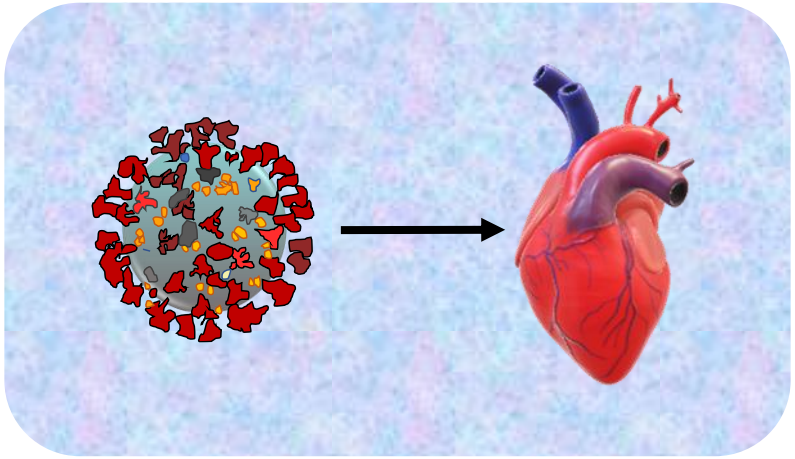
RUOLO POTENZIALE DELLA GALECTINA 3 COME PREDITTORE DI DANNO CARDIACO IN PAZIENTI AFFETTI DA COVID-19



Alessandro Cannavo, PhD

Prof. Associato, MED50

Dip. Di Scienze Mediche Traslazionali

Università degli Studi di Napoli Federico II

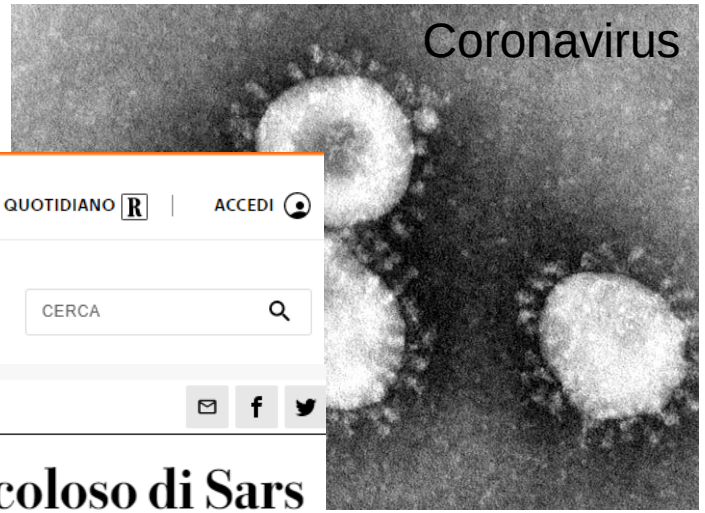
UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

I Coronavirus (CoVs), sono virus sferici a RNA.

I comuni portatori dei CoVs sono animali come uccelli, cammelli, bestiame, gatti e pipistrelli e raramente possono infettare l'uomo (zoonosi)

In passato abb
come la Sindro
Sindrome Resp

Da Dicembre 2
nuovo CoV ide
patologia deno



MENU | CERCA

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Salute

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R CONTENUTO PER GLI ABBONATI

Coronavirus, gli esperti: "Niente allarmismi, è meno pericoloso di Sars e Mers"

di VALERIA PINI

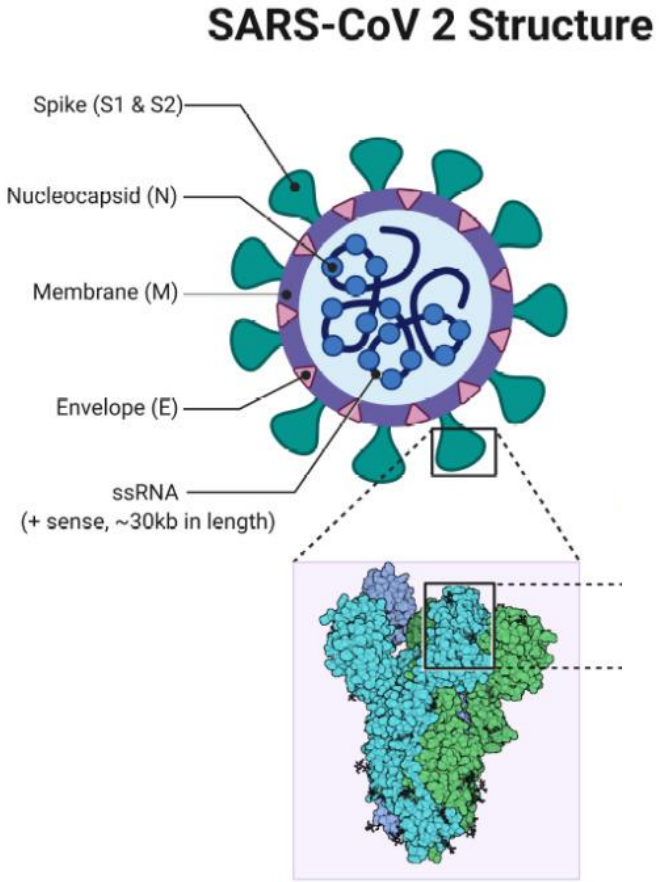
La Società Italiana di Terapia Antinfettiva tranquillizza: mortalità al 2%. Per la Sars il dato era del 10% e per Mers del 30%

-Acido nucleico: RNA a singolo filamento (ssRNA)

-Nucleocapside proteine organizzate in maniera precisa e molto ripetitiva intorno all'acido nucleico

-Involucro membranoso

-Glicoproteine (Spike Proteins)



University of BRISTOL

News and features

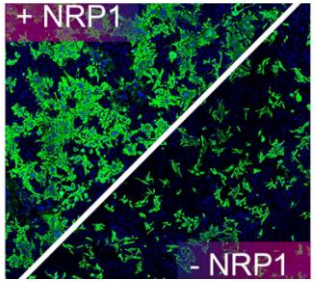
Current students Current sta

Neuropilin-1 drives SARS-CoV-2 infectivity, finds breakthrough study

Press release issued: 20 October 2020

In a major breakthrough an international team of scientists, led by the University of Bristol, has potentially identified what makes SARS-CoV-2 highly infectious and able to spread rapidly in human cells. The findings, published in Science today [20 October] describe how the virus's ability to infect human cells can be reduced by inhibitors that block a newly discovered interaction between virus and host, demonstrating a potential anti-viral treatment.

Unlike other coronavirus, which cause common colds and mild respiratory symptoms, SARS-CoV-2, the causative agent of COVID-19, is highly infective and transmissive. Until now, major questions have remained unanswered as to why SARS-CoV-2 readily infects organs outside of the respiratory system, such as the brain and heart.



Neuropilin-1 (NRP1) is a host factor for SARS-CoV-2 infection. The image shows human cells infected with SARS-CoV-2 and expressing viral proteins (shown in green). Removal of NRP1 from cells or treating cells with a drug or an antibody targeting NRP1 reduces SARS-CoV-2 infection
Image credit: University of Bristol

More news

Combining electronic and pl chips enables new record in quantum light detection
9 November 2020

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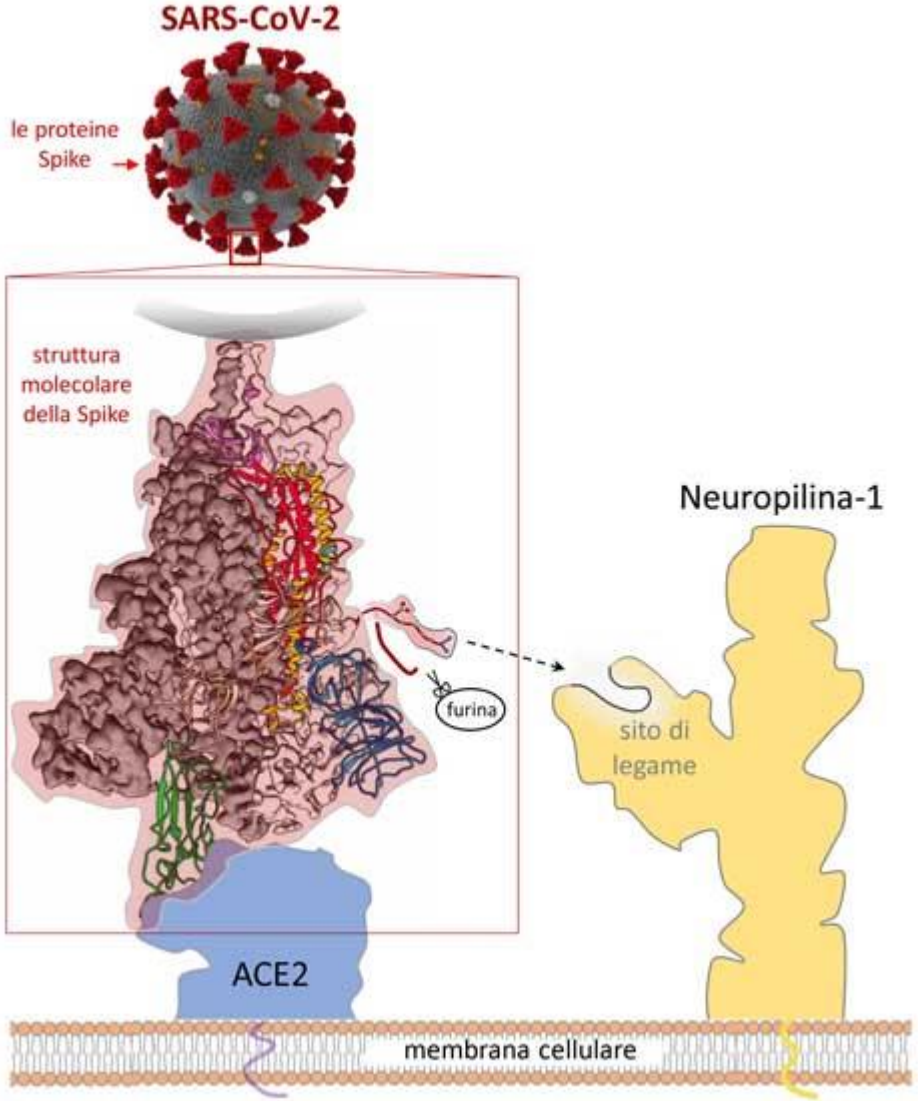

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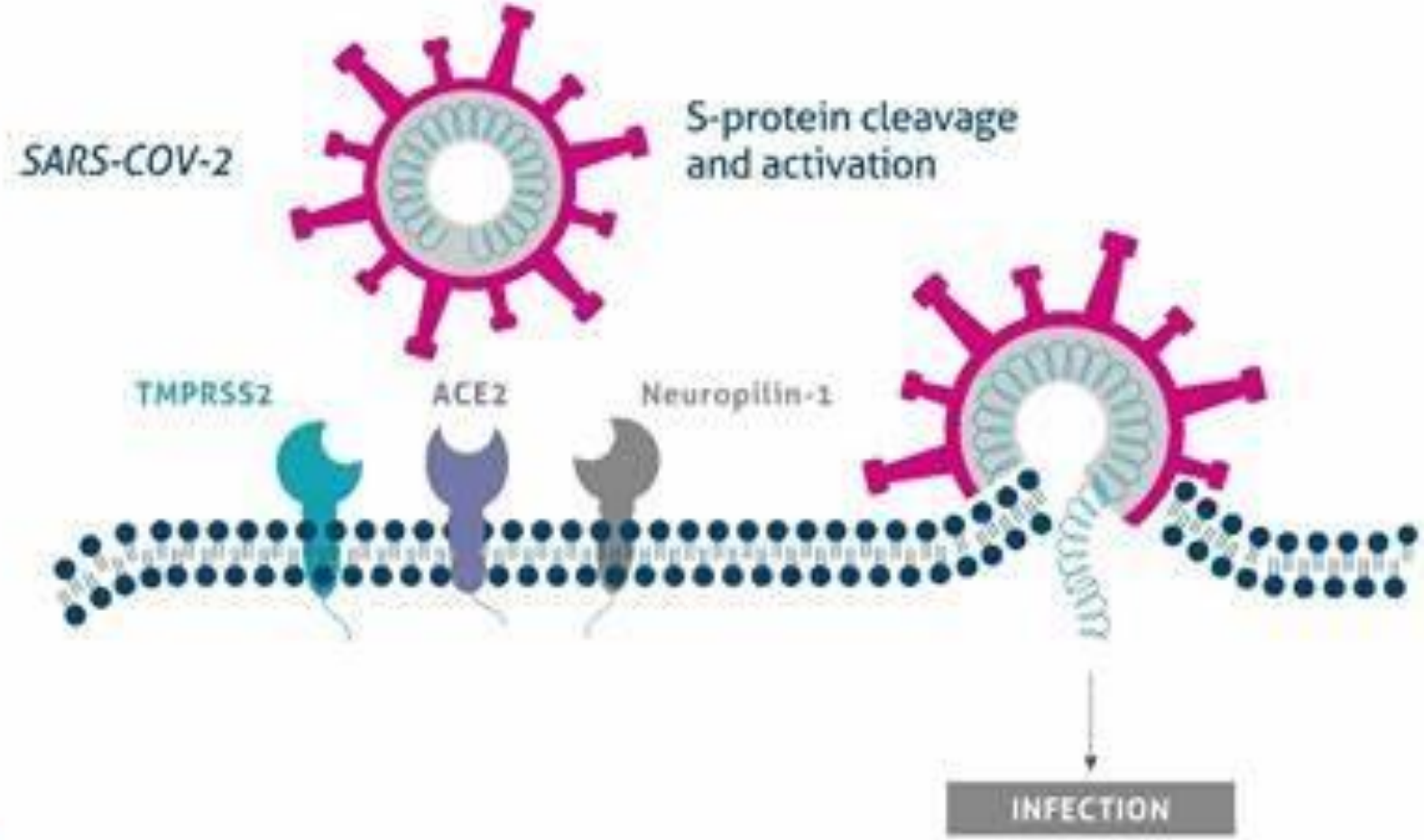

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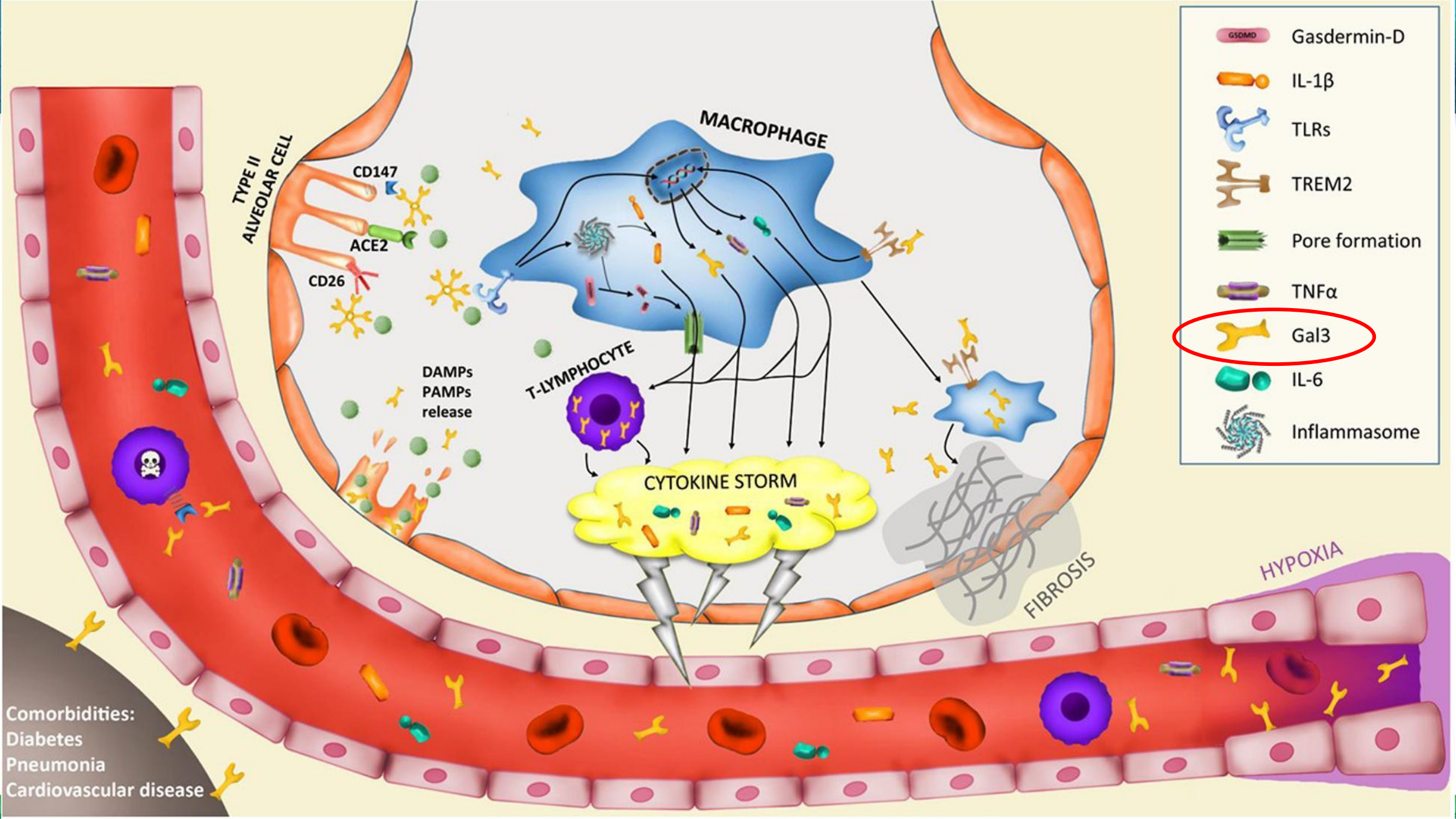
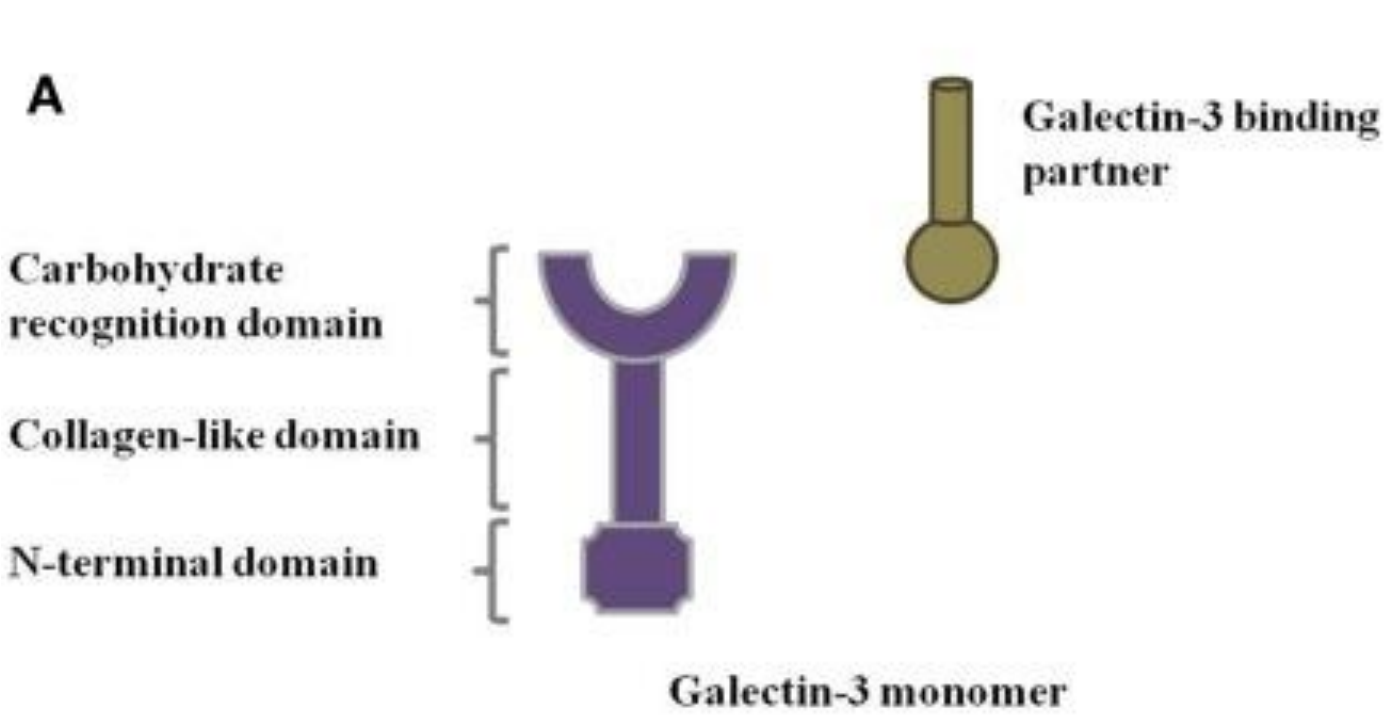
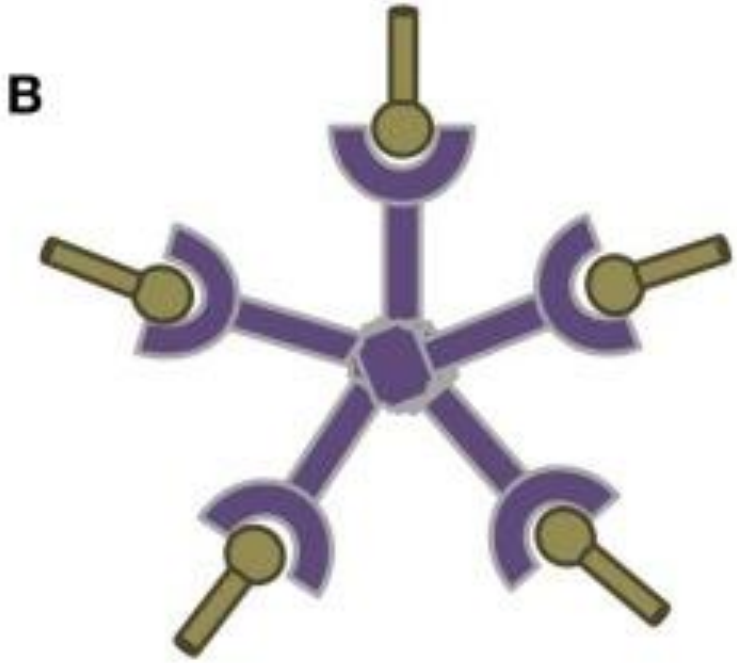

MACROPHAGE
TYPE II ALVEOLAR CELL
CD147
ACE2
CD26
DAMPs
PAMPs
release
T-LYMPHOCYTE
CYTOKINE STORM
FIBROSIS
HYPOXIA
Gasdermin-D
IL-1β
TLRs
TREM2
Pore formation
TNFα
Gal3
IL-6
Inflammasome
Comorbidities:
Diabetes
Pneumonia
Cardiovascular disease

Galectin-3





Galectin-3 pentamer with its carbohydrate binding partner

66° SIGG CONGRESSO NAZIONALE
ROMA, 1-4 DICEMBRE 2021
Geriatria e Rinascita
SOCIETÀ ITALIANA DI GERONTOLOGIA E GERIATRIA

International Journal of Biochemistry and Cell Biology 130 (2021) 105881

Contents lists available at ScienceDirect

International Journal of Biochemistry and Cell Biology

journal homepage: www.elsevier.com/locate/biocel

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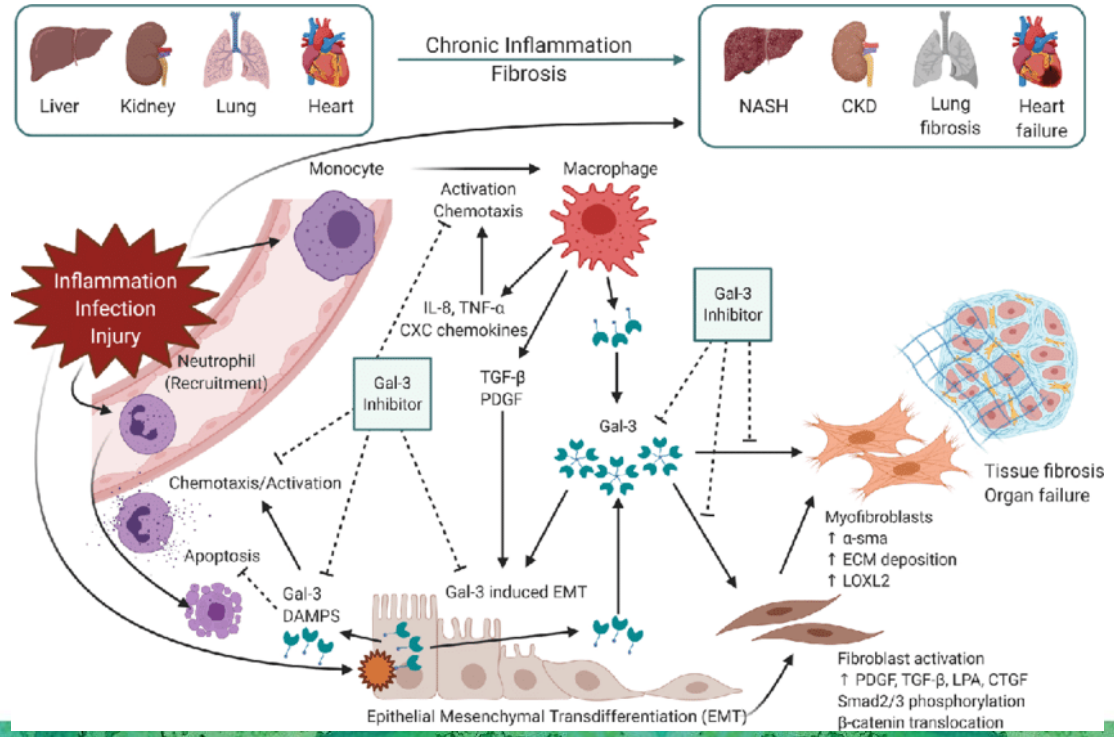
The therapeutic potential of galectin-3 inhibition in fibrotic disease

R.J. Slack [a,*], R. Mills [b], A.C. Mackinnon [a,b]



frontiers in Immunology
PERSPECTIVE
published: 18 August 2020
doi: 10.3389/fimmu.2020.02069

Hyperinflammation and Fibrosis in Severe COVID-19 Patients: Galectin-3, a Target Molecule to Consider

Juan Garcia-Revilla[1], Tomas Deierborg[2], Jose Luis Venero[1] and Antonio Boza-Serrano[1,3]**

[1] Departamento de Bioquímica y Biología Molecular, Facultad de Farmacia and Instituto de Biomedicina de Sevilla (IBiS), Hospital Universitario Virgen del Rocío/CSIC/Universidad de Sevilla, Seville, Spain, [2] Department of Experimental Medical Science, Experimental Neuroinflammation Laboratory, BMC, Lund University, Lund, Sweden, [3] Department of Experimental Medical Sciences, Experimental Dementia Research Laboratory, BMC, Lund University, Lund, Sweden

Jpn. J. Infect. Dis., 74, 530-536, 2021

Original Article

Assessment of Galectin-1, Galectin-3, and Prostaglandin E2 Levels in Patients with COVID-19

Sumeyye Kazancioglu[1]*, Fatma Meric Yilmaz[2,3], Aliye Bastug[4], Bahadir Orkun Ozbay[1], Omer Aydos[1], Çiğdem Yücel[5], Hurrem Bodur[4], and Gulsen Yilmaz[2,3]

Circulatio
Volume 136, Issue
https://doi.org/10.

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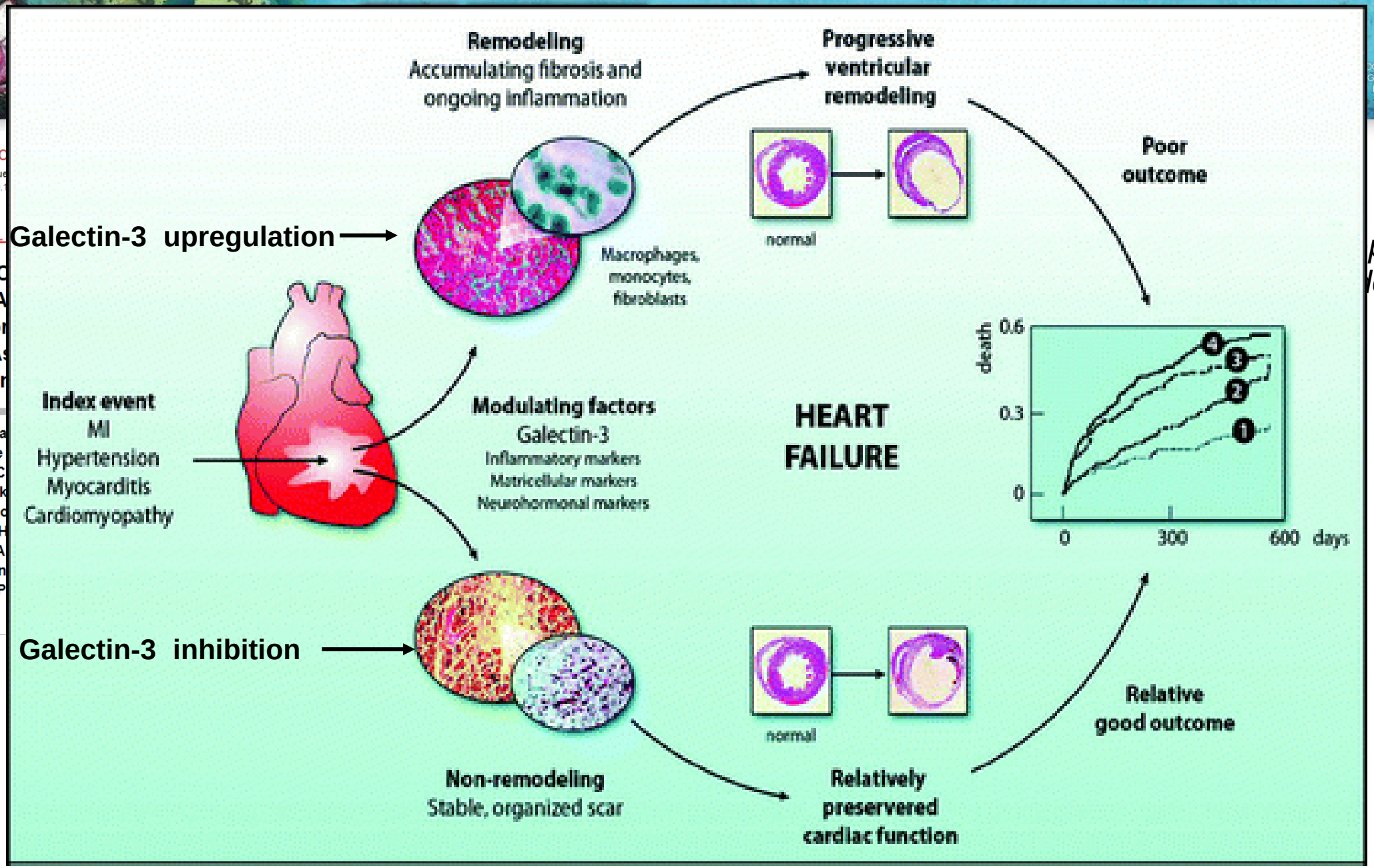
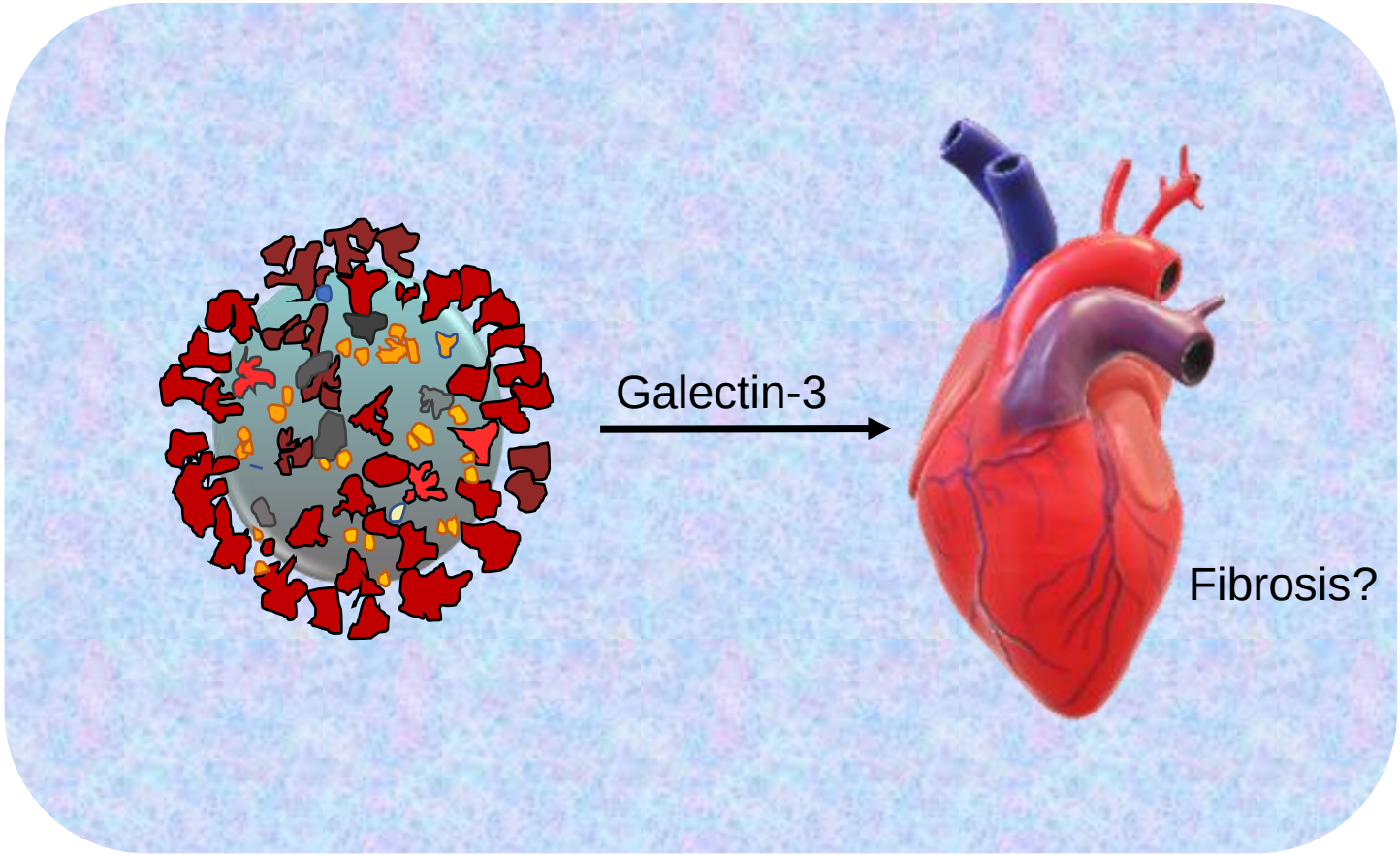
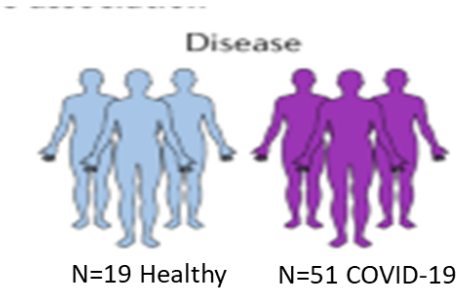
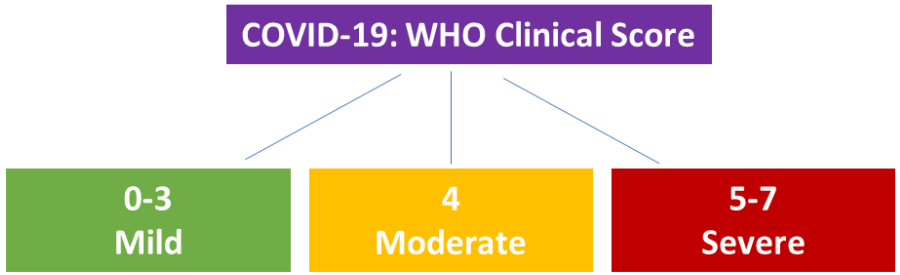


Aim of the study



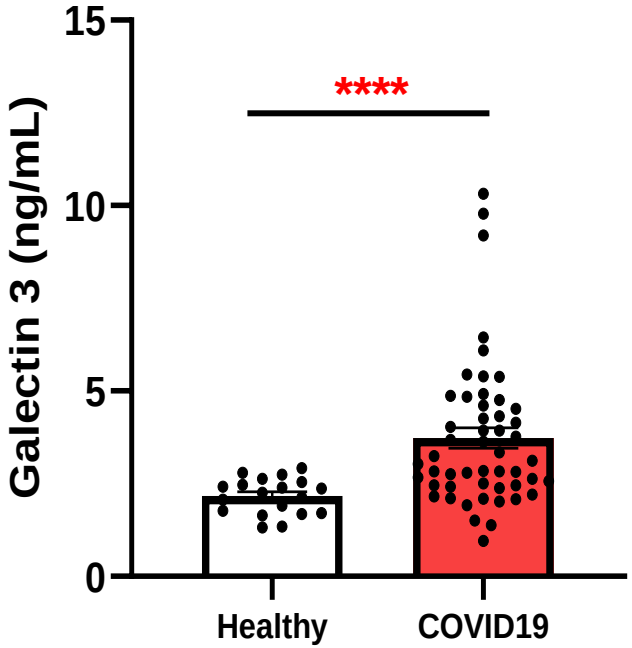
Demographic characteristics of COVID-19 patients

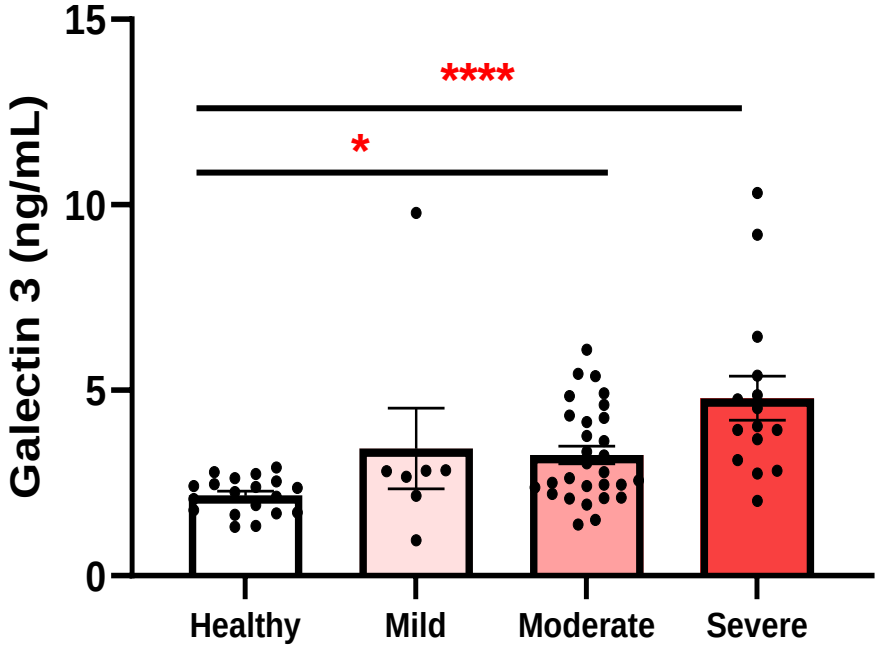




	All patients (n=51)	*Mild (n=7)*	*Moderate (n=29)*	*Severe (n=15)*	*p value*
Age	60.65 ± 12.99	55.14±15.06	60.00 ±12.12	64.46±12.38	0.281
Sex. Male. n (%)	41 (82%)	4 (57.14%)	25 (86.2%)	12 (80%)	0.237
BMI	27.77 ±4.02	26.82±1.93	27.59 ± 4.32	28.53 ±4.17	0.761
CAD	5 (9.80%)	1 (14.29%)	2 (6.90%)	2 (3.47%)	0.748
Diabetes	8 (15.68%)	1 (14.29%)	3 (10.34%)	4 (26.67%)	0.393
Hypertension	24 (46.30 %)	2 (28.57%)	13 (44.83%)	8(53.33%)	0.377
Smoking	7 (13.72%)	1 (14.29%)	5 (17.24%)	1 (6.67%)	0.577
Dyslipidemia	16 (31.37 %)	0 (0%)	11 (37.93%)	5 (33.33%)	0.136
COPD	11 (21.57%)	1 (14.29%)	5 (17.24%)	5 (33.33%)	0.439
CKD	5 (9.80%)	0 (0%)	2 (6.90%)	3 (20%)	0.259
AF	3 (5.88%)	0 (0%)	3 (10.34%)	0 (0%)	0.285
IHD	13 (25,48 %)	1 (14.29%)	6 20,68%)	6 (40%)	0.312
HF	0 (0%)	0 (0%)	0 (0%)	0 (0%)	N/A

Cannavo et al. Manuscript under Review





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ELMER PRESS
Original Article
Cardiol Res. 2020;11(6):398-404

Cardiac Troponin-I and COVID-19: A Prognostic Tool for In-Hospital Mortality

Baher AL Abbasi[a, d], Pedro Torres[a], Fergie Ramos-Tuarez[b], Nakeya Dewaswala[a], Ahmed Abdallah[a], Kai Chen[a], Mohamed Abdul Qader[a], Riya Job[a], Samar Aboulenain[a], Karolina Dziadkowiec[a], Huzefa Bhopalwala[c], Jesus E. Pino[b], Robert D. Chait[b]

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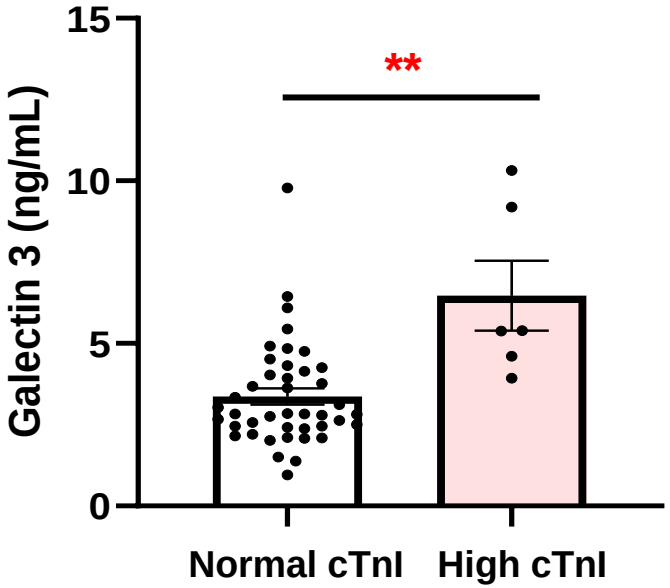
Contents lists available at ScienceDirect
Clinical Biochemistry
journal homepage: www.elsevier.com/locate/clinbiochem

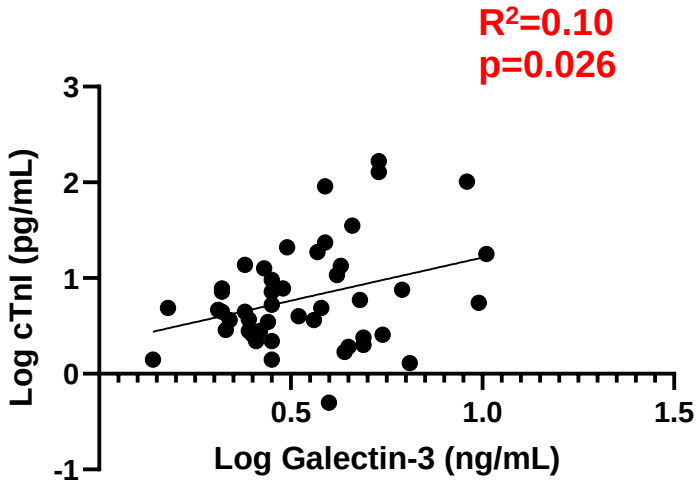
Using high sensitivity cardiac troponin values in patients with SARS-CoV-2 infection (COVID-19): The Padova experience

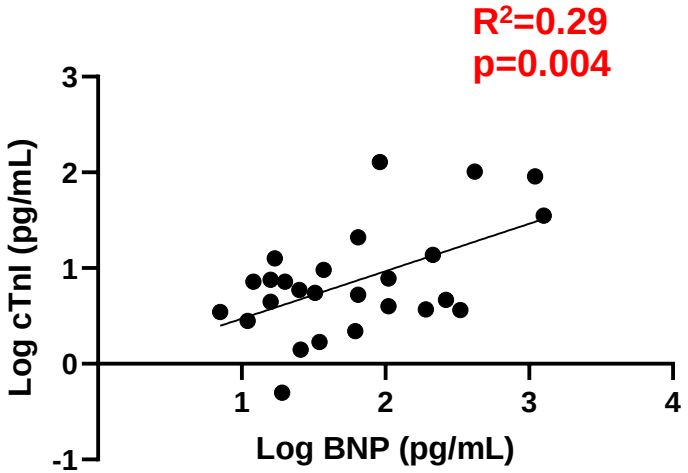
Laura De Michieli [a,b,1], Luciano Babuin [b,1], Stefania Vigolo [c], Giulia Berti De Marinis [c], Alessandro Lunardon [c], Francesco Favretto [c], Ronstan Lobo [a], Yader Sandoval [a], Sandra C. Bryant [d], Daniele Donato [e], Mario Plebani [f,g], Roberto Vettor [g], Sabino Iliceto [b], Vito Cianci [c], Allan S. Jaffe [a,h,*]

[a] Department of Cardiovascular Diseases, Mayo Clinic, Rochester, MN, USA
[b] Department of Cardiac, Thoracic and Vascular Sciences, University of Padova, Padova, Italy
[c] Emergency Department, Padua University Hospital, Padua, Italy
[d] Division of Biomedical Statistics and Informatics, Department of Health Sciences Research, Mayo Clinic College of Medicine Rochester, MN, USA
[e] Department of Directional Hospital Management, Azienda Ospedale Università Padova , Padua, Italy
[f] Department of Laboratory Medicine, University Hospital of Padova, Padova, Italy
[g] Department of Medicine-DIMED, Medical School, University of Padova, Padova, Italy
[h] Department of Laboratory Medicine and Pathology, Mayo Clinic, Rochester, MN, USA

"hs-cTnI is a simple way of anticipating an adverse clinical course or predicting a good one"







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Cardiac biomarkers in COVID-19 patients

	All patients (n=51)	*Mild (n=7)*	*Moderate (n=29)*	*Severe (n=15)*	*p value*
ALT	39.84 ± 50.22	67 ± 119.6	32.75 ± 22.56	42.66 ± 49.53	0.702
AST	35.28 ± 30.37	55.5 ± 79.38	33.65 ± 18.56	30.33 ± 12.14	0.609
LDH	282.62 ± 74.34	261 ± 76.55	269.34 ± 70.75	316.93 ± 76.21	0.129
cTnI	16.79 ± 33.7	7.18 ± 3.43	12.01 ± 31.28	30.12 ± 43.16	0.330
CK-MB	1.08 ± 1.26	0.41 ± 0.21	1.04 ± 1.02	1.43 ± 1.81	0.078

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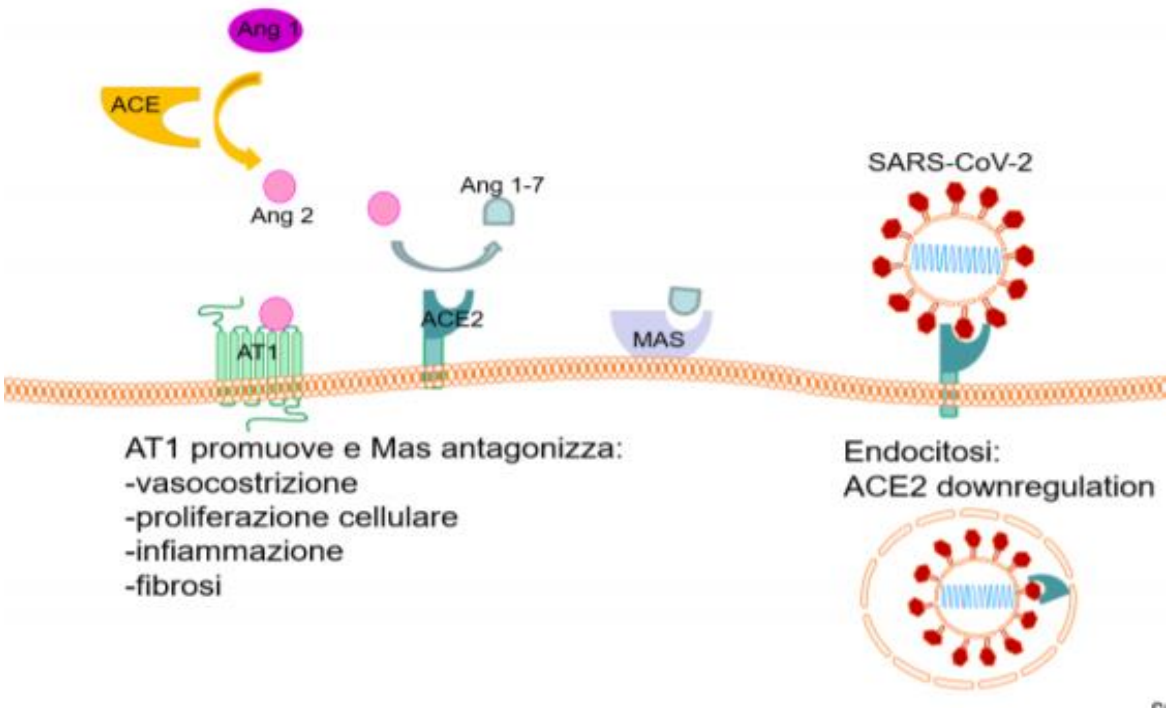
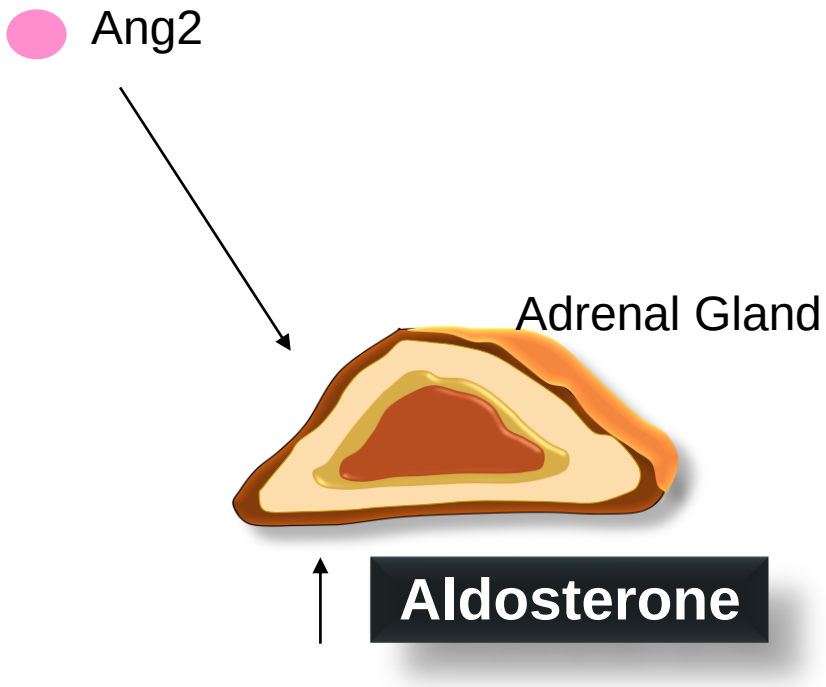

Ang 1
ACE
Ang 2
Ang 1-7
ACE2
AT1
MAS
SARS-CoV-2
AT1 promuove e Mas antagonizza:
-vasocostrizione
-proliferazione cellulare
-infiammazione
-fibrosi
Endocitosi:
ACE2 downregulation


Ang2
Adrenal Gland
Aldosterone

nature COMMUNICATIONS

ARTICLE

Received 13 Jun 2015 | Accepted 28 Jan 2016 | Published 2 Mar 2016 DOI: 10.1038/ncomms10877 OPEN

Myocardial pathology induced by aldosterone is dependent on non-canonical activities of G protein-coupled receptor kinases

Alessandro Cannavo[1], Daniela Liccardo[1], Akito Eguchi[1], Katherine J. Elliott[2], Christopher J. Traynham[1], Jessica Ibetti[1], Satoru Eguchi[2], Dario Leosco[3], Nicola Ferrara[3,4], Giuseppe Rengo[3,4] & Walter J. Koch[1]

Hindawi
Oxidative Medicine and Cellular Longevity
Volume 2018, Article ID 1204598, 10 pages
https://doi.org/10.1155/2018/1204598

frontiers in Pharmacology

ORIGINAL RESEARCH
published: 09 August 2019
doi: 10.3389/fphar.2019.00888

Aldosterone Jeopardizes Myocardial Insulin and β-Adrenergic Receptor Signaling *via* G Protein-Coupled Receptor Kinase 2

Alessandro Cannavo[1,2†], Federica Marzano[3†], Andrea Elia[1], Daniela Liccardo[1], Leonardo Bencivenga[1], Giuseppina Gambino[1], Claudia Perna[1], Antonio Rapacciuolo[3], Antonio Cittadini[1], Nicola Ferrara[1,4], Nazareno Paolocci[5,6], Walter J. Koch[2] and Giuseppe Rengo[1,4]*

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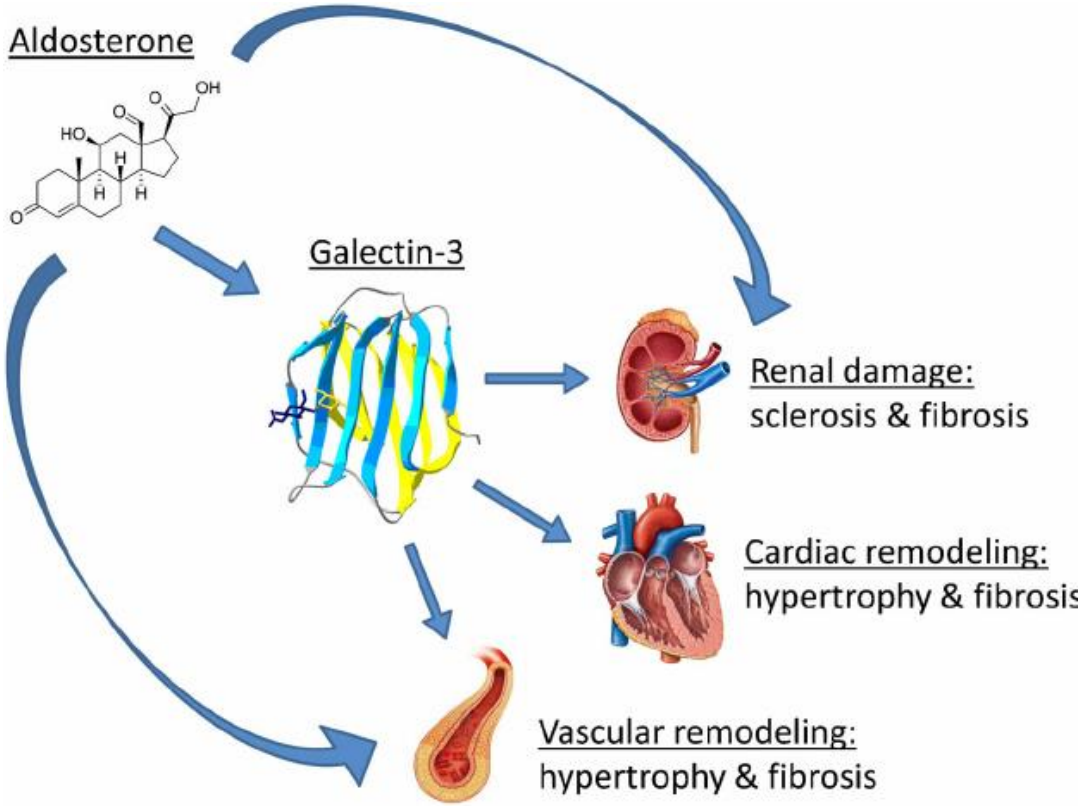
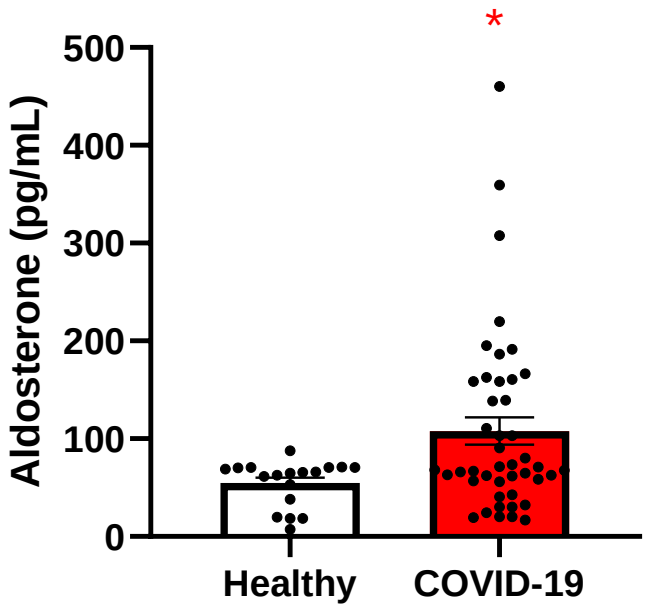
Review Article

Aldosterone and Mineralocorticoid Receptor System in Cardiovascular Physiology and Pathophysiology

Alessandro Cannavo,[1,2] Leonardo Bencivenga,[2] Daniela Liccardo,[2] Andrea Elia,[2] Federica Marzano,[2] Giuseppina Gambino,[3] Maria Loreta D'Amico,[3] Claudia Perna,[2] Nicola Ferrara,[2,3] Giuseppe Rengo,[2,3] and Nazareno Paolocci[4]





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Liaudet and Szabo *Critical Care* (2020) 24:318
https://doi.org/10.1186/s13054-020-03055-6

Critical Care

LETTER Open Access

Blocking mineralocorticoid receptor with spironolactone may have a wide range of therapeutic actions in severe COVID-19 disease

Lucas Liaudet[1*] and Csaba Szabo[2]

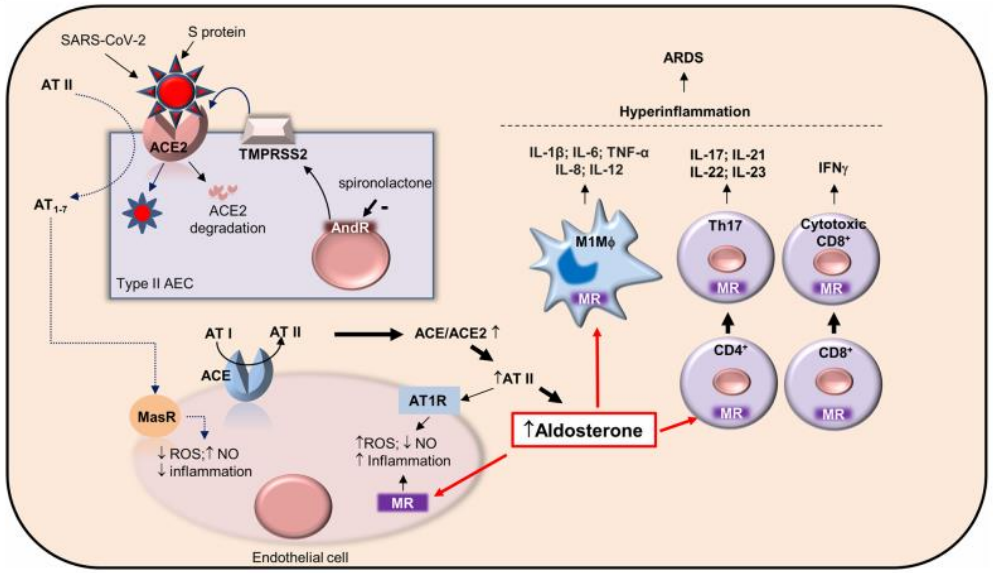


Fig. 1 Sites of potential pharmacological actions of spironolactone in COVID-19 ARDS. SARS-CoV-2 infects type II alveolar epithelial cells (type II AEC) via interaction between its spike S protein and ACE2 receptor, promoting internalization and degradation of ACE2 and pulmonary ACE/ACE2 imbalance. In turn, the degradation of angiotensin II (AT II) into angiotensin 1–7 (AT_{1-7}) is prevented (dotted lines), reducing anti-inflammatory signaling through the Mas receptor (MasR), and promoting pro-inflammatory AT II signaling through the angiotensin receptor type I (AT1R) in vascular endothelial cells. Increased AT II results in aldosterone formation, which signals through the mineralocorticoid receptor (MR), leading to vascular inflammation and immune cells activation. MR activation polarizes macrophages towards the M1 pro-inflammatory phenotype (M1Mϕ), favors $CD4^+$ lymphocytes differentiation towards pro-inflammatory Th17 cells, and induces cytotoxic $IFNγ^+$-$CD8^+$ lymphocytes. The development of a hyper-inflammatory state may trigger ARDS. MR inhibition with spironolactone may interrupt the deleterious actions of aldosterone. Furthermore, via its anti-androgenic effects, spironolactone may decrease the expression of TMPRSS2, a serine protease priming the S protein for its interaction with ACE2. Abbreviations: ACE, angiotensin-converting enzyme; AndR, androgen receptor; AT I, angiotensin I; AT II, angiotensin II; AT_{1-7}, angiotensin 1–7; AT1R, angiotensin receptor type I; MR, mineralocorticoid receptor; MasR, Mas receptor; NO, nitric oxide; ROS, reactive oxygen species; TMPRSS2, transmembrane serine protease 2

Spironolactone and Dexamethasone in Patients Hospitalized With COVID-19 (SPIDEX-II)

ClinicalTrials.gov Identifier: NCT04826822

The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been evaluated by the U.S. Federal Government. Know the risks and potential benefits of clinical studies and talk to your health care provider before participating. Read our disclaimer for details.

Recruitment Status : Recruiting
First Posted : April 1, 2021
Last Update Posted : April 1, 2021

See **Contacts and Locations**

Sponsor:

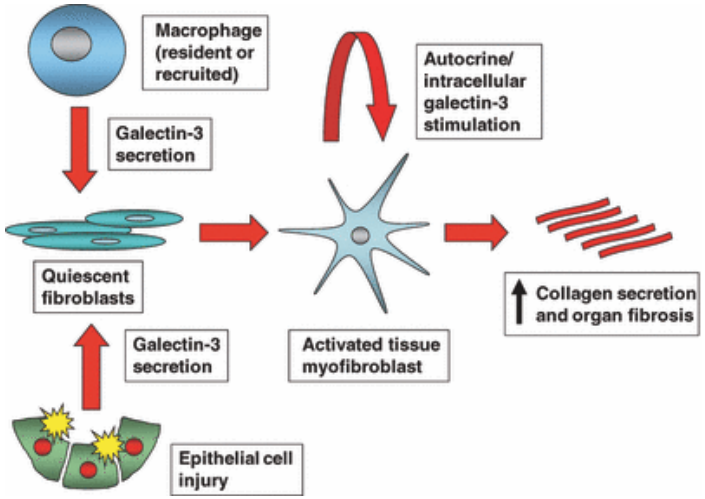
Study Description

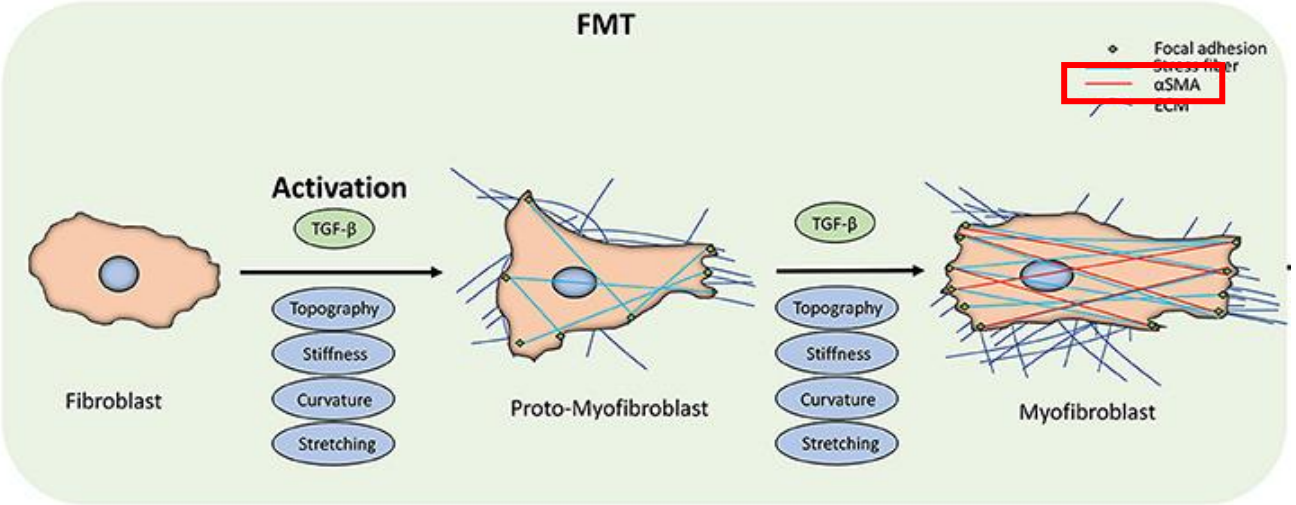
Go to

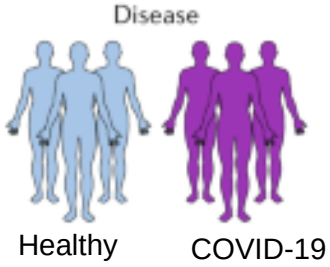
Brief Summary:

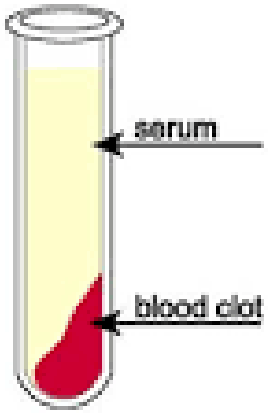
The Severe Acute Respiratory Syndrome CoronaVirus 2 (SARS-CoV-2) is a rapidly spreading infection of the respiratory tract. Most infected patients have either asymptomatic disease or mild symptoms. However, a proportion of patients, especially elderly men or patients with comorbidities, are at risk of developing acute respiratory distress syndrome (ARDS). ARDS, alongside clotting abnormalities, is known to be a major contributor to SARS-CoV-2-related mortality and admission to intensive care units, with evidenced effective preventative treatment options lacking. In this study, the investigators test a novel hypothesis that the use of a combination of spironolactone and dexamethasone at low doses will improve the clinical progression of the infection evaluated by the 6-point ordinal scale in patients with moderate and severe disease by blocking exocytosis of the Weibel-Palade bodies from endothelial cells.

Condition or disease	Intervention/treatment	Phase
Coronavirus Infection Pneumonia, Viral	Drug: Spironolactone + Dexamethasone Drug: Standard-of-care SARS-CoV-2 treatment	Phase 3

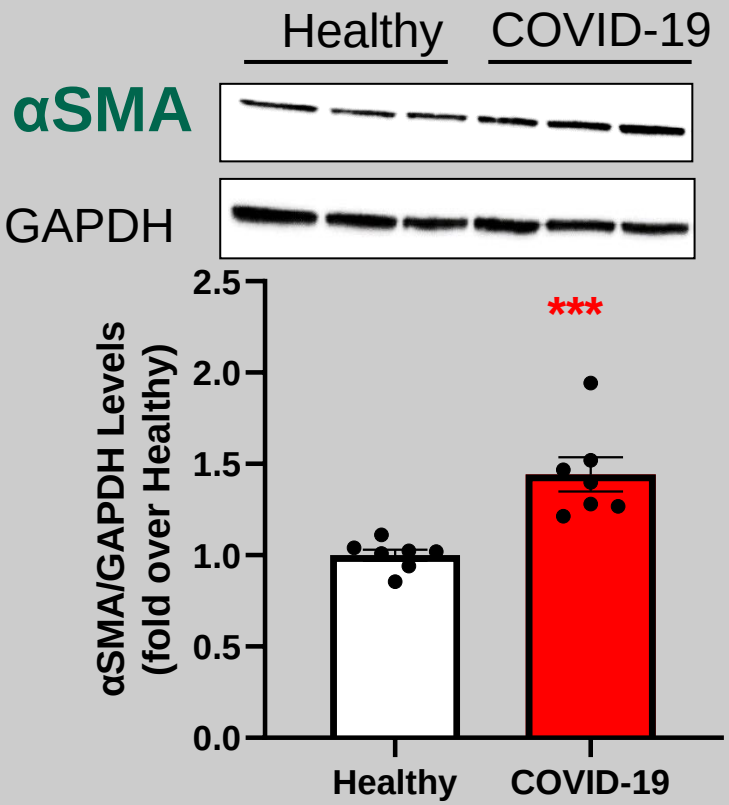

Macrophage (resident or recruited)
Galectin-3 secretion
Autocrine/ intracellular galectin-3 stimulation
Quiescent fibroblasts
Activated tissue myofibroblast
Collagen secretion and organ fibrosis
Galectin-3 secretion
Epithelial cell injury

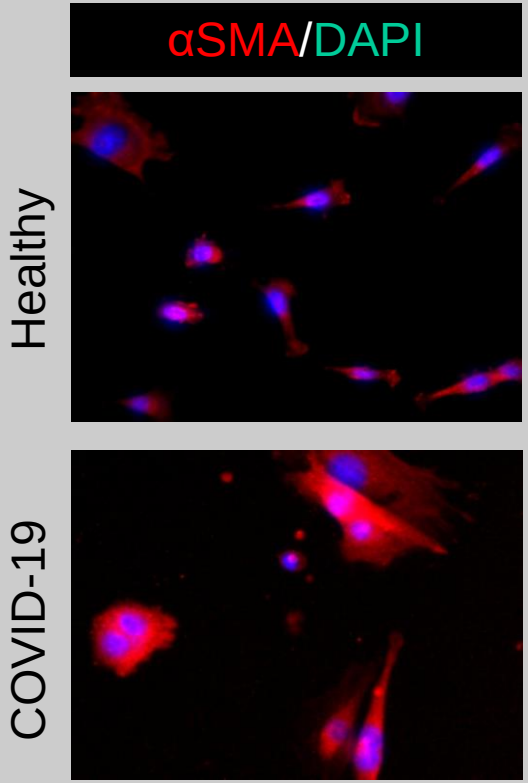

FMT
Focal adhesion
αSMA
Activation
TGF-β
Topography
Stiffness
Curvature
Stretching
Fibroblast
Proto-Myofibroblast
TGF-β
Topography
Stiffness
Curvature
Stretching
Myofibroblast



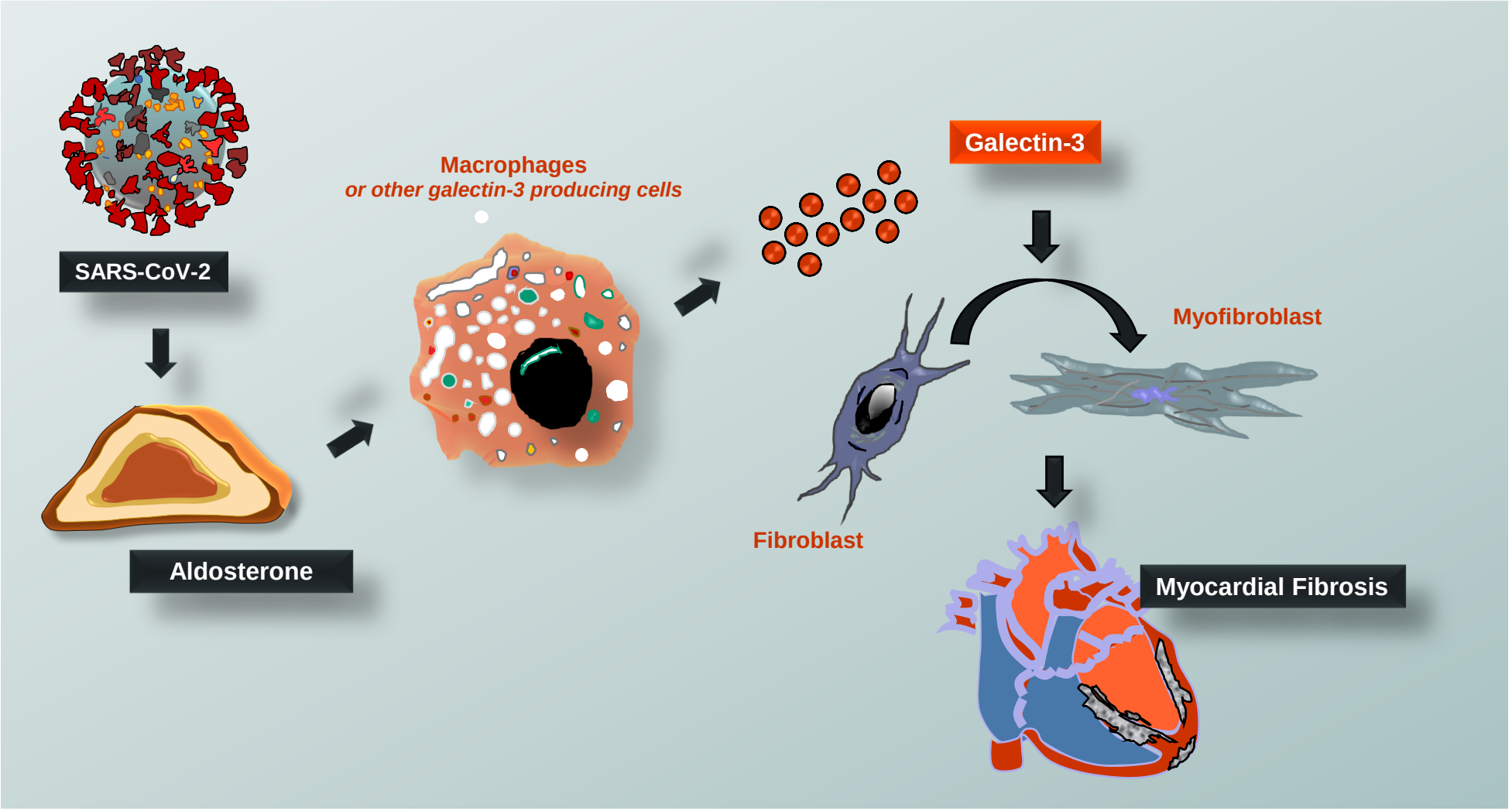


3T3 Fibroblasts





Cannavo et al. Manuscript under Review


SARS-CoV-2
Aldosterone
Macrophages
or other galectin-3 producing cells
Galectin-3
Fibroblast
Myofibroblast
Myocardial Fibrosis

Future Studies:

- To evaluate the impact of Galectin-3 on cardiac Inflammation and myocarditis
- To study the effects of Galectin-3 inhibition *in Vitro*

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ceinge BIOTECNOLOGIE AVANZATE

Grazie per l'attenzione!

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