

The Perfect Market Storm: Critical Materials, Cleantech and COVID-19

There seems to be a misguided notion (with some) that isolation means we have more time to waste. Far from reality, I am certain that many of you, like me are looking at your inbox wondering where or how to wade into the depth of quality deals and opportunities upon us...

Would like to kick your morning coffee off with a special nod to our longstanding friends from Avalon Advanced Materials Inc. (TSX: AVL | OTCQB: AVLNF) whose \$AVL soared 50% yesterday. We have been supporters of #Avalon since Don Bubar first did an interview with me in 2009 (with Jack Lifton) and introduced me to rare earths. And indeed, there is news flow in the rare earths a-n-d throughout the critical materials sector that is literally ricocheting from source-to-source online...

How to follow?

Jack Lifton, Clint Adam Smyth and I just launched the TechnologyMetals.com site to manage the influx of critical materials' news (and experts) we are communicating with regularly. Jack's interview with Dr. David Dreisinger on Search Minerals Inc. (TSXV: SMY) last week was purely outstanding (in my opinion) as he describes David as "the leading authority on solvent extraction process". This is a hot topic that we touch on in our weekly update that we just started...[click here](#) to access a preview

And associated technologies relating to cleantech? We saw Exro Technologies Inc. (CSE: XRO | OTCQB: EXROF) stock move up 30% yesterday! Interviewing CEO Sue Ozdemir on how Exro makes "electric motors faster, stronger and greener" for

InvestorIntel on Wednesday: we will get this up live as fast as we can!

Uranium continues to maintain a much-deserved interest, let me point you in the right direction for a quick update – Matt Bohlsen’s piece from last week titled, The DoE’s plan to rebuild the uranium sector and ‘pull America’s nuclear industrial base back from the brink of collapse’... reinforces the sustainability themes we are touting on the Technology Metals Show. Arranging interviews as we speak with Mark Chalmers of Energy Fuels Inc. (NYSE: UUUU | TSX: EFR) and Jeff Klenda of Ur-Energy Inc. (NYSE: URG | TSX: URE) as they “stand to be the major beneficiaries, especially given they started the whole S232 petition back in January 2018” you should see those live on InvestorIntel next week.

And yes, we are following the biotech and life sciences market. If you subscribe to our AI driven market updates on InvestorChannel.com – you can catch the 20 companies, we are following in the race for vaccinations...click here

Speaking of AI technology, we would like to ensure that you are aware of the news that was put out by Predictmedix Inc. (CSE: PMED | OTCQB: PMEDF) yesterday titled – Predictmedix Files Patent for Mass Screening for Infectious Diseases Such As #COVID19



1 YR stock Chart for Predictmedix Inc. (CSE: PMED) – Source: TD Waterhouse

And speaking on the war against the COVID-19, StageZero Life Sciences Ltd. (TSX: SZLS) put out the following news on April 20th StageZero Life Sciences Initiates Testing for COVID-19 In the USA

Remember, click [here](#) to subscribe to the InvestorChannel for daily market updates on the Canadian, US and Hong Kong markets – and to follow InvestorIntel’s stock watchlist for Gold, Uranium, Rare Earths and of course, COVID-19..

The COVID-19 (Coronavirus) Vaccine Market Race Update

for Tuesday, April 7th

Last week InvestorIntel reviewed the leading companies that are treating COVID-19 (coronavirus). This week we take a look at the vaccine companies, as there are currently **1,363,123 confirmed cases** and **76,383 deaths** from the coronavirus COVID-19 outbreak as of April 07, 2020, 13:24 GM.

The company (or companies) that win the COVID-19 vaccine race can look forward to millions if not billions in revenues, as most of the world's population would likely undergo COVID-19 vaccination, with governments likely to pick up the bill.

There are still multiple factors to consider, such as:

- Will a vaccine be found?
- Will it prove to be effective?
- Which company, and/or companies, will succeed to find the vaccine first?
- When will we get a successful vaccine?

The answers to all these questions are still unknown, however, the quote below gives a few clues as to what to expect.

CNBC recently reported:

"The first human trial testing of a potential vaccine to prevent COVID-19 is "on track" with public distribution still projected in 12 to 18 months, which would be the "ultimate game changer" in the fight against the pandemic," White House health advisor Dr. Anthony Fauci said. "U.S. health officials have been fast-tracking work with biotech company Moderna to develop a vaccine to prevent COVID-19. They began their first human trials on a potential vaccine March 16."

On March 30 Reuters reported:

"The U.S. government has cut deals with Johnson & Johnson and Moderna Inc. and said it is in talks with at least two other

companies to prepare them to produce massive quantities of coronavirus vaccines even before safe and effective ones become available.”

The anatomy of coronavirus

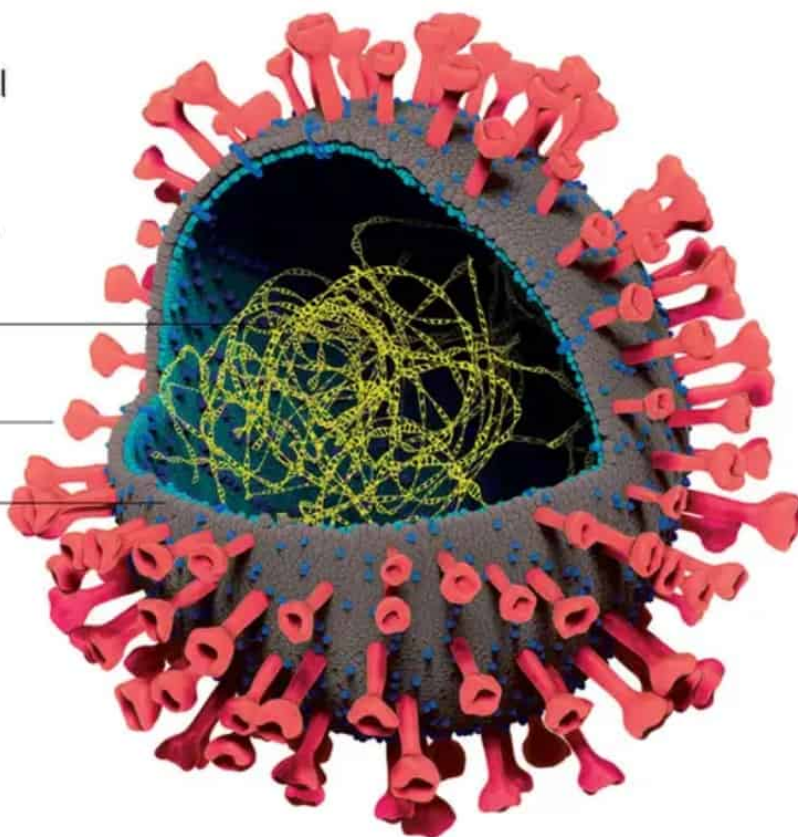
Anatomy of a virus

The covid-19 virus has several features we may be able to target with drugs to break it down and stop it entering cells

RNA enclosed
in protein

Spike protein

Lipid membranes



A cutaway of the structure of the new coronavirus

Source

A look at the leading coronavirus vaccine companies (alphabetical order)

BioNTech SE (NASDAQ: BNTX)

BioNTech has a COVID-19 vaccine called BNT162. BioNTech has licensed Chinese rights to its vaccine to Shanghai Fosun Pharmaceutical (Group) Co. Ltd. (OTC: SFOSF | HK: 2196), and joined with Pfizer (NYSE: PFE) on ex-China markets, with clinical testing beginning in April 2020.

CanSino Biologics (OTC: CASBF | HK: 6185)/Beijing Institute of

Biotechnology

CanSino Biologics is a Chinese company currently conducting Phase 1 human clinical trials on their COVID-19 vaccine Ad5-nCoV, with trials set to end by December 2020. CanSino has a successful track record having previously developed an Ebola vaccine. CanSino's vaccine takes a snippet of coronavirus' genetic code and entwines it with a harmless virus.

According to CanSino, pre-clinical results showed that the vaccine can induce a strong immune response in animal models, with a good safety profile. CanSino has a head start being Chinese and access to testing on humans in Wuhan.

GlaxoSmithKline (NYSE: GSK) & Clover Biopharmaceuticals (private)

GlaxoSmithKline is one of the world's largest vaccine manufacturers. Glaxo will provide its pandemic adjuvant to Clover Biopharmaceuticals for use as a COVID-19 vaccine candidate. An adjuvant helps the vaccine work better.

Chinese firm, Clover Biopharmaceuticals is working on a COVID-19 vaccine called 'S-Trimer' that targets the 'Spike' protein the coronavirus needs to enter host cells. Clover state they have in-house manufacturing that is capable to scale up production of S-Trimer to >100 m doses annually if needed.

Heat Biologics Inc. (NASDAQ: HTBX)

Heat Biologics is developing a COVID-19 vaccine with the University of Miami Miller School of Medicine. Heat Biologics vaccine candidate has been added to the World Health Organization's 'draft landscape' of 41 candidate vaccines.

Inovio Pharmaceuticals Inc. (NASDAQ: INO)

Inovio is working on a DNA vaccine called INO-4800. Inovio plans to start clinical trials in the U.S., China and South

Korea in April, 2020. Inovio would be able to deliver one million doses by the end of 2020 with existing capacity. Inovio has already commenced small-scale manufacturing, and has received a US\$5 million grant from the Bill & Melinda Gates Foundation, as well as US\$9 million in funding from the Coalition for Epidemic Preparedness Innovations (CEPI). The Company has partnered with a Chinese manufacturer, Beijing Advaccine Biotechnology.

Johnson & Johnson (NYSE: JNJ)

Last week it was announced that the U.S. government and Johnson & Johnson would co-invest about \$1 billion into vaccine research, development and clinical testing. These funds would be able to create enough manufacturing capacity to make more than 1 billion doses of a vaccine. Johnson & Johnson says it expects human clinical studies for its vaccine candidate to go ahead by September 2020 or earlier; and the vaccine to be available for emergency use in early 2021.

The UK is also running a human trial with J&J's COVID-19 treatments and vaccine, to be tested on health care workers.

Moderna Inc. (NASDAQ: MRNA)

Moderna is working on their vaccine called mRNA-1273, with Phase 1 clinical studies having commenced in March 2020, and due to end in June 2020. Moderna is using a different approach by creating a vaccine that does not contain the virus. Instead, Moderna uses a new technique to make artificial messenger RNA (mRNA), which is similar to mRNA found in the coronavirus. The artificial mRNA gives instructions that prompt human cells to build a protein found on the surface of the virus. That protein should trigger a protective immune response and hence a successful vaccine. This has allowed Moderna to skip animal trials, and move rapidly to human trials.

Novavax Inc. (NASDAQ: NVAX)

Novavax has several vaccine candidates in pre-clinical animal studies. Novavax recently received a US\$4 million grant from CEPI to develop a COVID-19 vaccine. The Company plans to initiate a Phase I clinical study by June, 2020.

Sanofi Pasteur (NASDAQ: SNY | EURONEXT: SAN)

Sanofi has a SARS-CoV FDA-approved vaccine; however their COVID-19 vaccine Phase 1 clinical trials won't be starting until March 2021.

Others

Some other smaller companies working on a COVID-19 vaccine include:

- Altimune Inc. (NASDAQ: ALT)
- Arcturus Therapeutics Holdings Inc. (NASDAQ: ARCT)
- CureVac (private)
- Dynavax Technologies Corp. (NASDAQ: DVAX)
- ExpreS2ion Biotech Holdings (SS: EXPRS2)
- Genex Biotechnology Corp. (OTCQB: GNBT)
- iBio Inc. (NYSE: IBIO)
- ImmunoPrecise Antibodies (TSXV: IPA | OTCQB: IPATF)
- ISR Immune System Regulation (SS: ISR)
- Vaxart Inc. (NASDAQ: VXRT)
- Vaxil Bio Ltd (TSXV: VXL)

A virus isn't a cell, isn't even considered alive. It's a nucleic acid (DNA or RNA) wrapped in a coat of proteins



Many viruses that plague humans have RNA as their genetic material. It's copied into DNA in our cells.

Source

Reference

For a list of details on 47 companies and organizations developing a coronavirus vaccine investors can view the Milken Institute report [here](#), and a WHO report [here](#).

Closing remarks

The race is on to find a COVID-19 vaccine. It is still too early to predict a winner, or if a company will even succeed. For now, it appears that the leading three companies are Johnson & Johnson, Moderna, and CanSino Biologics; as they are at the clinical trial stage and the first two have been financially backed by the US Government.

Governments and regulatory bodies are playing their part by funding and speeding up approval processes for vaccine makers. Some may say this is risky but with daily global coronavirus deaths, the world cannot wait a year for a vaccine. A vaccine or successful treatment is urgently needed now, but we will most likely need to wait until early 2021 for a vaccine.