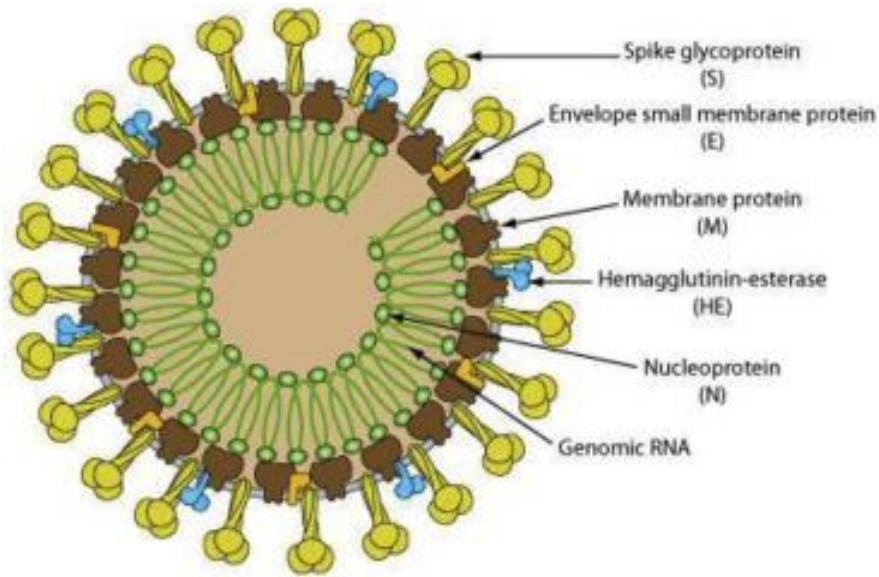


COVID-19 AND THE HEART

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- Atypical pneumonia cluster: Wuhan Province, China: Dec 2019
- Jan 13th: First reported case outside China
- Jan 30th: WHO declares a PHEIC
- Early patients: visited wet animal market
- Virus isolation studies → Coronavirus (COVID-19, SARS-CoV-2)
 - Single-stranded enveloped RNA virus
 - 89-96% nucleotide overlap with bat coronaviruses
 - 7th human coronavirus: *common cold (229E, OC43, NL63, HKU1), SARS-CoV (2002), MERS (2012)*

January

22: PHE threat elevated from very low to low
 29: 1st reported case in UK

February

23: Italy; 150 deaths and lockdown imposed
 28: 1st person-person transmission in UK reported
 28: stock market crash

March

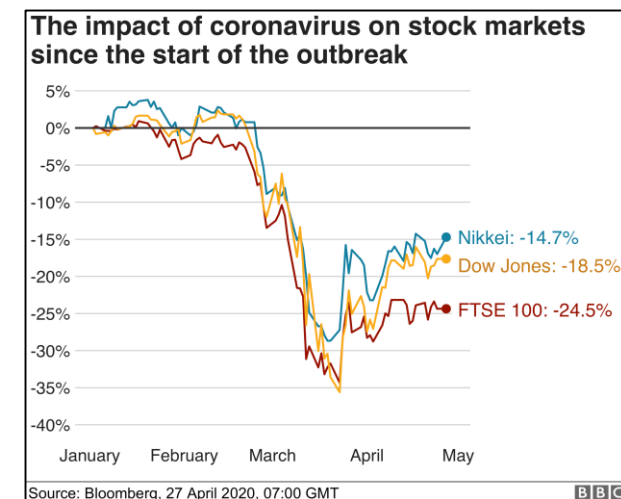
23: UK lockdown
 25: Prince Charles tests +ve
 27: Boris Johnson and Matt Hancock test +ve

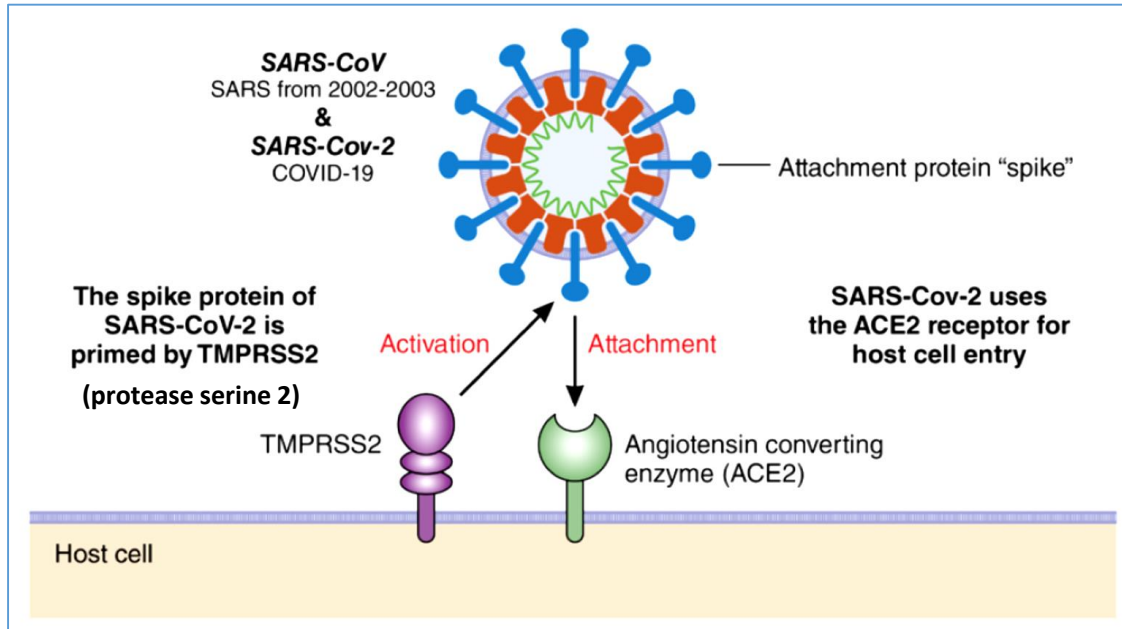
April

5: Boris Johnson hospitalised

1,790,191	US
514,849	Brazil
414,878	Russia
276,156	United Kingdom
239,479	Spain
232,997	Italy
191,356	India
189,010	France
183,508	Germany
164,476	Peru
163,942	Turkey

~40,000 UK deaths





ACE2:

Type II alveolar cells

Myocardium

(Intestines, vascular endothelium, kidneys)

- A beneficial enzyme: converts angiotensin II back to angiotensin I
- Opposite effect of ACE1
- Angiotensin II: harmful cardiovascular actions
- (hypertension, endothelial dysfunction, salt retention, systemic inflammation, myocardial fibrosis)
- ACE-I & ARBs: widely used in cardiology to inhibit action of ACE1

Meta-analysis : COVID +ve patients

- 8 studies: n=46,248
- High prevalence of cardiac disease
- HT: 17%
- DM: 8%
- CVD: 5%
- Other studies suggest presence of underlying cardiac disease increases risk of COVID-related mortality (2-4 fold)

• **Cardiac disease is more common in elderly**

• **Cardiac disease is more common in certain ethnic groups**

? **↑COVID infections in BAME community reflects inherent susceptibility to viral infection or is it a confounding effect:**

- higher prevalence of HT/CHD/diabetes
- other factors (socio-economics, employment, co-dwelling)

? **Should I discontinue treatment with ACE-I/ARBs**

No, all major cardiology societies advise continuation

COVID-19 and Myocardial Injury

2 patterns described: ~7% of all COVID patients

Early phase: D4

- SOB + mild elevation of cardiac biomarkers
- Persistent low troponin: survivors
- Progressive troponin elevation: non-survivors
 - Parallels \uparrow of other inflammatory biomarkers (*D-dimer, ferritin, IL-6*)
 - ?part of cytokine storm and multi-organ failure

Late Phase

- Classical viral cardiomyopathy
- Stress cardiomyopathy
- Thrombo-embolic micro-vascular necrosis

