

# COVID-19 (SARS-CoV-2), by Robert Bransfield, MD



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Below is a compilation of Covid-19 information from scientific sources compiled by Dr. Robert Bransfield, MD that the LDA has permission to post.

Dr. Bransfield thanks contributors to this project: members of ILADS, Microbes and Mental Illness listserv, and Psychopharmacology listserv.

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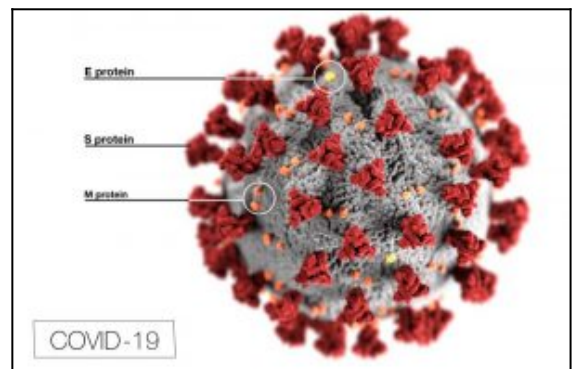
## SECTIONS

Dr. Bransfield has divided the material into 9 sections listed in the boxes below. Each section of COVID-19 information consists of a number of different links to valuable content about that topic. In the parenthesis, after the link, is whoever created the content or where it can be found.

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RECENT	GENERAL INFORMATION	TESTING
THERAPEUTIC POTENTIAL	NOMENCLATURE	HISTORY
EPIDEMIOLOGY	CLINICAL PRESENTATIONS	CONTROVERSY

RECENT



This illustration, created at the Centers for Disease Control and Prevention (CDC), reveals ultrastructural morphology exhibited by coronaviruses. (Photo Credit: Alissa Eckert, MS; Dan Higgins, MAMS)

This is a historic and defining moment in our lives. If we mobilize our cooperative efforts with rapid implementation of creative innovation, we will conquer this epidemic. In contrast, if we are paralyzed by bureaucracy and rigidity, it will intensify this catastrophe. Whatever course this takes, we will recover, and I hope this experience improves how we respond to infectious diseases other than COVID-19. In most

countries, there is a daily increase of 33% and a doubling every two days in the number of recognized cases. Singapore, Hong Kong, South Korea, and Japan are exceptions:

COVID-19 – Evidence Over Hysteria (ZeroHedge 3/21/20)

We need to be well informed and alert, follow good judgment, and have the flexibility to adapt to changing circumstances. Public health strategies are being implemented, including quarantining, and social distancing. As Dr. Fauci states, this is an unknown microbe, it is highly contagious, and it can be lethal to high-risk groups. In view of the speed of this pandemic, vaccine development and new drug development will take too long to be viable options. We have never developed a vaccine for AIDS or the common cold (Coronavirus). The creative use of repurposed drugs and repurposed resources is the most viable option. Where is this pandemic headed? In the best scenario, the virus appears to be mutating away from the more pathogenic L strain that was predominant early in the epidemic; people with sub-clinical and mild infections will become immunized which will reduce the contagion; the approaching summer with heat, light, and humidity will reduce contagion; and therapeutics and public health strategies will help. In the worst scenario, some have predicted a large percent of the world population will become infected and millions will die.

### **Will the seasonal change reduce the pandemic?**

Coronaviruses have decreased survival as a result of light, heat, and humidity. Will the early spring may help to make this Coronavirus less contagious? The virus appears to be mutating and the more severe L strain that was more prevalent early in the epidemic appears to be less prevalent now. Will it evolve into a less dangerous pathogen?

Video: Flu has a season, but will Covid-19 melt away with the spring? It's not so simple (STAT 3/5/20)

At Harvard forum, three who know warn of 'most daunting virus' in half a century (STAT 3/7/20)

Video: Epidemiologist predicts effects of coronavirus in the months ahead (CDC 3/2/20)

40% to 70% Could Become Infected:

Video: Epidemiologist predicts effects of coronavirus in the months ahead (CBS 3/2/2020)

Coronavirus: Expert's worst-case scenario is 96 million infected in US with up to 500,000 dead (The Independent 3/7/2020)

National Emergency:

Trump Declares U.S. National Emergency for COVID-19 (MedPage Today 3/13/2020)

Reasons Not to Panic:

Coronavirus: how to keep things in perspective (The Conversation 3/3/2020)

COVID-19: Why I'm Very Concerned (MedPage Today 3/9/2020)

The Taiwan approach:

Taiwan's Response to the Coronavirus Challenge of 2020 (Taiwan Studies Programme 3/5/2020)

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**THERAPEUTIC POTENTIAL:**

Antibody treatments, many potential repurposed drugs (and others not yet approved), 12 or more vaccines are in

development and serum from COVID-19 survivors:

### **Antibody Treatments:**

Currently available: Polyclonal antibodies, IVIG

In development: Monoclonal antibodies (Takeda TAK-888) IVIG from recovered patients, a mix of manufactured antibodies (Regeneron, Vir Biotechnology)

How blood plasma from recovered patients could help treat the new coronavirus (STAT 3/5/20)

China finds promising coronavirus treatment in blood plasma from recovered patients (Fortune 2/14/20)

### **Repurposed Drugs:**

High throughput screening and other approaches have resulted in identifying repurposed drugs that may have the potential to treat Covid-19. These drugs are used to treat alcoholism, arthritis, and other RNA viruses( HIV, Hepatitis C, Ebola, SARS, MERS).

- Alcoholism: Antabuse (disulfiram)
- Arthritis: Tivorbex, (indomethacin)
- Malaria: (Hydroxychloroquine & chloroquine)
- Other drugs: mycophenolic acid, interferons, (favipiravir, ribavirin) and experimental nucleoside analogues (remdesivir and galidesivir), Ritonavir, Darunavir and cobicistat,

Approved Drugs that are Protease Inhibitors:

disulfiram, lopinavir, and ritonavir, Favipiravir, Saquinavir and Beclabuvir best candidates based on virtual high throughput screening

(China has approved the use of Favilavir to treat Coronavirus.)

Virtual High Throughput Screening based prediction of potential drugs for COVID-19

Currently available treatments (disulfiram, indomethacin, and many others) that may be repurposed to treat and prevent COVID-19:

Disulfiram can inhibit MERS and SARS coronavirus papain-like proteases via different modes. (Antiviral Res 2/2018)

Indomethacin Has a Potent Antiviral Activity Against SARS Coronavirus (Antivir Ther 2006)

Broad-spectrum antivirals for the emerging Middle East respiratory syndrome coronavirus (Journal of Infection 12/2013)

Therapeutic options for the 2019 novel coronavirus, 2019-nCoV (nature reviews – drug discovery 2/19/20)

Therapeutic options for the 2019 novel coronavirus (2019-nCoV) SUPPLEMENTARY INFORMATION (nature reviews – drug discovery)

How experts plan to treat the new coronavirus (LIVESCIENCE 2/6/20)

Can drugs meant for HIV treat the new coronavirus? (Advisory Board 2/20/20)

Therapeutic strategies in an outbreak scenario to treat the novel coronavirus originating in Wuhan, China. (F1000Res. 2/7/2020)

Virtual High Throughput Screening Based Prediction of Potential Drugs for COVID-19 (Preprints 3/9/20)

J&J Therapeutic:

HHS, Janssen Collaborate To Develop Coronavirus Therapeutics (HHS.gov 2/18/20)

SARS-CoV-2 Cell Entry Depends on ACE2 and TMPRSS2 and Is Blocked by a Clinically Proven Protease Inhibitor (Cell 3/5/20)

China OK'd use of the arthritis drug tocilizumab (Actemra), an interleukin-6 inhibitor, to treat COVID-19 cases marked by serious pulmonary damage and high levels of IL-6.

China approves use of Roche drug in battle against coronavirus complications (Reuters 3/4/20)

Angiotensin receptor blockers as tentative SARS-CoV-2 therapeutics, Losartan (Drug Dev Res 3/4/20)

Response to the emerging novel coronavirus outbreak (BMJ 1/31/2020)

Chloroquine, Chlorpromazine, Loperamide, and Lopinavir to Treat MERS:

Screening of an FDA-Approved Compound Library Identifies Four Small-Molecule Inhibitors of Middle East Respiratory Syndrome Coronavirus Replication in Cell Culture (Antimicrob Agents Chemother 8/2014)

Hydroxychloroquine:

Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an openlabel non-randomized clinical trial (Mediterranee Infection 3/17/20)

Hydroxychloroquine and azithromycin as a treatment of COVID-19: results of an open-label non-randomized clinical trial (International Journal of Antimicrobial Agents 3/20/20)

Chloroquine and hydroxychloroquine as available weapons to fight COVID-19 (International Journal of Antimicrobial Agents, Pre-Proof 2/2020)

Breakthrough: Chloroquine phosphate has shown apparent efficacy in treatment of COVID-19 associated pneumonia in

clinical studies. – PubMed – NCBI (Biosci Trends 3/16/20)

Could the anti-malarial drug chloroquine treat COVID-19?  
(LiveScience 3/19/20)

COVID-19 CURE: Australia Plans To Roll Out The Use of Two Existing Medications After Patients Have Successfully Recovered in Secret Trials (Tech Times 3/20/20)

French researcher posts successful Covid-19 drug trial (The Connexion 3/17/20)

Hydroxychloroquine reduces viral load in COVID-19 patients (virology blog 3/19/20)

Clinical Trials:

13 Studies found for: hydroxychloroquine | COVID-19 (ClinicalTrials.gov)

Tamiflu:

Is there a cure for the new coronavirus? (LiveScience 3/14/20)

Serum From COVID-19 Survivors:

Antibodies From Covid-19 Survivors Could Be Used To Treat Patients, Protect Those At Risk (HUB 3/13/2020)

The convalescent sera option for containing COVID-19 (JCI 3/13/2020)

In Vitro Antiviral Activity and Projection of Optimized Dosing Design of Hydroxychloroquine for the Treatment of Severe Acute Respiratory Syndrome Coronavirus 2 (Clin Infect Dis 3/9/2020)

Roche launches clinical trial of COVID-19 pneumonia hopeful Actemra after backing from China (FiercePharma 3/19/2020)

WHO Project:



WHO to launch multinational trial to jumpstart search for coronavirus drugs (STAT 3/18/20)

Antiviral Herbs:

Redeploying plant defences (Nature Plants 3/13/2020)

Antiviral Natural Products and Herbal Medicines (J Tradit Complement Med, 2014)

The Open-Air Treatment of *PANDEMIC INFLUENZA* (Am J Public Health 10/2009)

35 treatments in development:

How to Conquer Coronavirus: Top 35 Treatments in Development (GEN 3/2/2020)

Drug Shortages (FDA 3/13/2020)

Overview of planned or ongoing studies of drugs for the treatment of COVID-19 (3/26/2020)

COVID-19 Drug Therapy – Potential Options (Elsevier 3/2020)

Medicines used in respiratory diseases only seen in children (European Respiratory Journal 2009)

**Current NIH Trial (remdesivir):**

NIH clinical trial of remdesivir to treat COVID-19 begins (NIH 2/25/2020)

Gilead suspends access to experimental Covid-19 drug due to 'overwhelming demand' (STAT 3/22/2020)

WHO Updates Statement About Taking Ibuprofen If You Have COVID-19 Symptoms (The Western Journal 3/21/2020)

Comparison of Lopinavir/Ritonavir or Hydroxychloroquine in Patients With Mild Coronavirus Disease, COVID-19 (Asan Medical Center 3/13/2020)

COVID-19 Clinical Trial Launches at University of Minnesota  
(3/17/2020)

### **Vaccine Development:**

(Includes Tonix Pharmaceuticals, Innovation Pharmaceuticals, Inovio Pharmaceuticals, Beijing Advacine Biotechnology, Clover Biopharmaceuticals, Moderna, WuXi Biologics, GSK, J&J, Migal Galilee Research Institute)

Verdict: Coronavirus treatment: Vaccines/drugs in the pipeline for Covid-19 (Clinical Trials Arena 3/25/2020)

J&J Vaccine:

What You Need to Know About the Coronavirus—and a Potential Preventive Vaccine (Johnson & Johnson 2020)

Moderna delivers first experimental coronavirus vaccine for human testing (WSJ 2/26/2020)

Israel has a vaccine under development that can be quickly altered for the corona virus. The vaccine could “achieve safety approval in 90 days,” he said. It will be an oral vaccine, making it particularly accessible to the general public:

Israeli scientists: ‘In a few weeks, we will have coronavirus vaccine’ (Jerusalem Post 3/15/2020)

Israeli researchers say vaccine for coronavirus could be available in three months (JC 2/28/2020)

Israel’s state-funded Migal Galilee Research Institute said it had identified similarities between COVID-19 and Infectious Bronchitis Virus, which affects poultry, that could allow it to develop a vaccine to battle the deadly outbreak. It said it was working to quickly adapt its IBV vaccine for use against COVID-19.

Other groups developing vaccines are Moderna, Baylor College of Medicine, Glaxo, Sanofi, and Johnson and Johnson.

GSK Announcement:

A Chinese biotech partners with GSK to boost its coronavirus vaccine development (STAT 2/24/2020)

### **Vaccine Development Concern:**

Vaccines will take too long.

COVID-19, unlike other coronaviruses, has a plastic RNA genome and can rapidly make many variations that can render vaccine development problematic by evading the vaccine-generated immune response by the appearance of new variants with different antigenicity.

Lack of Capability:

Federal vaccine development sites ill-suited to counter covid-19 epidemic (Washington Post 3/15/2020)

### **Survival of Coronaviruses:**

“Pathogenic human coronavirus 229E remained infectious in a human lung cell culture model following at least 5 days of persistence on a range of common nonbiocidal surface materials, including polytetrafluoroethylene (Teflon; PTFE), polyvinyl chloride (PVC), ceramic tiles, glass, silicone rubber, and stainless steel. We have shown previously that noroviruses are destroyed on copper alloy surfaces. In this new study, human coronavirus 229E was rapidly inactivated on a range of copper alloys (within a few minutes for simulated fingertip contamination) and Cu/Zn brasses were very effective at lower copper concentration:

Human Coronavirus 229E Remains Infectious on Common Touch Surface Materials (mbio Nov-Dec 2015)

Watch: Coronavirus survives on surfaces up to 72 hours. Here's how to protect yourself (STAT 3/19/2020)

Viruses tend to survive the longest in low-temperature, low-humidity, low light environments, that is why you see lots of respiratory viruses during the winter.

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## EPIDEMIOLOGY



CDC staff support the COVID-19 response in the Emergency Operations Center.

(Photo Credit: James Gathany)

### **COVID-19 Updated Statistics:**

*Note: all disease statistics are underreported*

Worldometer: Coronavirus Cases:

Coronavirus, COVID-19, Global Cases by Center for Systems Science & Engineering (CSSE), Johns Hopkins University

Interactive Web-Based Dashboard to Track COVID-19 in real time (Lancet Infectious Diseases)

Health Map, Covid-19 (documents spread over geography x time)

World Health Organization – Coronavirus Dashboard

Coronavirus Disease (COVID-19) – Statistics and Research (Our World in Data)

Live Data: nCoV2019

United States: Covid-19 – FluTrackers News and Information

### **Genomic Epidemiology:**

Cryptic transmission of novel coronavirus revealed by genomic epidemiology (Bedford Lab 3/2/2020)

Researchers identify two coronavirus strains as China cases dwindle (Reuters 3/3/2020)

TWO strains of the killer coronavirus are spreading around the world – and 70% of infected patients have caught the more aggressive and contagious type, study claims (Daily Mail 3/4/2020)

### **COVID-19 vs. Flu:**

The death rate from COVID-19 is higher than the death rate from the flu, but there are many more cases of flu. Some have immunity to the flu, no one has immunity to Covid-19.

Flu: Estimated 1 billion cases worldwide; 9.3 million to 45 million cases in the U.S. per year. Deaths: Flu: 291,000 to 646,000 deaths worldwide; 12,000 to 61,000 deaths in the U.S. per year. Article on Coronavirus Disease 2019/2020 Lisa Lockerd Maragakis, M.D., M.P.H. – Expertise in Infectious Diseases Senior Director of Infection Prevention, The Johns Hopkins Health System

Corona Virus 2019 and Influenza:

Coronavirus Disease 2019 and Influenza 2019-2020 (JAMA

2/26/2020)

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## GENERAL INFORMATION

New England Journal of Medicine (NEJM): COVID-19

WHO: Coronavirus disease (COVID-19) advice for the public

WHO: Q&A on coronaviruses (COVID-19)

AMA: COVID-19 (2019 novel coronavirus) resource center for physicians

CDC: COVID-19 Resource Page

Bill Gates Perspective: Responding to Covid-19 – A Once-in-a-Century Pandemic? (NEJM 2/28/2020)

Guidance for Doctors: CDC and WHO

Self-Quarantine Guide to Preventing Coronavirus Spread (HealthTap Blog 3/6/2020)

Coronavirus: How hand sanitizers protect against infections (Compound Interest 3/4/2020)

CSTE: Healthcare Providers Disease Reporting – Phone Numbers for Each US State and Region

Prof. Marcel Salathé Course: COVID-19, EPFL's (2/26/2020)

Prof. Marcel Salathé: COVID update (3/8/2020)

CORONAVIRUS AND EMERGING INFECTIOUS DISEASE OUTBREAKS RESPONSE

Fact Sheets – Coronavirus and Emerging Infectious Disease Outbreaks Response (CSTS – Center for Study of Traumatic

Stress)

COVID-19: The Internet Book of Critical Care (IBCC)

Infected people without symptoms might be driving the spread of coronavirus more than we realized (CNN 3/19/2020)

Covid-19: WHO says Africa should 'prepare for the worst' (Daily Nation 3/22/2020)

Africa Records More Than 1,000 COVID-19 Cases, Spanning at Least 40 Countries (Time 3/21/2020)

COVID-19 sees lockdowns across Africa as cases of virus increase in the continent (ABC 3/22/2020)

Larry Brilliant Predicted this Pandemic (Wired 3/19/2020)

Larry Brilliant TED Talk: My Wish, Help Me Stop Pandemics (2006)

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## NOMENCLATURE

### **CDC Terminology:**

1. Person Under Investigation (PUI): case meets clinical criteria for COVID-19 testing
2. Presumptive Positive: case has tested positive by a public health laboratory and is pending confirmatory testing at CDC
3. Confirmed Case: case has tested positive by the CDC

### **CLINICAL PRESENTATIONS:**

Know the Symptoms of COVID-19 (WebMD 3/10/2020)

Disease severity: 81% mild, 14% severe (pneumonia), 5% critical (ARDS, Septic shock, MOSF); Overall case fatality 1-2%

Clinical Characteristics of Imported Cases of COVID-19 in Jiangsu Province: A Multicenter Descriptive Study (Clinical Infectious Diseases 2/29/2020)

Clinical Characteristics of Coronavirus Disease 2019 in China (NEJM 2/28/2020)

First British victim, 25, Describes Coronavirus (Daily Mail 3/4/2020)

First Case of 2019 Novel Coronavirus in the United States (NEJM 3/5/2020)

A Beijing Hospital Confirms Covid-19 Attacks Central Nervous System (CNTechPost 3/5/2020)

The neuroinvasive potential of SARS-CoV2 may be at least partially responsible for the respiratory failure of COVID-19 patients (Journal of Medical Virology 2/27/2020)

The first COVID-19 case originated on November 17, according to Chinese officials searching for 'Patient Zero' (Business Insider 3/13/2020)

Epidemiologic features and clinical course of patients infected with SARS-CoV-2 in Singapore (JAMA 3/10/2020)

COVID-19 and the cardiovascular system (Nature Reviews Cardiology 3/5/2020)

Young adults make up alarming percentage of U.S. coronavirus hospitalizations (NJ Advance Media for NJ.com 3/19/2020)

A Medical Worker Describes Terrifying Lung Failure From COVID-19 – Even in His Young Patients (ProPublica 3/21/2020)

Doctors say vaping could make coronavirus worse for young



people (New York Post 3/21/2020)

Five days after Paulo's article is published, the Lancet also puts forth the theory that certain antihypertensives may lead to greater infectivity and more serious illness from COVID-19  
Are patients with hypertension and diabetes mellitus at increased risk for COVID-19 infection? (TheLancet.com 3/11/2020)

Coronavirus: Why You Must Act Now (Medium 3/10/2020)

Fatality is greater in older and debilitated individuals  
Age, Sex, Existing Conditions of COVID-19 Cases and Deaths (Worldometer 2/29/2020)

Coronavirus Disease 2019 (COVID-19): Are You at Higher Risk for Severe Illness? (CDC)

Clinical Characteristics of Imported Cases of COVID-19 in Jiangsu Province: A Multicenter Descriptive Study (Clinical Infectious Diseases 2/29/2020)

Why is the coronavirus so much more deadly for men than for women? (LA Times 3/21/2020)

**Psychiatric Issues:** Panic, isolation, scapegoating, adjusting to the whole family being home, or feeling excessively invincible.

The large number of unknowns is conducive to panic. Accurate knowledge and effective planning relieve panic. COVID-19 information hotlines exist for additional questions. (In NJ, NJ DOH hotline: 1-800-222-1222)

Social distancing and quarantining contribute to isolation. Brooks et. al.

The psychological impact of quarantine and how to reduce it: rapid review of the evidence (The Lancet 2/26/2020)

APA Coronavirus Information Hub (American Psychiatric

Association).

APA COVID-19 Mental Health Impacts: Resources for Psychiatrists (American Psychiatric Association)

Scapegoating:

Yang & Anti-Defamation League CEO: Avoid coronavirus racism and scapegoating (USA Today 3/21/2020)

In the hands of racist officials, the covid-19 pandemic may be a weapon (Washington Post 3/20/2020)

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## TESTING



This is a picture of CDC's laboratory test kit for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

What Should US Clinicians Know About COVID-19? (Contagion Live 2/20/2020)

Testing: Coronavirus Disease 2019 (CDC)

Thermo Fisher to produce millions of coronavirus diagnostic tests (STAT 3/14/2020)

FDA authorizes new test that could detect coronavirus in about 45 minutes (CNN 3/21/2020)

Coronavirus (COVID-19) Update: FDA Issues first Emergency Use Authorization for Point of Care Diagnostic (FDA 3/21/2020)

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## HISTORY

In the 1918 Pandemic there was higher mortality in young and middle-age individuals (those with more robust immune systems). Mortality was associated with immune reactions to the infection. The mortality in this epidemic is quite different, with higher mortality in older and debilitated individuals (those with weaker immune systems).

The 1918 Pandemic:

How the Horrific 1918 Flu Spread Across America (Smithsonian Magazine 11/2017)

Coronavirus and the Sun: a Lesson from the 1918 Influenza Pandemic (Medium 3/10/2020)

Why Was It Called the 'Spanish Flu?' (History 3/27/2020)

History in a Crisis – Lessons for Covid-19 (NEJM 3/12/2020)

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## CONTROVERSY

Lessons From Lyme Disease: Six Reasons The CDC's COVID-19 Failure Was Predictable (Forbes 3/13/2020)

The conspiracy theories about the origins of the coronavirus, debunked (Vox 3/12/2020)

Why the Coronavirus Has Been So Successful (The Atlantic 3/20/2020)

Does Italy Have More COVID19 Deaths Than South Korea Because They're Not Prescribing Chloroquine? (Medium 3/16/2020)

The Tip of the Iceberg: Virologist David Ho (BS '74) Speaks About COVID-19 (Caltech 3/20/2020)

The First Case Report – Implications For Coronavirus Conspiracy Theories (Real Psychiatry 3/16/2020)

Uncanny similarity of unique inserts in the 2019-nCoV spike protein to HIV-1 gp120 and Gag (bioRxiv 2/2/2020)

New evidence emerges: Coronavirus “bioweapon” might have been a Chinese vaccine experiment gone wrong... genes contain “pShuttle-SN” sequences, proving laboratory origin (Natural News 2/2/2020)

False claims about sources of coronavirus cause spat between the US, China (ABC News 3/13/2020)

Full-genome Evolutionary Analysis of the Novel Corona Virus (2019-nCoV) Rejects the Hypothesis of Emergence as a Result of a Recent Recombination Event (Infect Genet Evol 4/2020)

The coronavirus did not escape from a lab. Here's how we know. (LiveScience 3/21/2020)

Engineered bat virus stirs debate over risky research (Nature 11/2015)

The proximal origin of SARS-CoV-2 (Nature Medicine 3/17/2020)

Logistical and Technical Exploration into the Origins of the Wuhan Strain of Coronavirus (Harvard to the Big House 1/31/2020)

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