of the herbs that we're recommending at Sophia are coming up, so andrographis being one of them. We haven't recommended the green tea, but there are some retroviral formulations that we have been working with via BioPure, so BioPure has a product called EN-V that has mushroom extracts, and it does actually, I believe, have the green tea. I have to check that out, but yeah, it's just interesting. I didn't know about that being the mechanism of why they worked. Colostrum or betaglucin for prevention and treatment? That's a question. Any comments on that?

Dr. Marco Ruggiero:

Well, colostrum in itself, it's a good stimulant and re-balances the immune system. Even better when it is fermented, as in the products of microbial fermentation I've mentioned, because from colostrum, you make a GcMF, and GcMF, in addition to all the known actions on the immune system, it also adds these negatively charged sequences that might be useful in binding virus molecules, so colostrum is good, fermented colostrum is better.

Christine Schaffner:

Someone's asking, "Do you have any thoughts about quercetin being a treatment?"

Dr. Marco Ruggiero:

No, I don't. I haven't found it in those lists of potential furin inhibitors, but I assume that not all potential treatments have been studied as of today. Maybe in the future, they will be, so I know what I've that are published today. Maybe in two weeks from now, we could have much longer lists of products that could be potential inhibitors both of furin processing or the spikes, or other mechanisms.

Christine Schaffner:

Someone's asking about ozone therapy. We use a lot of ozone therapy, and you can get an ozone home generator. We do think that is a tool. I don't know if you have any thoughts about that.

Dr. Marco Ruggiero:

There is no direct evidence, but again, drawing a comparison with other viruses and other infections, I would say, "Why not?" It should be useful.

Christine Schaffner:

There's a question around some of our enzymes, or proteolytic enzymes, have protease in them. Any clarification around supplemental protease or proteolytic enzymes in this connection with-

Dr. Marco Ruggiero:

We have a lot of protease in our stomach. Otherwise we couldn't digest anything, so I wouldn't be worried about this, because here the problem is not the proteases. Here, the problem is that the coronavirus, in this case, is susceptible to these protease. It shouldn't be. It has become, by mutation, insertions, or whatever. I don't see any point in inhibiting general protease. We need

the protease, for the processing of process. We need proteases for digestion, so we have to block the mechanism of action of the virus, not the proteases that we need, in any case.

Christine Schaffner:

Then on the list, I don't remember if it said folic acid of folinic acid, and people are asking.

Dr. Marco Ruggiero:

Folic, yes.

Christine Schaffner:

Okay, and then methylated folate is big in our community, just because of methylation SNPs that we're supporting people with. Do you have any comments on folic versus folinic versus methyl folate? It seems like they'd all do the job.

Dr. Marco Ruggiero:

Well, they seem all to be good in inhibiting the furin, according, at least, to those theoretical studies. If you are good with methylated folic acid, the methyl group, they simply increase the potency and efficacy of the folic acid, so I would say, again, "Why not?" They are not toxic. They have no side effects.

Christine Schaffner:

This question, "If HIV protease inhibitor is repurposed for treatment, wouldn't it be the case that it is with HIV that the disease will take hold if the drug is stopped? If not, that would suggest the virus dies after some time if it is not activated. True or not?" Any thoughts on that?

Dr. Marco Ruggiero:

I have no idea. I think not even those who are running the clinical trials right now have no idea. I would ask myself another question. Oddly enough, I couldn't find this question anywhere else, but assuming that all this is true, and actually, I had no time to insert another slide. I had 76, so more than enough, but just a few minutes ago, I read that there is another researcher from Chinese researchers, again demonstrating this mixture of HIV and the new coronaviruses, so it has been confirmed by several angles. My question is, and I'm not answering, so I'm asking the question.

Whoever hears or listen to me, please provide and answer. Is there any remote possibility that if you are infected by the new coronavirus and 80% of patients may recover, so you recover after one. Everything is gone. Everything has passed. Everything is forgotten. Is there any possibility that you become positive to HIV, even without having ever met the HIV, simply because you have been infected by a virus that has the sequences that are identical to HIV? I don't know. I have this question. I don't know if anybody has the answer. If somebody has the answer, please answer this.

Christine Schaffner:

Yeah, I know, that's a really fascinating question, and then of course, my brain is also going to how this stimulates our own endogenous retroviral activation, and that piece to the puzzle as

well, so yeah, I think this is a very to be continued conversation. I want to respect Dr. Ruggiero's time. I'm getting close to 11:00, and so again, this replay is going to be sent out. Dr. Klinghardt is also going to do a talk for our community next Tuesday, so he's going to digest more of the information. Again, we're on the front line. We're taking temperatures and dealing with patients who are coming up with some symptoms, and so we are really on the front line of trying to treat people and be as safe as possible, so I think we're going to learning a lot, but I'm all about education, empowerment.

We have so many tools to support people, and Dr. Ruggiero just gave us so many therapeutics and mechanisms to think about to support ourselves and our patients. One thing I just want to share, because it's something that we're using, there's something that we share with our community called Briotech HOCl. It's a hypochlorous solution. They're actually local to Woodinville, and you can take this orally or as a spray, or as a disinfectant. They have even on their website that they've shown that it has affected the family of coronaviruses. Obviously, this is a novel coronavirus that we're all up against, but Dan from Briotech, he was the owner, he may be able to talk with us some more, and he's actually going to be talking with Trump and Pence about his findings, so hopefully that will be a solution.

As far as protecting yourself, I'm seeing some questions about MMS, which is a different type. It's chlorine dioxide, not this hypochlorous solution, but we're spraying our faces at the clinic, our hands. You could nebulize that, so that's something that we have available, and you can check out their website, and then of course, that whole suite of products, the Sophia Flow product being one of them, the Bravo's suppositories, the yogurt, and then the Immuno, if you have access to that. Just stay tuned. We have a lot of tools. I think of this time, as Marco and I, you can get into the fear really quickly.

I think listening to a lecture like this, even though it stimulates a lot more questions, we have a lot of solutions that we just heard about, so that's what I'm all about, and vitamin C. We're all taking at least two grams of vitamin C a day at the office, as well as intravenous vitamin C, as well. Again, we have a whole host, a toolkit, and Marco, you might laugh at this. I always think that conventional medicine freaks out with viruses because they don't have as many tools, and we just have so many tools, we just need to know when and how to apply them appropriately.

Dr. Marco Ruggiero:

I'm not laughing at this at all. Again, I have no time, and I already had too many slides, but if you wish, I can send you another paper comparing Chinese traditional medicine that is highly recommended in China for the treatment of new coronavirus and Western medicine. This is a very well done paper by Chinese researchers, so there is nothing to laugh about, because more than one billion people, they trust that tradition, and the authorities, Chinese authorities, they trust the traditional medicine. This means that there must be something, so it is not something laughable, not at all.

Christine Schaffner:

Mm-hmm (affirmative). Absolutely, and then one other site I want to make sure people know about is they were asking about that other webinar that you referenced to. We have a website called SophiaEducate.com, and Marco, all of the talks that he's given for our community are on

that website, so if you want to learn more, please go there as well. Any parting words, Marco? Again, we're so grateful for your time, and this is so informative. I'm just going to be digesting this more, and I know that we're going to stay in touch about how we can just come up with more and more solutions for everyone.

Dr. Marco Ruggiero:

Absolutely, and again, I remain at your disposal for any question. Feel free to forward them. I don't know if I've answered all the questions that were presented to me in advance by your colleague, but I think I showed them I did, and if not, feel free.

Christine Schaffner:

Great. Well, we'll be in touch, and maybe as we learn more, we'll do a part two, but you gave us a lot to think about, so thank you so much.

Dr. Marco Ruggiero:

Thank you, Christine.

Thanks to everybody.