

# Corona-Virus Crisis

## *Knowledge Improvements*

*Collected, arranged and annotated by Helmut Duwe  
Work in Progress (10-June-2020)*

# Terms

**Covid-19** Corona Virus Disease 2019

**SARS** Severe Acute Respiratory Syndrome

**SARS-CoV** SARS Coronavirus

**SARS-CoV-1** *SARS Coronavirus 1 (2003)*

**SARS-CoV-2** SARS Coronavirus 2 (2019)

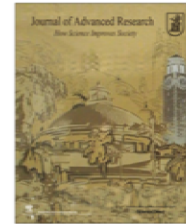
# Start Paper



Contents lists available at [ScienceDirect](#)

Journal of Advanced Research

journal homepage: [www.elsevier.com/locate/jare](http://www.elsevier.com/locate/jare)



## COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses



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### Introduction

Coronaviruses belong to the Coronaviridae family in the Nidovirales order. Corona represents crown-like spikes on the outer surface of the virus; thus, it was named as a coronavirus.

Peer review under responsibility of Cairo University.

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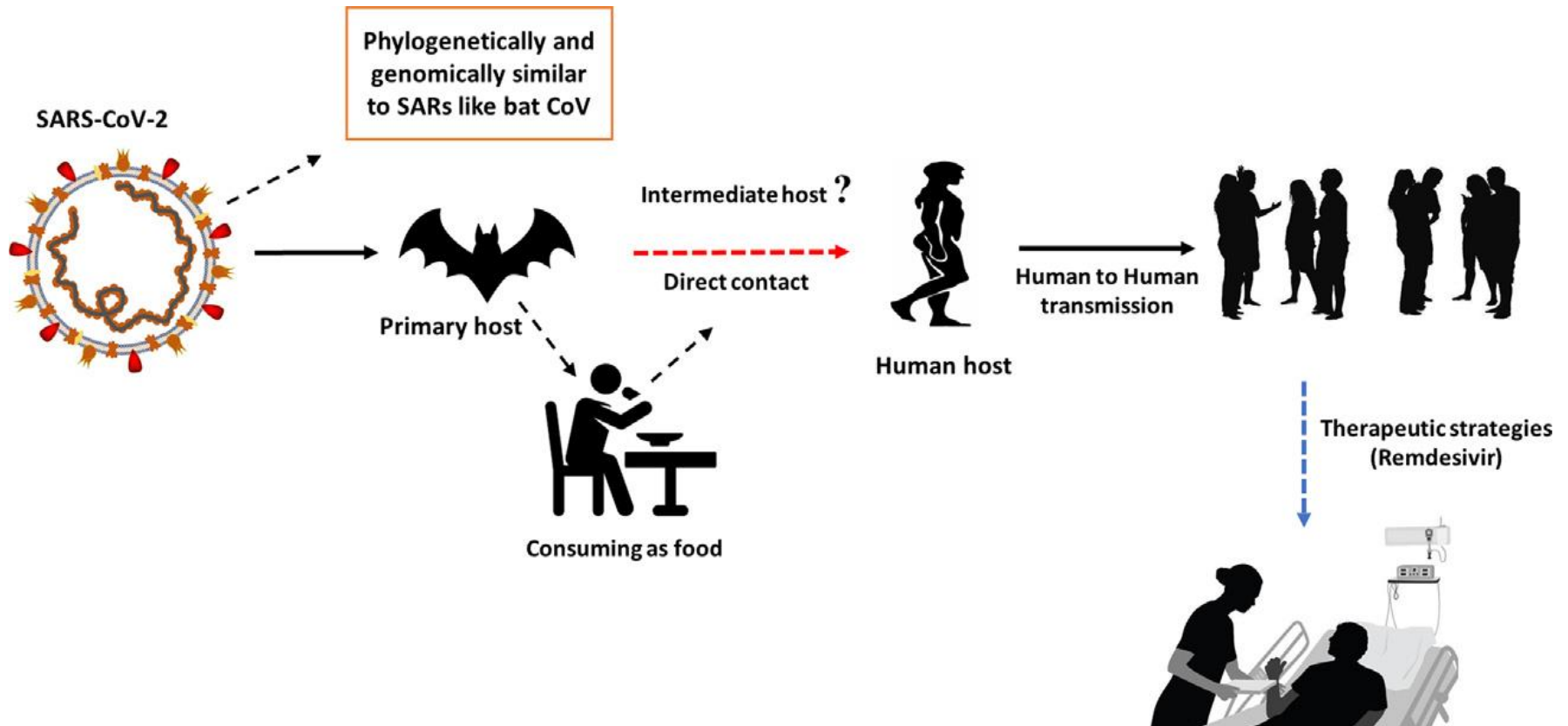
<sup>1</sup> Contributed equally (M.A.S and S.K).

<https://doi.org/10.1016/j.jare.2020.03.005>

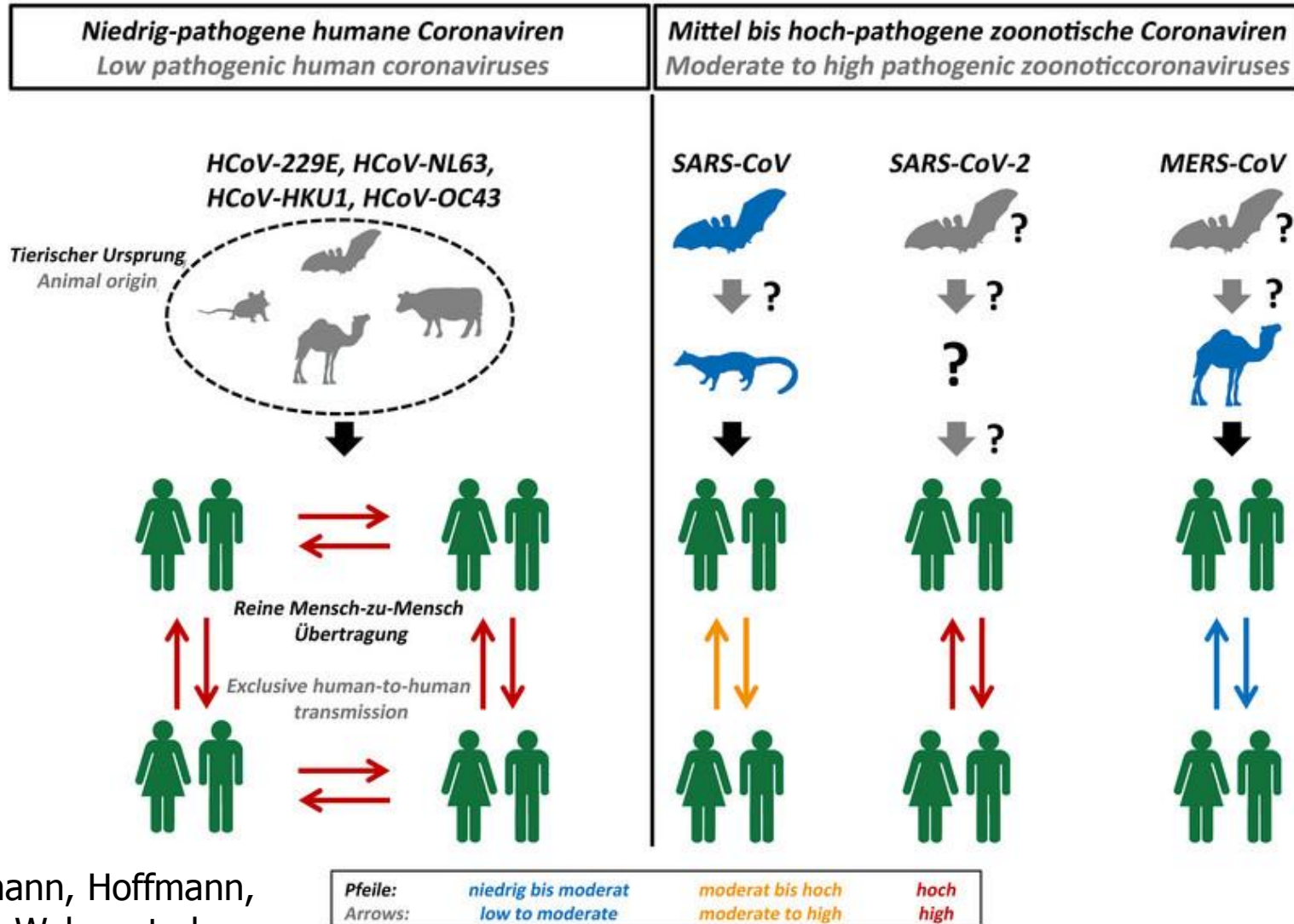
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# Spreading Pattern I

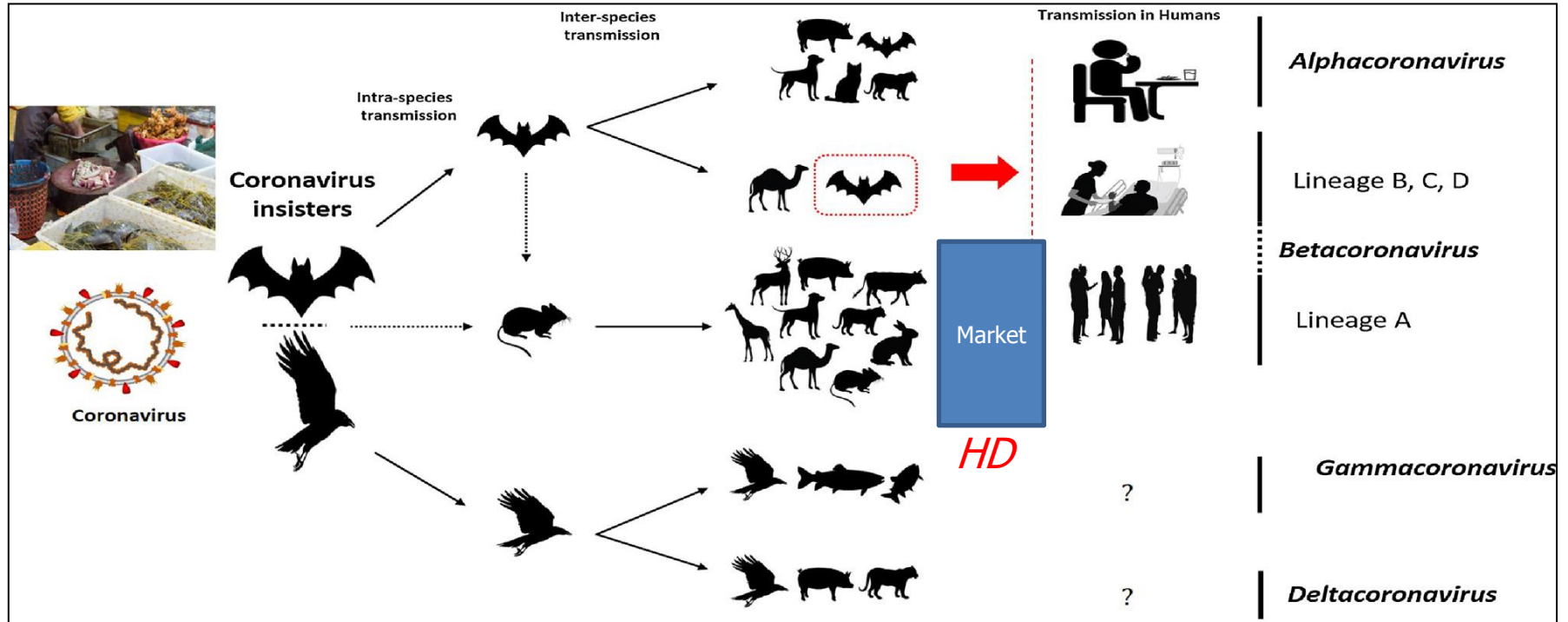


# Spreading Pattern II



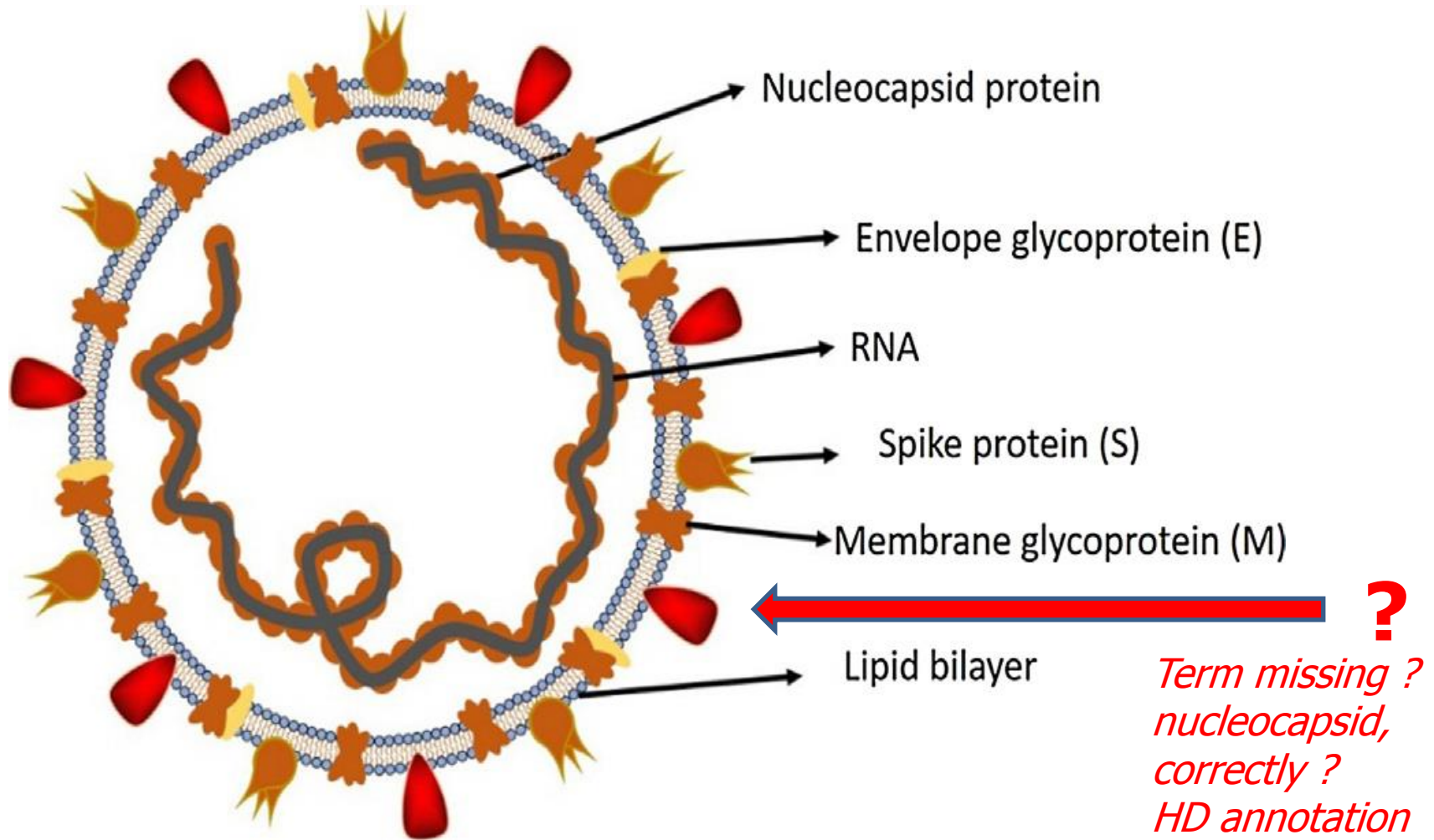
Pöhlmann, Hoffmann,  
Kleine-Weber et al.  
(Web Site)

# Coronaviruses - Transmission



Shereen, Khan, Kazmi et al., Journal of Advanced Research, 2020

# Corona Virus - Structure

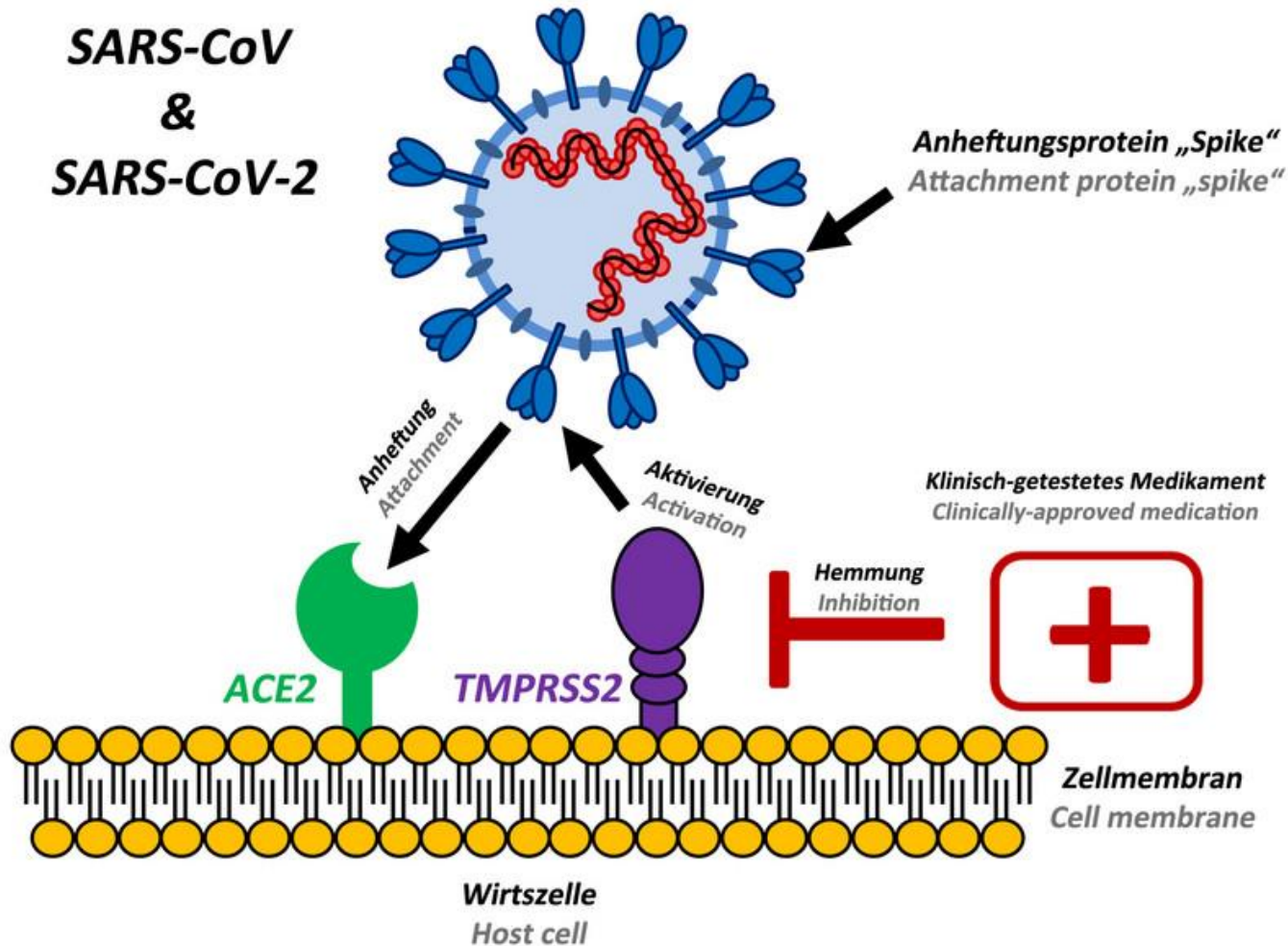


Virus structure as presented  
by Shereen et al. / *annotated by HD*

Shereen, Khan, Kazmi et al., 2020

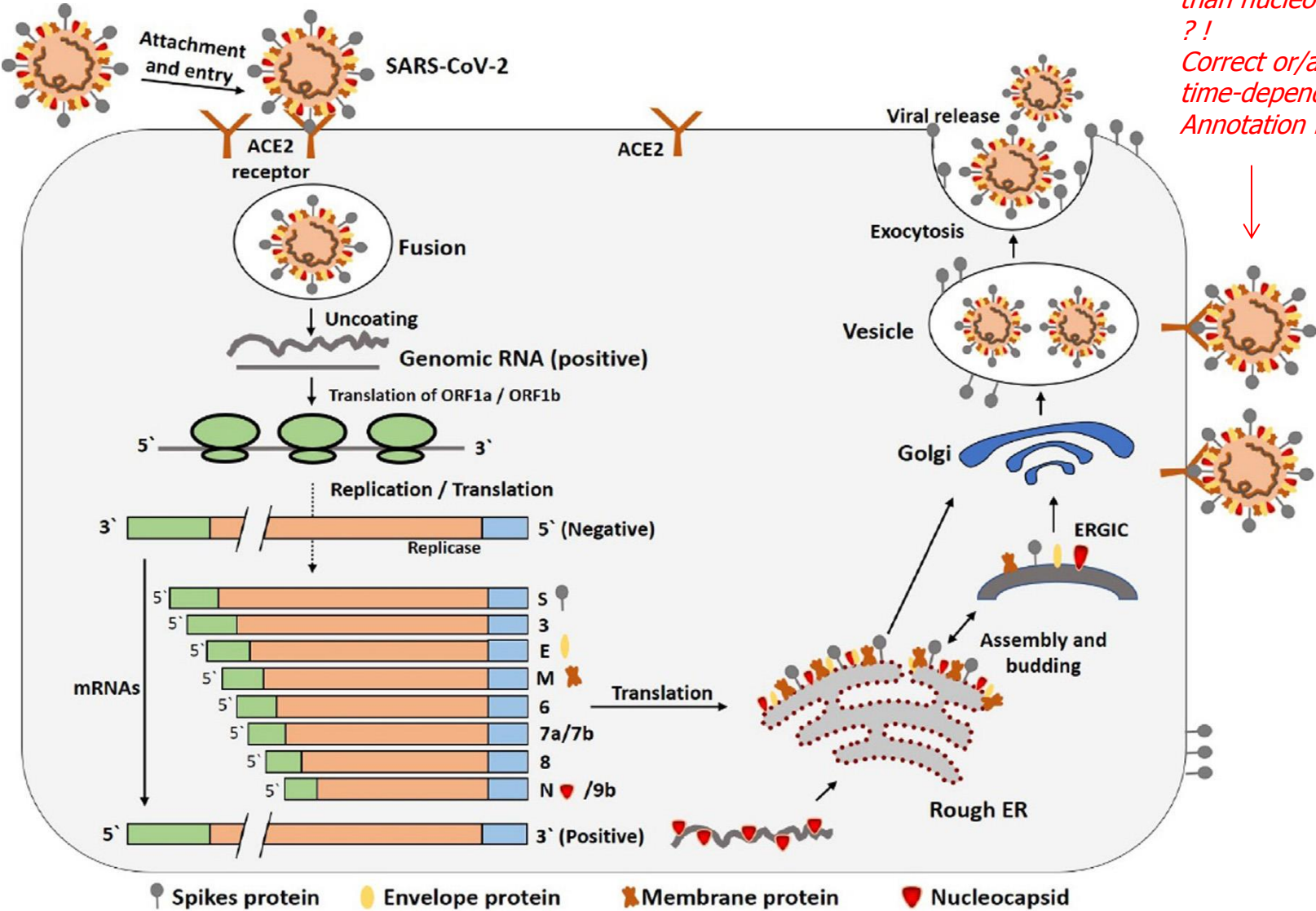


# SARS-CoV - Coupling Mechanism





# SARS-CoV-2 Virus - Life Cycle

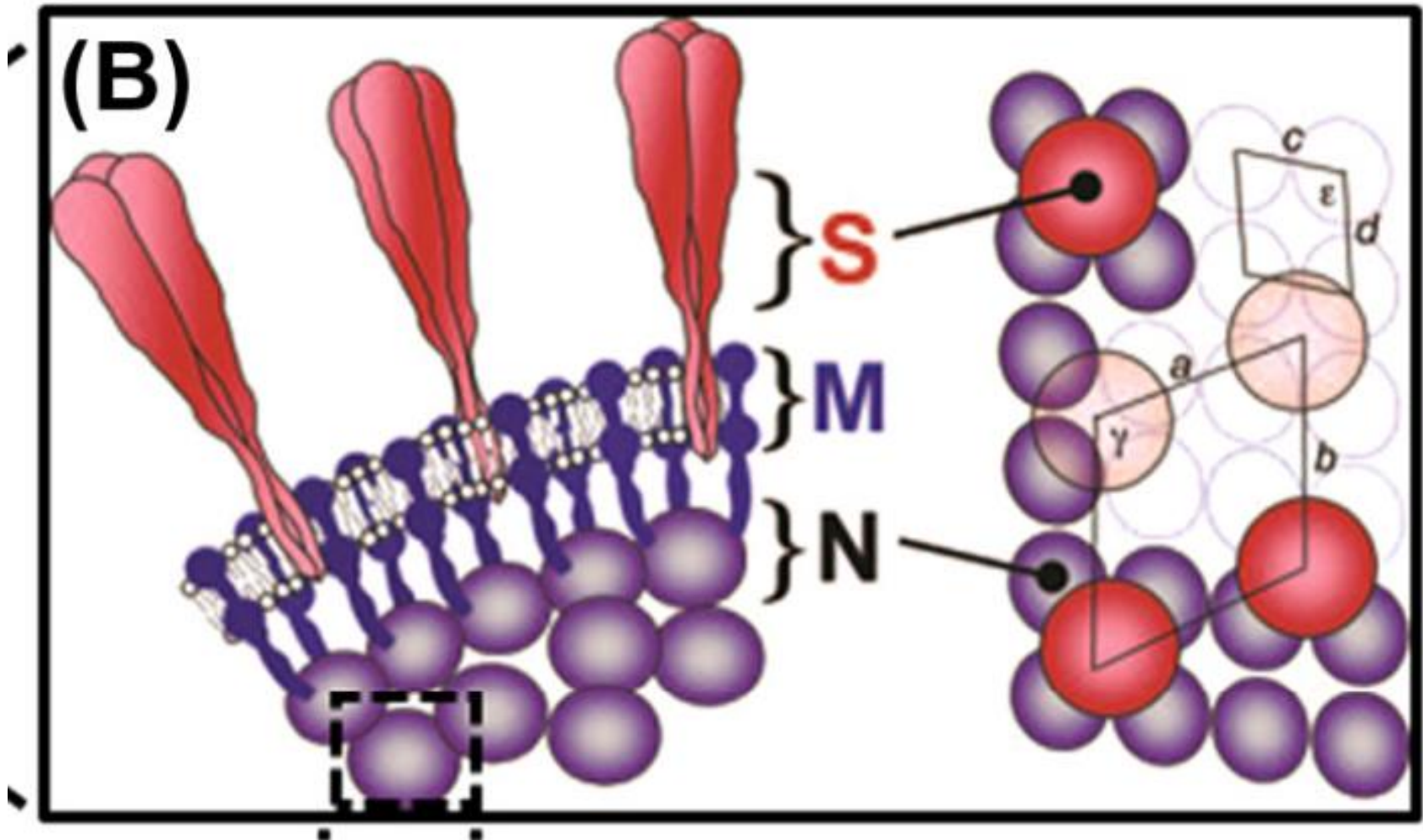


*Spikes here larger than nucleocapsid ?!  
Correct or/and time-dependent ?  
Annotation HD*



*? HD annotation*

# Spike – Nucleocapsid-Relationship

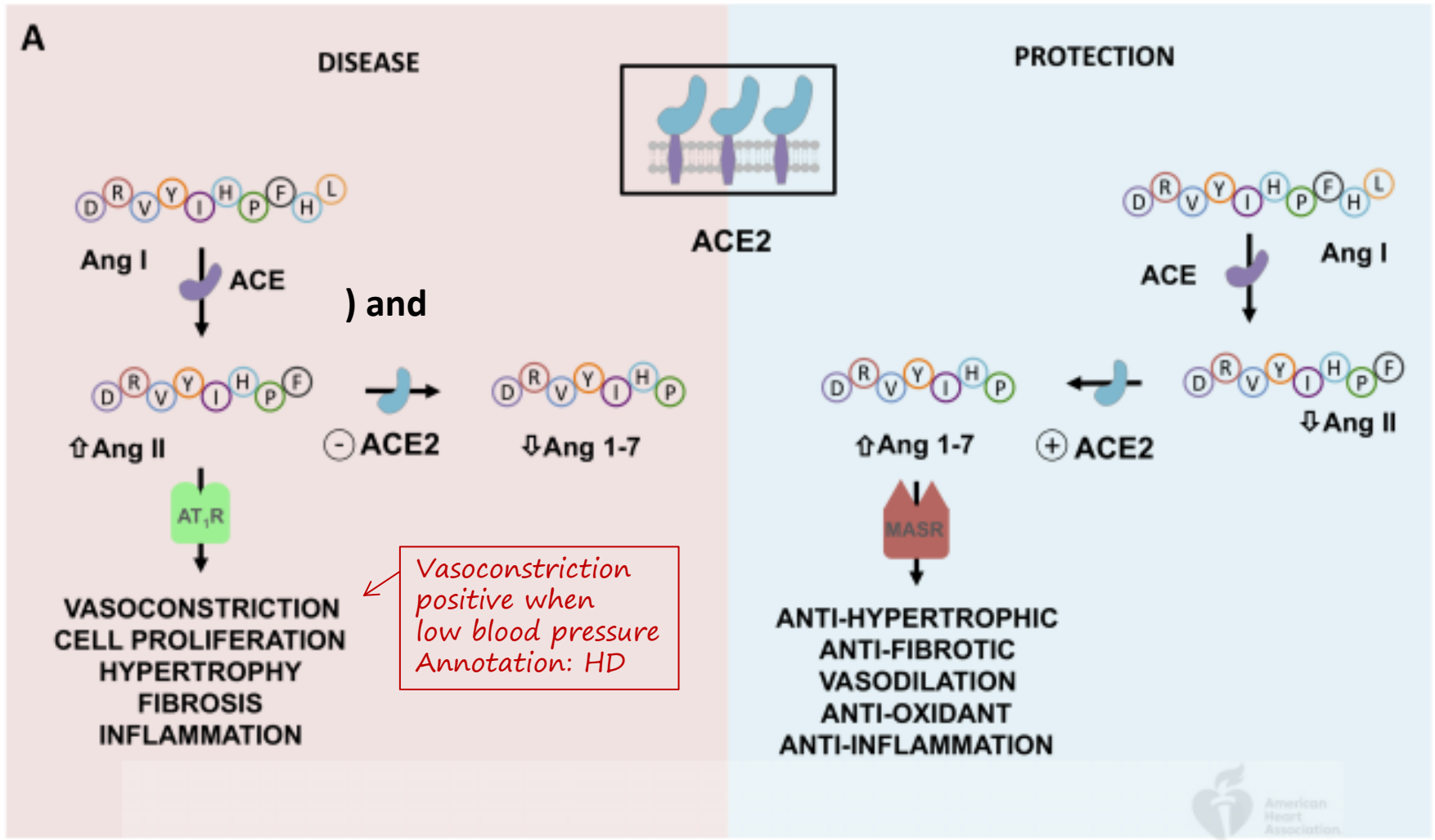


Chang, Hou, Chang, et al,  
Antiviral Research, 2014

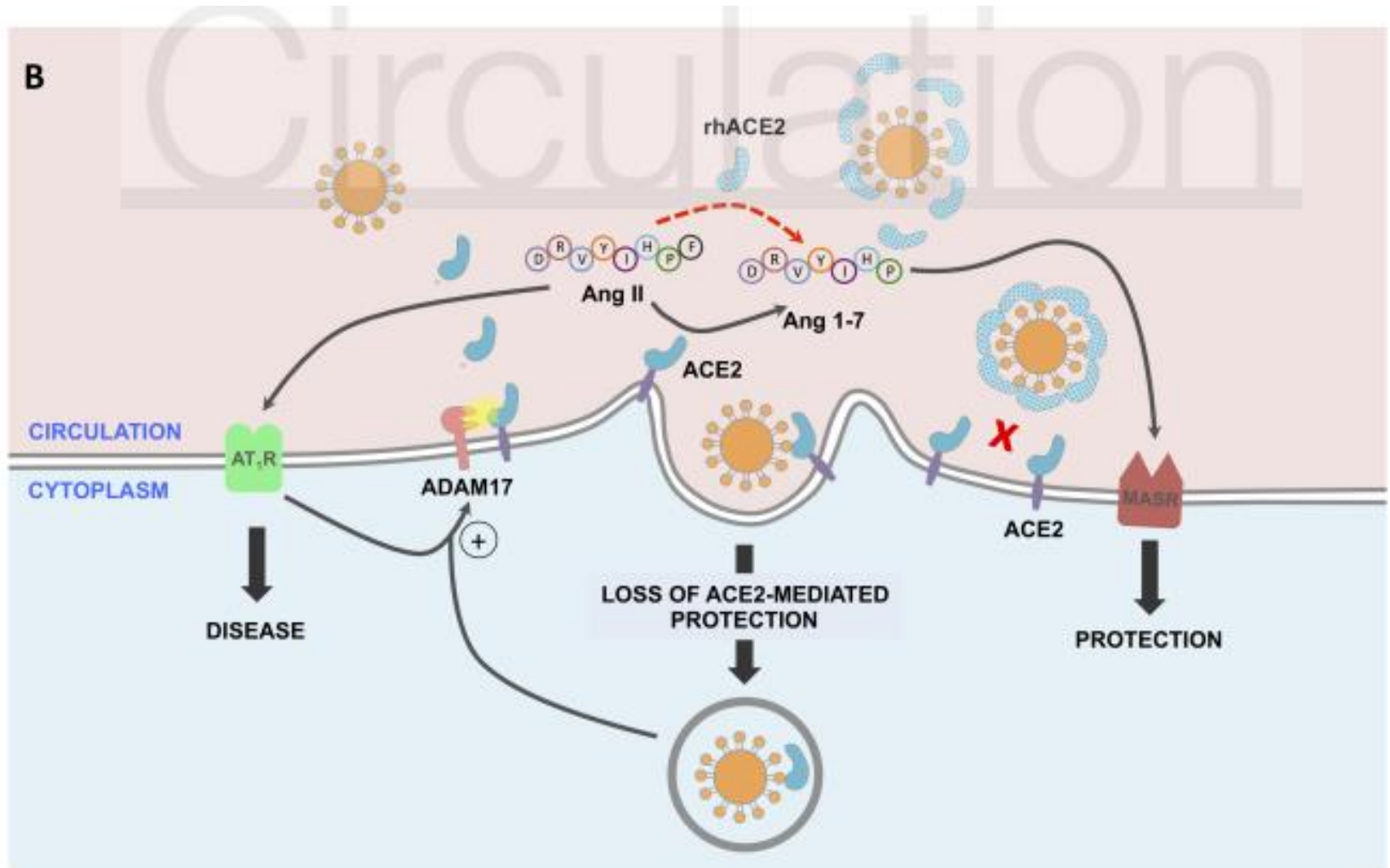
“spikes (S) are shaded in red...  
nucleoproteins (N) are shaded in violet...”

# **Cardiovascular Implications**

# Role of ACE2 in the Renin-Angiotensin System

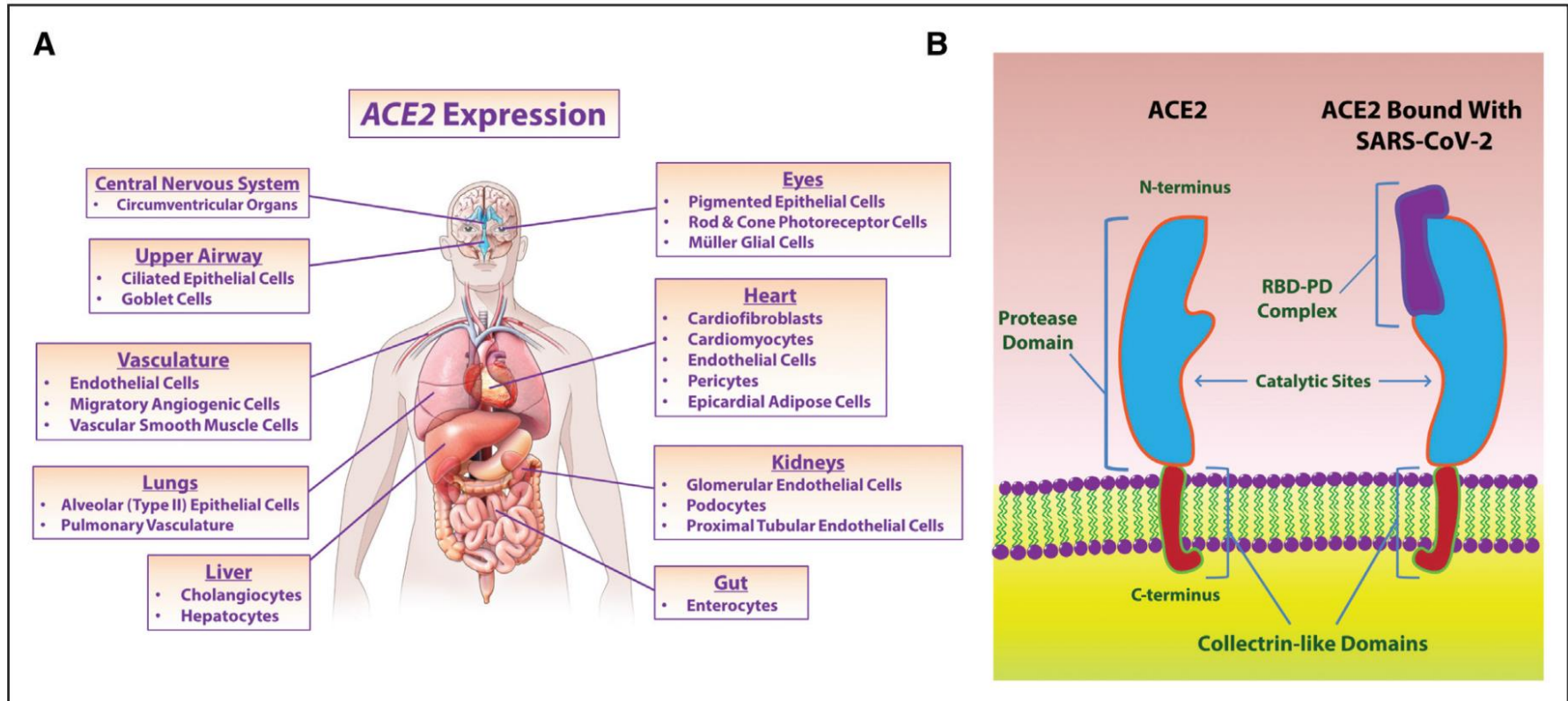


# Proposed mechanism for SARS-CoV-2-induced downregulation of cell surface ACE2 expression





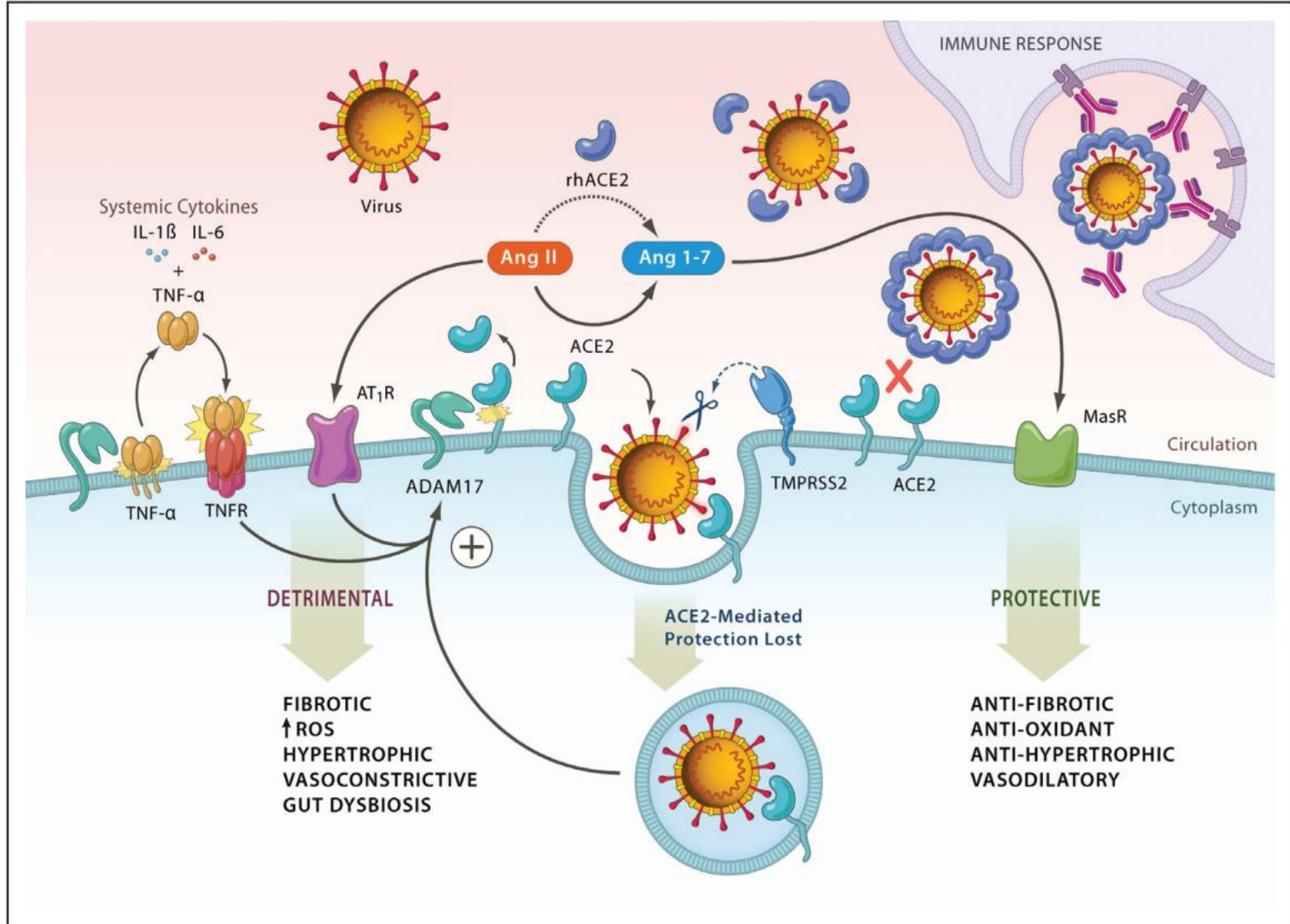
# ACE2: Sites of Expression and SARS Binding



Gheblawi, Wang, Viveiros, et al., Circulation Research, 2020



# Recombinant ACE2 and Immune System



Gheblawi, Wang, Viveiros, et al. 2020

# **Science and Information Policy**

# Information Policy Analysis

- ❖ Responsible scientists in multi-national teams (including ones from the People Republic of China and U.S. American Researchers) issued massive **warnings** already in 2013
- ❖ Some political leaders concentrate too much on blaming others

## LETTER

doi:10.1038/nature12711

### Isolation and characterization of a bat SARS-like coronavirus that uses the ACE2 receptor

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Finally, this study demonstrates the public health importance of pathogen discovery programs targeting wildlife that aim to identify the 'known unknowns'—previously unknown viral strains closely related to known pathogens. These programs, focused on specific high-risk wildlife groups and hotspots of disease emergence, may be a critical part of future global strategies to predict, prepare for, and prevent pandemic emergence<sup>28</sup>.

# Take Home Messages

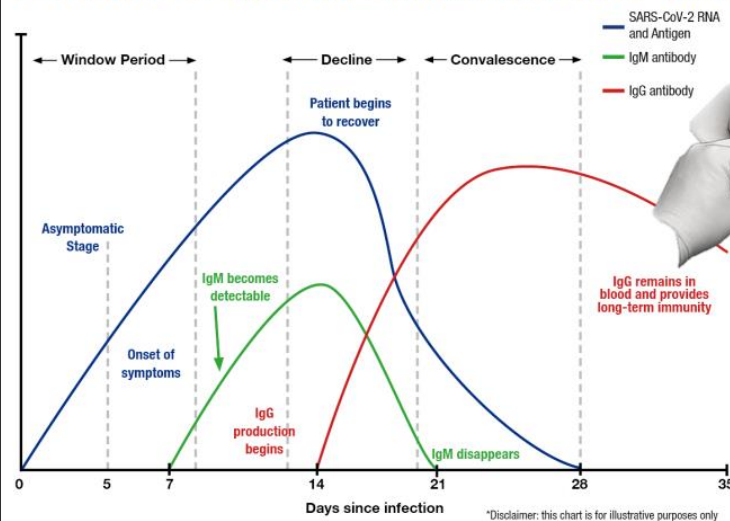
- Take over responsibility for „fact checking“!
- Organize und participate in „interlinked networks of action“
- Contribute to improve the escalation mechanism for „true risks“
- Be motivated to learn more about priority topics (knowledge for all)
- since all are endangered all should be able to contribute to solutions

# ANNEX MATERIAL



## Diagnostics Testing and Detection

### Presence of Viral RNA/ Antibodies over Time

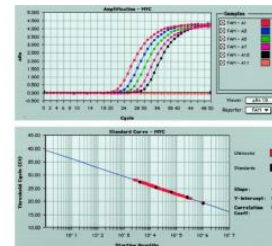


Viral RNA

Antibodies

qRT-PCR  
RT-PCR

ELISA  
RapidTest



**Kristen N. Peters Olson, Ph.D.**

Imaging Specialist and Field Applications Scientist

BioTek Instruments — A part of Agilent

May 13, 2020