Verlust von Geruchs-und Geschmacksin - ein typisches Covid19 Symptom? Forschungsergebnisse und Ausblick

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Universitätsspital Basel

Hintergrund

Dez. 2019:
Erste Fälle von Patienten mit Pneumonien unbekannten Ursprungs, ähnlich viralen Pneumonien

$^{2}/_{3}$ dieser waren auf demselben Fischmarkt gewesen

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Hintergrund

«novel betacoronav

	All patients (n=41)	ICU care (n=13)	No ICU care (n=28)	p value
Characteristics				
Age, years	49·0 (41·0–58·0)	49·0 (41·0–61·0)	49·0 (41·0–57·5)	0·60
Sex	..	..	..	0·24
Men	30 (73%)	11 (85%)	19 (68%)	..
Women	11 (27%)	2 (15%)	9 (32%)	..
Huanan seafood market exposure	27 (66%)	9 (69%)	18 (64%)	0·75
Current smoking	3 (7%)	0	3 (11%)	0·31
Any comorbidity	13 (32%)	5 (38%)	8 (29%)	0·53
Diabetes	8 (20%)	1 (8%)	7 (25%)	0·16
Hypertension	6 (15%)	2 (15%)	4 (14%)	0·93
Cardiovascular disease	6 (15%)	3 (23%)	3 (11%)	0·32
Chronic obstructive pulmonary disease	1 (2%)	1 (8%)	0	0·14
Malignancy	1 (2%)	0	1 (4%)	0·49
Chronic liver disease	1 (2%)	0	1 (4%)	0·68
Signs and symptoms				
Fever	40 (98%)	13 (100%)	27 (96%)	0·68
Highest temperature, °C	..	..	..	0·037
<37·3	1 (2%)	0	1 (4%)	..
37·3–38·0	8 (20%)	3 (23%)	5 (18%)	..
38·1–39·0	18 (44%)	7 (54%)	11 (39%)	..
>39·0	14 (34%)	3 (23%)	11 (39%)	..
Cough	31 (76%)	11 (85%)	20 (71%)	0·35
Myalgia or fatigue	18 (44%)	7 (54%)	11 (39%)	0·38
Sputum production	11/39 (28%)	5 (38%)	6/26 (23%)	0·32
Headache	3/38 (8%)	0	3/25 (12%)	0·10
Haemoptysis	2/39 (5%)	1 (8%)	1/26 (4%)	0·46
Diarrhoea	1/38 (3%)	0	1/25 (4%)	0·66
Dyspnoea	22/40 (55%)	12 (92%)	10/27 (37%)	0·0010
Days from illness onset to dyspnoea	8·0 (5·0–13·0)	8·0 (6·0–17·0)	6·5 (2·0–10·0)	0·22
Days from first admission to transfer	5·0 (1·0–8·0)	8·0 (5·0–14·0)	1·0 (1·0–6·5)	0·0023
Systolic pressure, mm Hg	125·0 (119·0–135·0)	145·0 (123·0–167·0)	122·0 (118·5–129·5)	0·018
Respiratory rate >24 breaths per min	12 (29%)	8 (62%)	4 (14%)	0·0023

Clinical features of ... coronavirus in Wu...

Chaolin Huang, Yeming Wang*, Xingwang ... ,*
Zhenshun Cheng, Ting Yu, Jiaan Xia, Yuan W ... ngang Xie,
Guangfa Wang, Rongmeng Jiang, Zhanchen...

Summary

Background A recent cluster of p... ronavirus, the 2019 novel coronavirus (2019-nCoV ... characteristics and treatment and clinical outcom...

Methods All patients with suspect... prospectively

Lancet 2020; 395: 497–506
Published Online
January 24, 2020
https://doi.org/10.1016/S0140-6736(20)30183-5

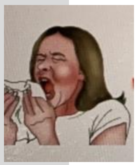
800 Fälle zum Publikationszeitpunkt

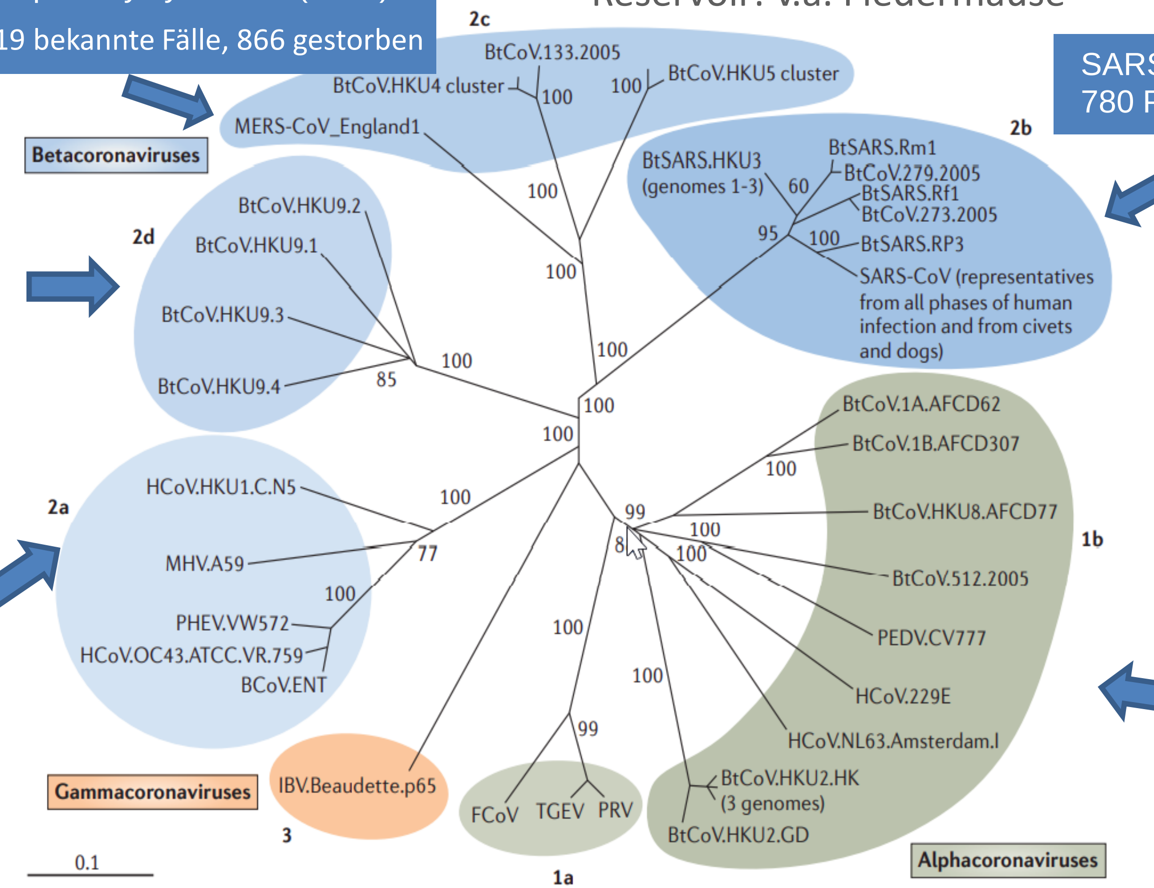
Coronavirus Phylogeny

middle east respiratory syndrome (2012):
Feb. 2020: 2519 bekannte Fälle, 866 gestorben

Reservoir: v.a. Fledermäuse

SARS-CoV: Nov.02-03:
780 Patienten gestorben





Human CoVs cause between 10-40% colds

Nature review; Graham et al, 2013

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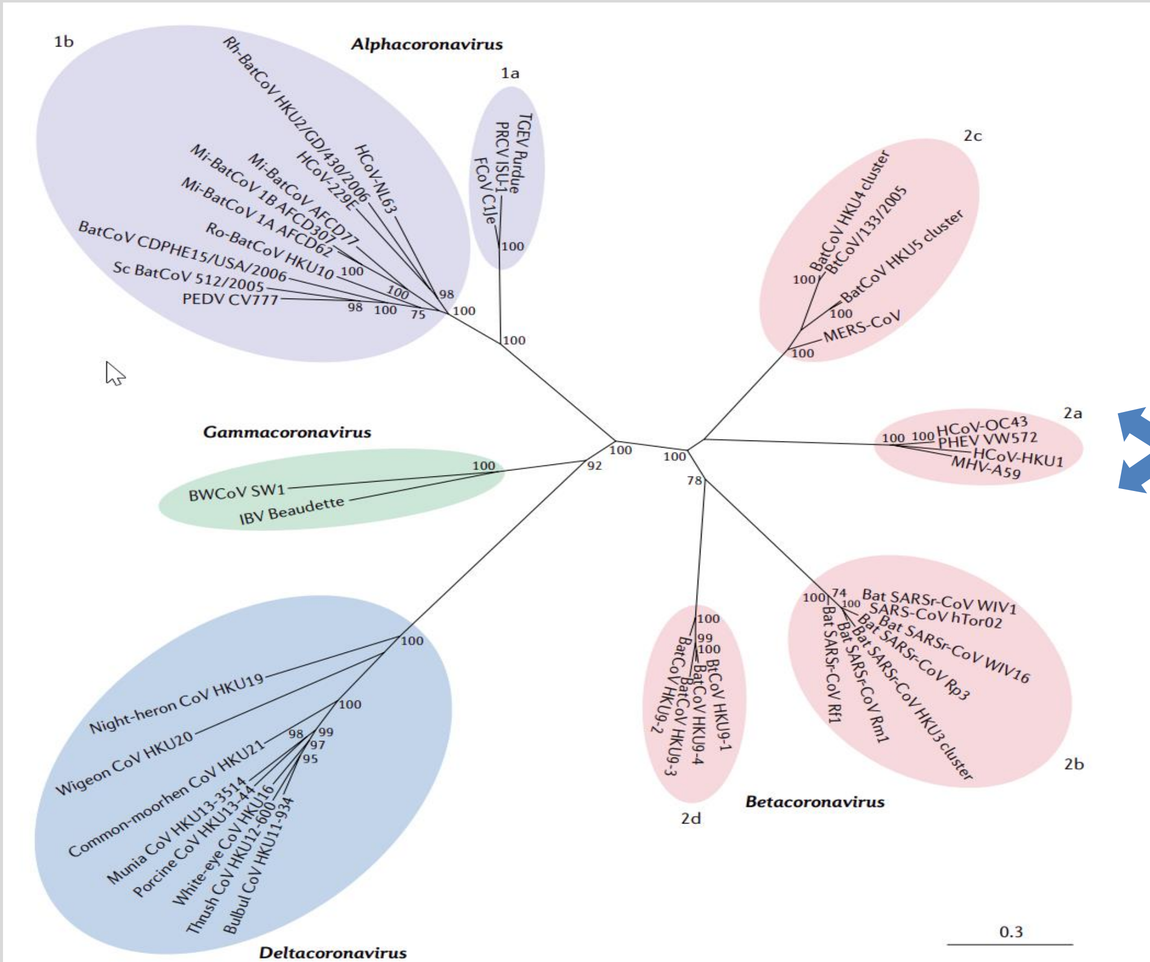
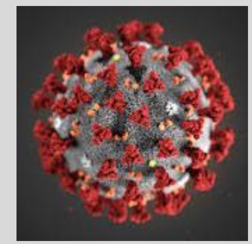
Coronavirus Phylogeny





Neues Betacoronavirus, 2019- nCoV2,SARS-CoV2 (Sarbecovirus)

Cui et al, Nature review 2019

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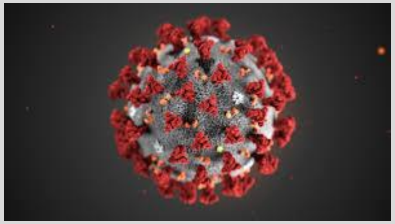
Namensgebung

Gemäss WHO: bis zum 11. Februar: 2019-nCoV, dann: COVID-19

Coronavirus Study Group (CSG) of the International Committee on Taxonomy of Viruses:
Severe acute respiratory syndrome – Co(rona)V(irus) – 2

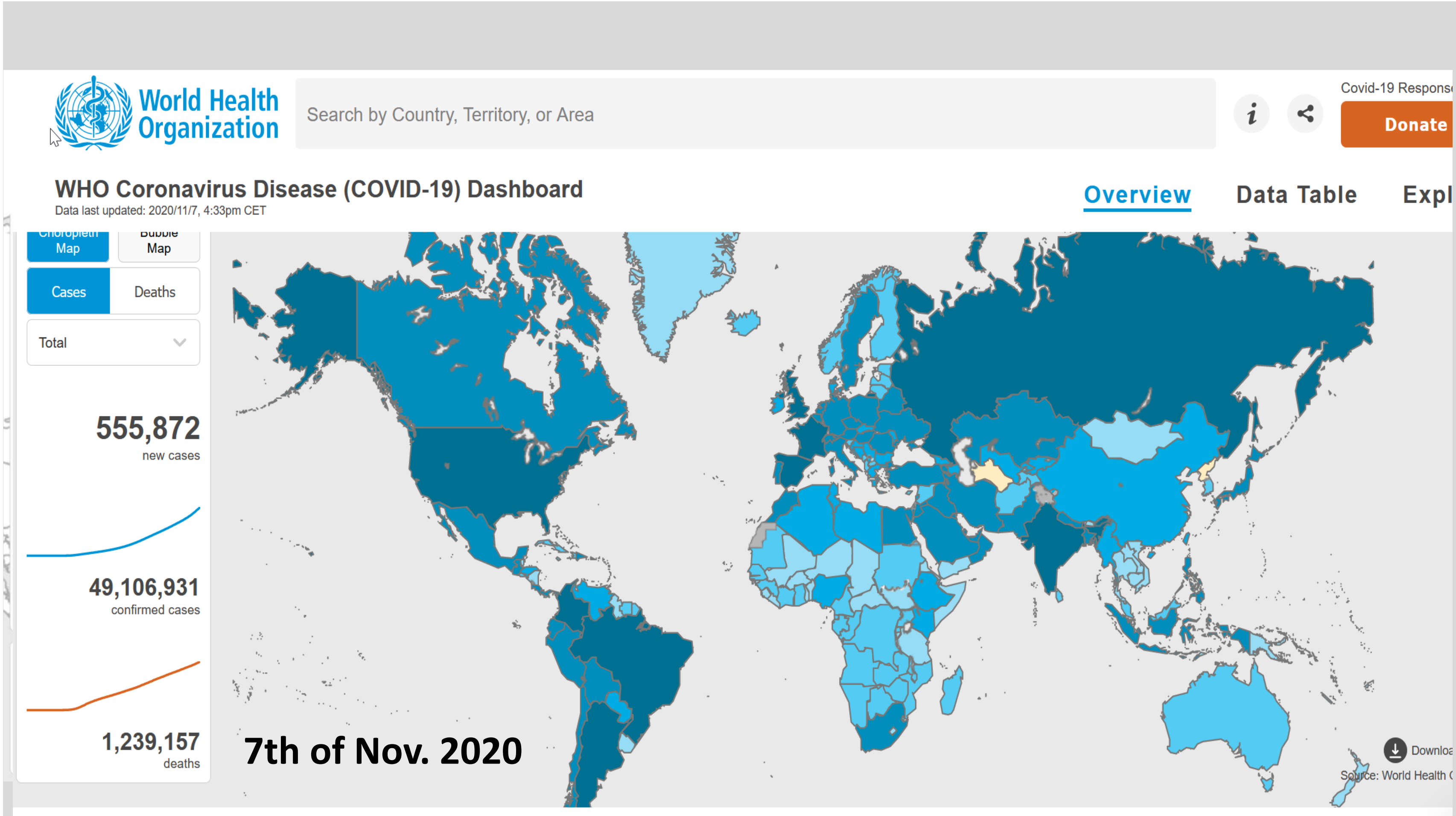


RNA Genomsequenz identifiziert: 13. Januar

60-140 nm

WHO:
30.01.2020: Internationale Gesundheitsnotlage
28.02: Risiko: «sehr hoch»
11.03: Pandemie

COVID 19 – spreading within 7 mts



https://covid19.who.int

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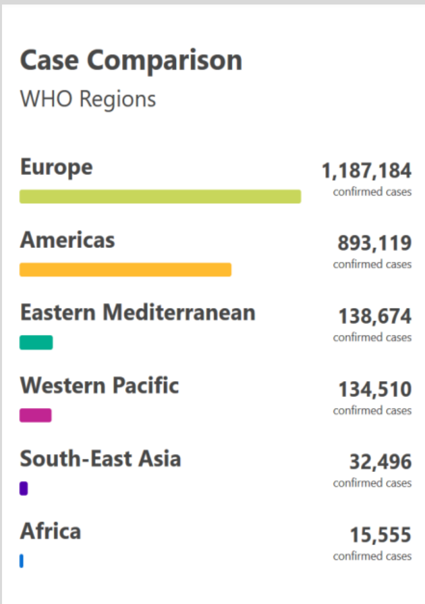
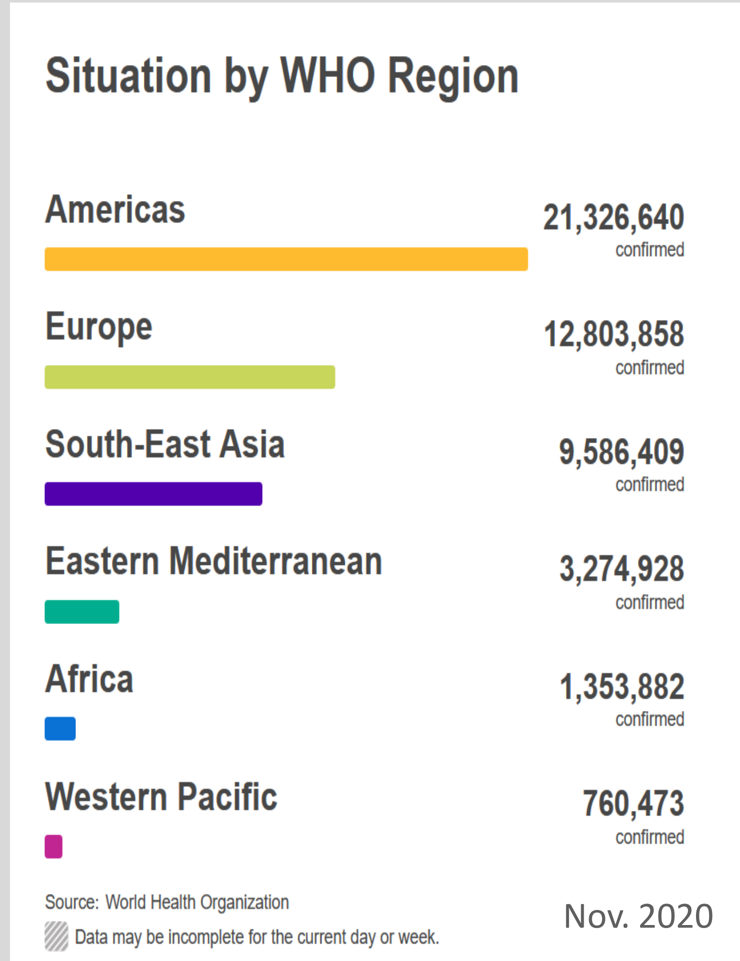
COVID 19



April 2020



Nov. 2020

https://covid19.who.int

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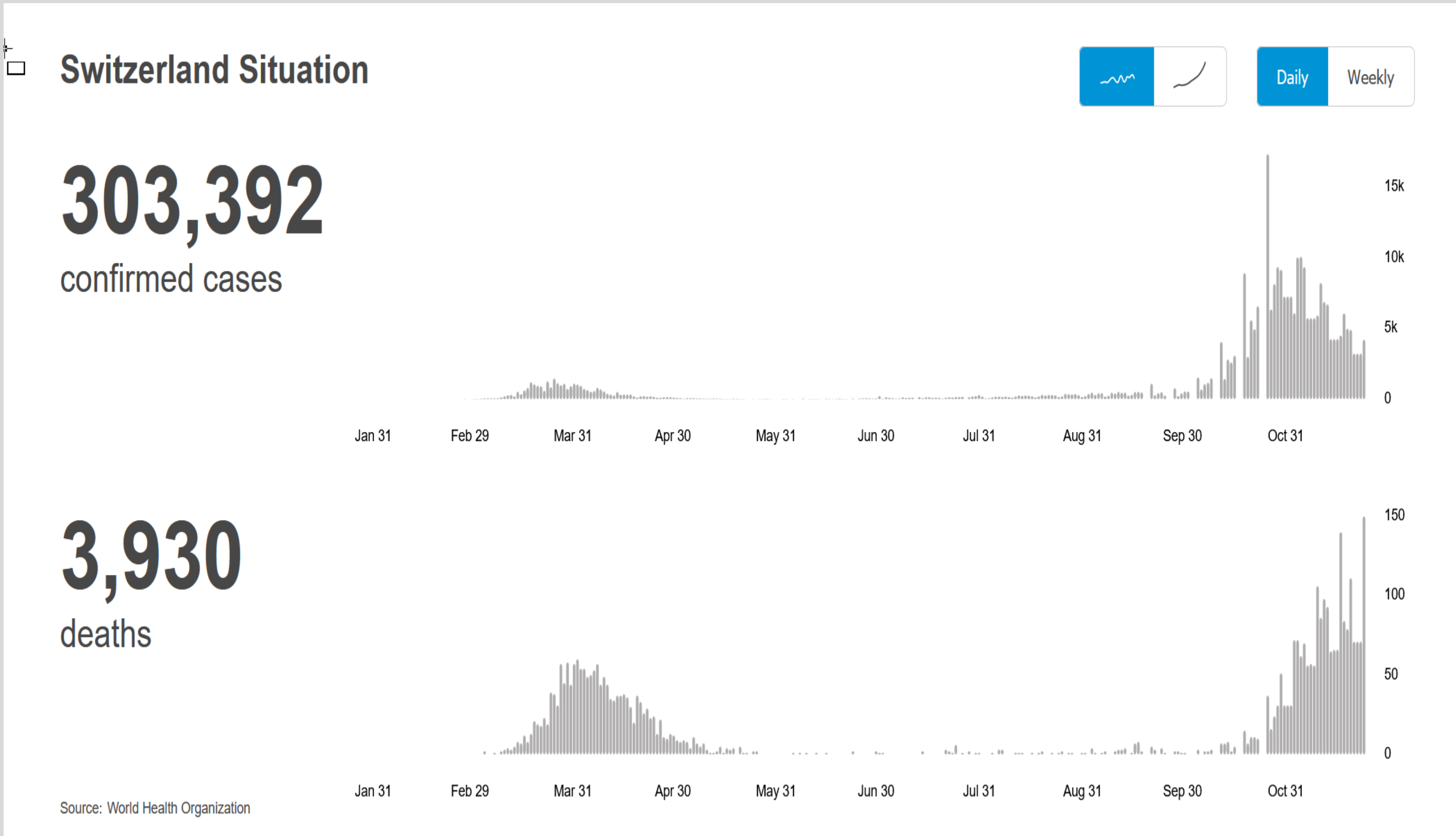
COVID 19 - Schweiz



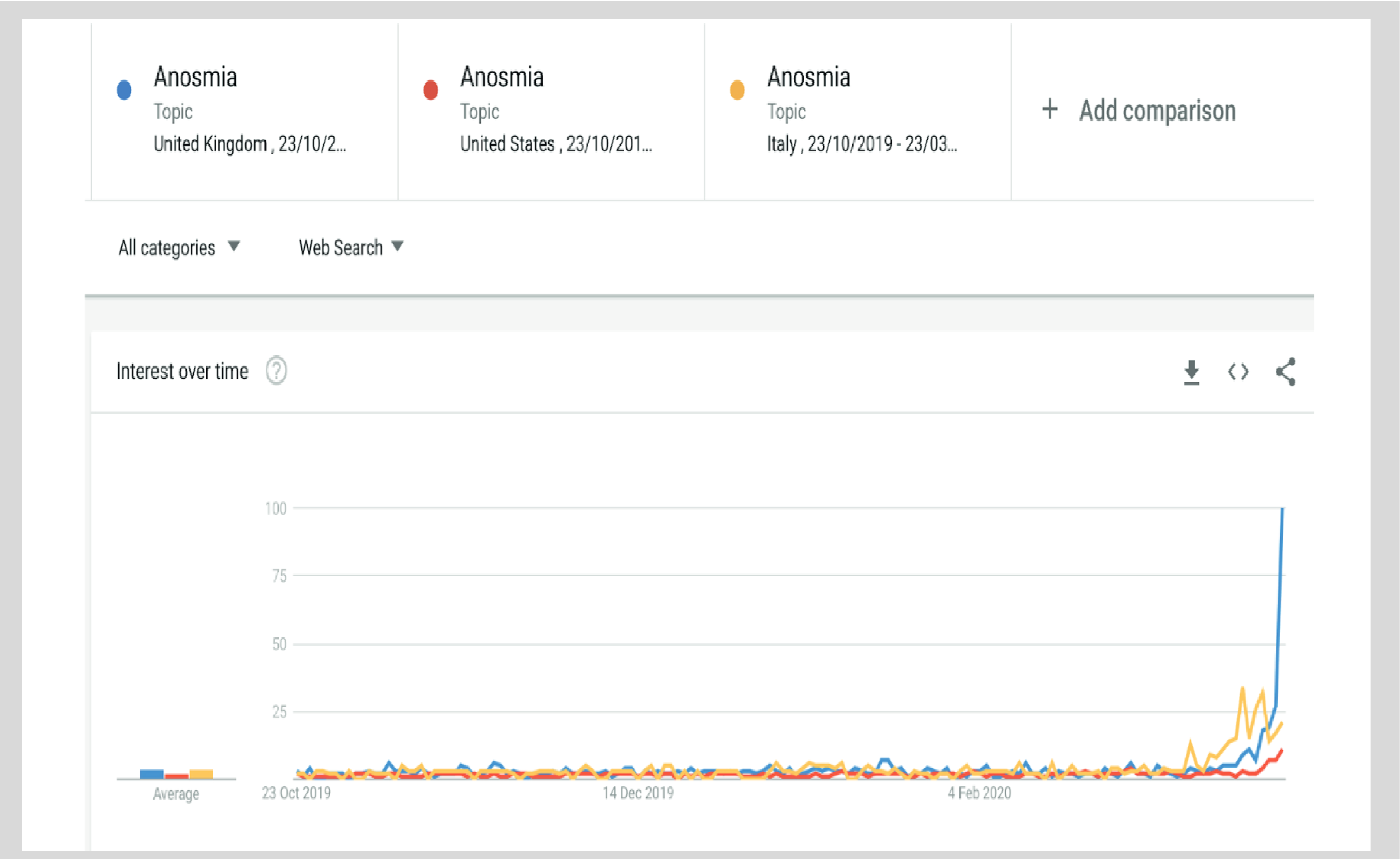
https://covid19.who.int/region/euro/country/ch

COVID – 19

EU/EEA and the UK	Sum of Cases	Sum of Deaths	14-day cumulative number of COVID-19 cases per 100 000	14-day cumulative number of COVID-19 deaths per 100 000
France	1 661 853	39 865	926.4	8.0
Spain	1 328 832	38 833	602.3	8.7
United_Kingdom	1 146 484	48 475	473.4	5.9
Italy	862 681	40 638	625.9	5.9
Germany	642 488	11 226	270.4	1.5
Poland	493 765	7 287	699.0	8.2
Belgium	487 949	12 708	1497.3	17.6
Czechia	403 497	4 526	1551.0	24.0
Netherlands	397 255	7 877	724.2	5.3
Romania	287 062	7 663	443.1	7.3
Portugal	166 900	2 792	529.9	5.0
Sweden	146 461	6 022	346.7	0.9
Austria	138 604	1 295	697.9	3.6
Hungary	104 943	2 357	499.8	9.9
Bulgaria	72 184	1 576	509.5	7.1
Slovakia	71 088	317	608.7	3.4
Ireland	64 538	1 940	189.2	1.3
Croatia	62 305	717	750.4	7.5
Denmark	53 180	738	250.7	0.7
Greece	52 254	715	216.3	1.5
Slovenia	42 658	353	1121.9	8.4

https://www.ecdc.europa.eu/en/covid-19-pandemic

COVID – 19



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COVID – 19

JAMA Neurology | Original Investigation

Neurologic Manifestations of Hospitalized Patients With Coronavirus Disease 2019 in Wuhan, China

Ling Mao; Huijuan Jin; Mengdie Wang; Yu Hu; Shengcai Chen; Quanwei He; Jiang Chang; Candong Hong; Yifan Zhou; David Wang; Xiaoping Miao; Yanan Li, MD, PhD; Bo Hu, MD, PhD

Table 1. Clinical Characteristics of Patients With COVID-19

Characteristic	No. (%) Total (N = 214)	Severe (n = 88)	Nonsevere (n = 126)	P value[a]
Age, mean (SD), y	52.7 (15.5)	58.2 (15.0)	48.9 (14.7)	
Age, y				
<50	90 (42.1)	24 (27.3)	66 (52.4)	<.001
≥50	124 (57.9)	64 (72.7)	60 (47.6)	
Sex				
Female	127 (59.3)	44 (50.0)	83 (65.9)	.02
Male	87 (40.7)	44 (50.0)	43 (34.1)	
Nervous system symptoms				
Any	78 (36.4)	40 (45.5)	38 (30.2)	.02
CNS	53 (24.8)	27 (30.7)	26 (20.6)	.09
Dizziness	36 (16.8)	17 (19.3)	19 (15.1)	.42
Headache	28 (13.1)	15 (17.0)	13 (10.3)	.15
Impaired consciousness	16 (7.5)	13 (14.8)	3 (2.4)	<.001
Acute cerebrovascular disease	6 (2.8)	5 (5.7)	1 (0.8)	.03
Ataxia	1 (0.5)	1 (1.1)	0	NA
Seizure	1 (0.5)	1 (1.1)	0	NA
PNS	19 (8.9)	7 (8.0)	12 (9.5)	.69
Impairment				
Taste	12 (5.6)	3 (3.4)	9 (7.1)	.24
Smell	11 (5.1)	3 (3.4)	8 (6.3)	.34
Vision	3 (1.4)	2 (2.3)	1 (0.8)	.37
Nerve pain	5 (2.3)	4 (4.5)	1 (0.8)	.07

COVID – 19

Clinical Infectious Diseases

CORRESPONDENCE

Self-reported Olfactory and Taste Disorders in Patients With Severe Acute Respiratory Coronavirus 2 Infection: A Cross-sectional Study

34% (von n = 59 Patienten):
Schmeck- / und oder Riechstörungen

Giacomelli et al, March 2020

RESEARCH LETTER

Alterations in Smell or Taste in Mildly Symptomatic Outpatients With SARS-CoV-2 Infection

64% (von n = 130 Patienten):
Schmeck- /und oder Riechstörungen

Spinato et al, JAMA April 2020

Olfactory and gustatory dysfunctions as a clinical presentation of mild-to-moderate forms of the coronavirus disease (COVID-19): a multicenter European study

86% (von n = 417 Patienten):
Riechstörungen, 80% Anosmie

Lechien et al, Eur Arch Oto-Rhino-Laryngol April 2020

Smell dysfunction: a biomarker for COVID-19

Shima T. Moein, MD, PhD[1], Seyed MohammadReza Hashemian, MD, FCCM[2], Babak Mansourafshar, MD[2], Ali Khorram-Tousi, MD[1], Payam Tabarsi, MD[3] and Richard L. Doty, PhD, FAAN[4]

95% (von n = 60 Patienten):
anosmisch (UPSIT)

Moein et al, Int Forum Allergy & Rhinology, April 2020

COVID – 19

Sniffing out the evidence; It's now time for public health bodies to recognize the link between COVID-19 and smell and taste disturbance*

Jerome R. Lechien[1,2], Claire Hopkins[3,#], Sven Saussez[4,#]

[1] COVID-19 Task Force of the Young-Otolaryngologists of the International Federations of Oto-rhino-laryngological Societies (YO-IFOS)

[2] Department of Human Anatomy and Experimental Oncology, Faculty of Medicine, UMONS Research Institute for Health Sciences and Technology, University of Mons (UMons), Mons, Belgium

[3] Guy's and St Thomas NHS Foundation Trust, London, UK

[4] Department of Otorhinolaryngology and Head and Neck Surgery, CHU de Bruxelles, CHU Saint-Pierre, School of Medicine, Université Libre de Bruxelles, Brussels, Belgium

Rhinology 58: 4, 402 - 403, 2020

https://doi.org/10.4193/Rhin20.159

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have contributed as co-senior authors

COVID – 19

Krankheitssymptome

Das neue Coronavirus kann sehr unterschiedliche Krankheitssymptome zeigen.

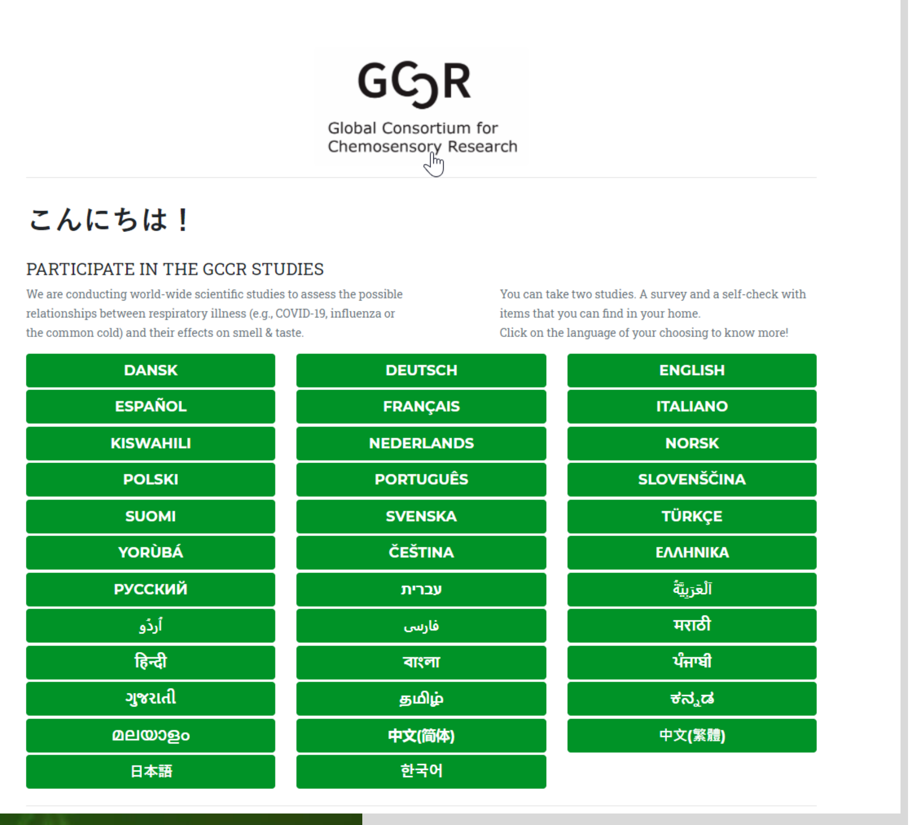
Die häufigsten Symptome sind:

- Symptome einer akuten Atemwegserkrankung (Halsschmerzen, Husten (meist trocken), Kurzatmigkeit, Brustschmerzen)
- Fieber
- Plötzlicher Verlust des Geruchs- und/oder Geschmackssinns

Zudem sind folgende Symptome möglich:

- Kopfschmerzen
- Allgemeine Schwäche, Unwohlsein
- Muskelschmerzen
- Schnupfen
- Magen-Darm-Symptome (Übelkeit, Erbrechen, Durchfall, Bauchschmerzen)
- Hautausschläge

https://www.bag.admin.ch/bag/de.



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Postinfektiöse Riechstörung

Akut viral bedingte endonasale Veränderungen:

Konduktive Störung

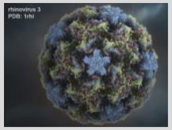
- Schwellung der Mukosa beeinträchtigt Belüftung der Nase
- Vermehrte schleimproduktion
- Veränderte Schleimzusammensetzung

Symptome:
«Nase ist zu», «Nase läuft»

Infekt klingt ab, Symptome verschwinden, Riechvermögen kehrt zurück

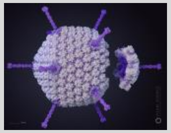
Bleibende Störungen (Anosmie) nach dem Abklingen des Infektes

Ätiologie: Rhinovirus ?



https://www.datuopinion.com/rhinovirus

Adenovirus ?

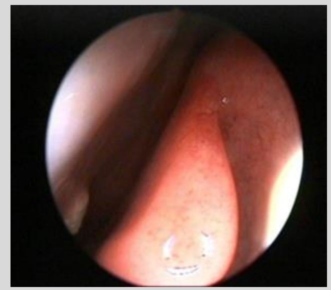
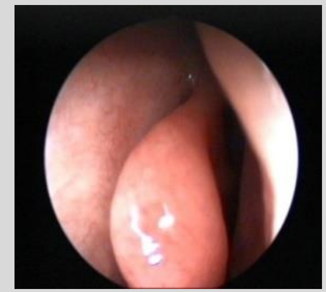


https://www.visual-science.com/projects

Postinfektiöse Riechstörung

Pathophysiologie:
Direkter Schaden der olfaktorischen Nervenzellen (ONZ)

Erholung (teilweise oder vollständig) möglich, aufgrund von basalen Stammzellen

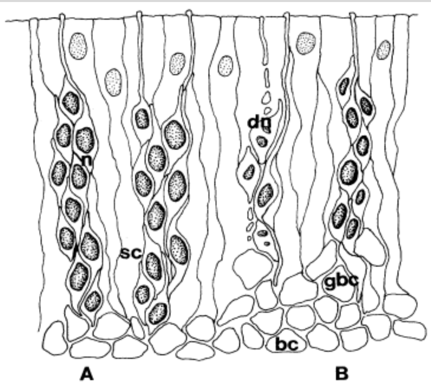


Fig. 18. Diagram of the olfactory epithelium with a quiescent (A) and active (B) zone. The basal immature elements (bc and gbc) are numerous in B. Between quiescent and active zones a portion of the diagram shows the intermediate process of neuron degeneration (dn).

Graziadei and Monti Graziadei, 1979

Spontanerholungsraten bei postinfektiösen Riechstörungen innerhalb von 2 Jahren

15 - 87% Alter, Dauer der Erkrankung

(Mott et Leopold 1991, Reden et al, 2006 Duncan et Seiden, 1995, Welge-Lüssen and Wolfensberger, 2006; London et al, 2008, Lee et al, 2015, Cavazzana et al, 2018)

SARS-CoV2 – typische postinfektiöse Riechstörung ?

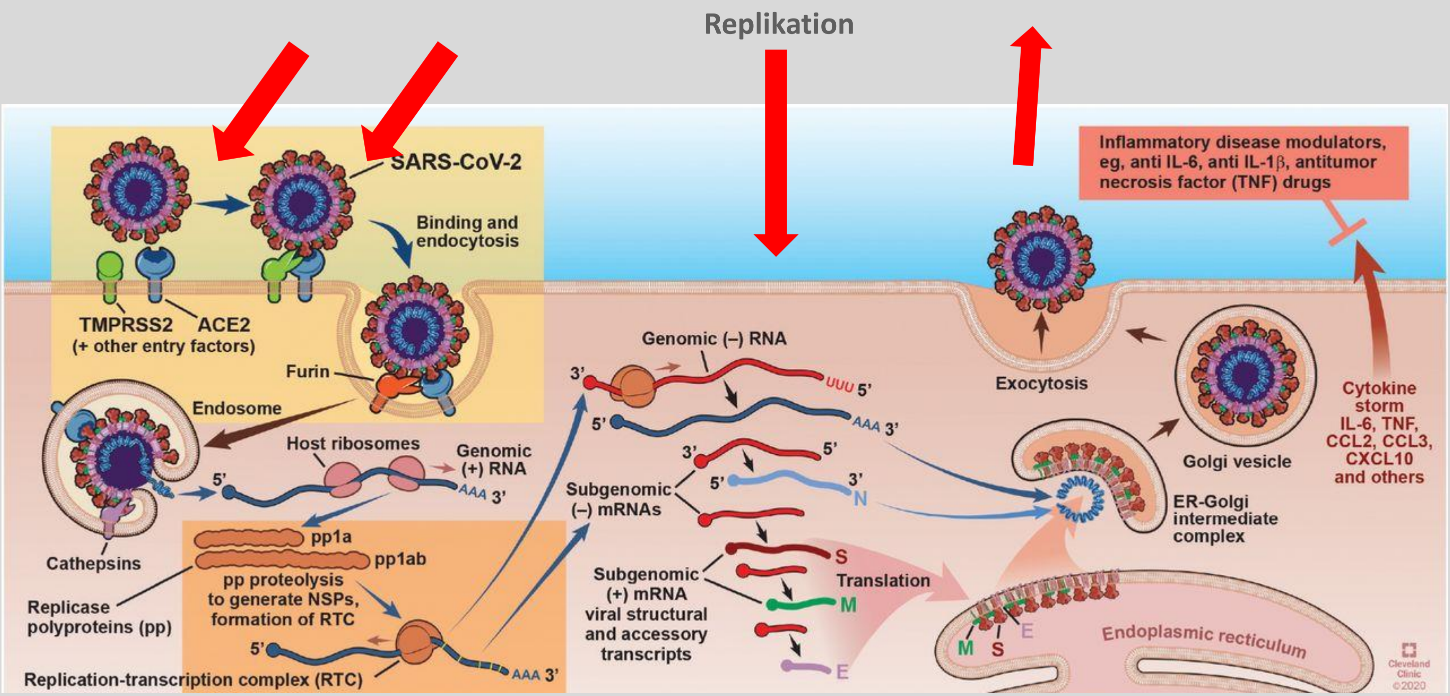
Anamnese und Verlauf bei COVID-19.....

- Fehlen einer nasalen Obtruktion
- Anosmie als einziges Symptom (kann sowohl Erst- oder einziges Symptom sein)
- Mehrheit der Patienten: Vollständiger Riechverlust
- Dauer des Riechverlustes: anders (schnellere Erholung, innerhalb von Tagen bis Wochen)

….nein, scheint anders zu sein !

SARS - CoV2   Invasion in die Zelle

- Virus bindet sich an Angiotensin Converting Enzym Rezeptor 2 (**ACE2**)
- Spaltung durch die Serin Protease **TMPSS2** um nachfolgend die Fusion mit der Wirtsmembran zu ermöglichen



Bergmann et Silvermann, Cleveland Clinic Journal of Medicine June 2020

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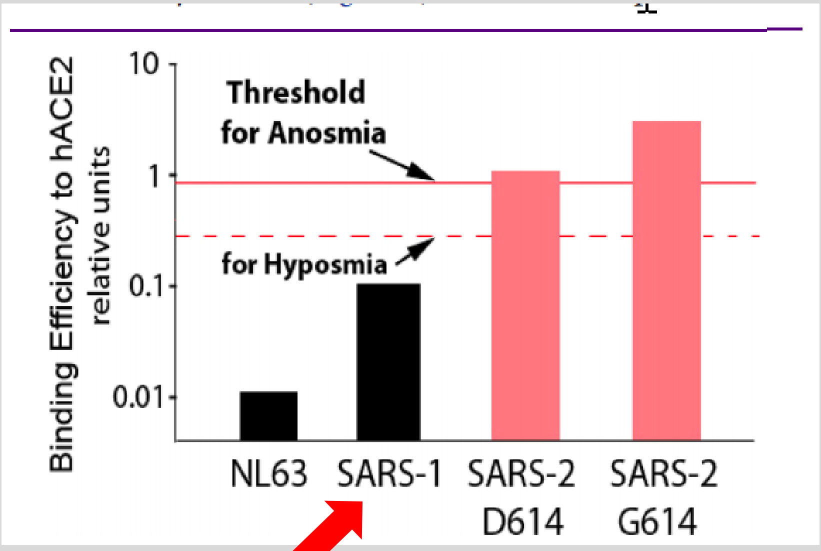
SARS - CoV2 Pathophysiologie

Lokale Entzündungsreaktion von Bedeutung

Im Unterschied zu SARS-CoV:

“Receptor-binding domain of the SARS-CoV-2 spike protein”
- Höhere Affinität zum ACE2 Rezeptor
- Andere Art der Bindung als SARS-CoV



Lokale «spike binding mode»
von Bedeutung

Hyposmie / Anosmie:
Bindung des Virus (im Bereich des olfakorischen Epithels) oberhalb einer gewissen Schwelle nötig

Butowt et al, ACS Chem. Neurosci. 2020

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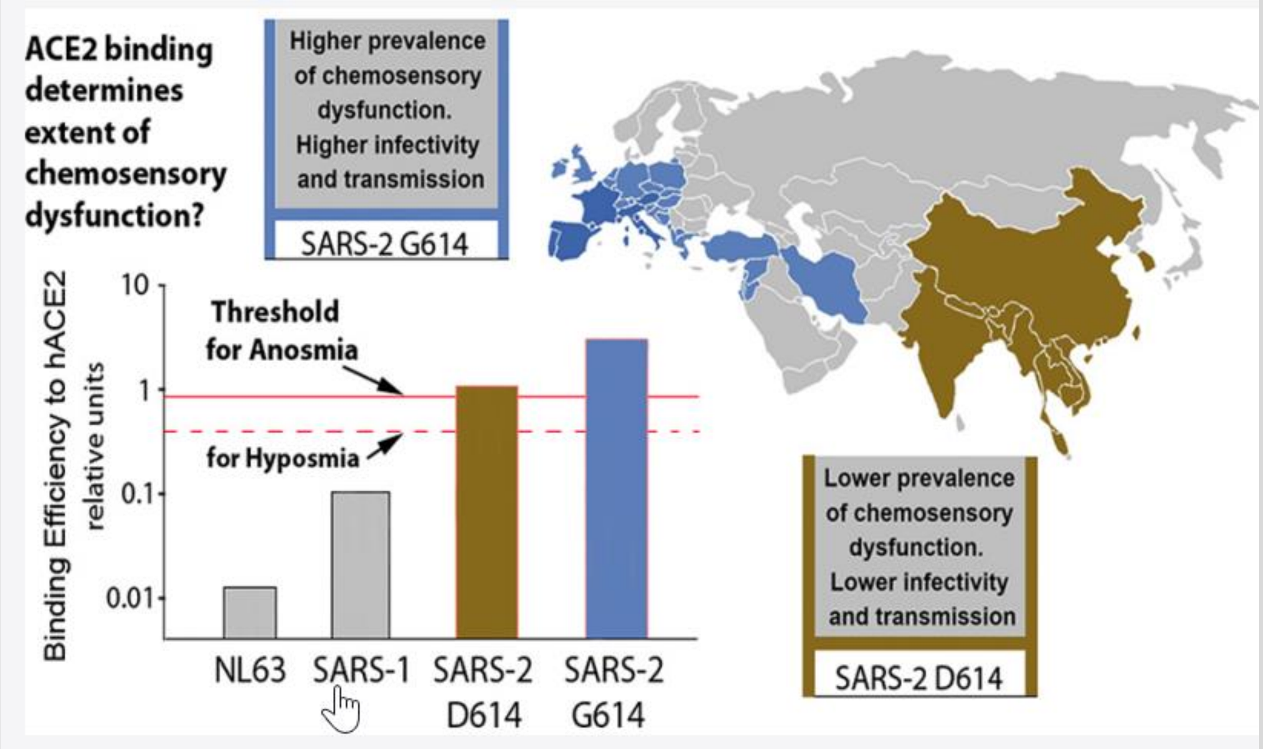
SARS - CoV2 Pathophysiologie

Unterschiedliche Prävalenz von chemosensorischen Dysfunktionen in verschiedenen Regionen der Welt – **Warum ?**

genetische virale Faktoren, unterschiedliche genetische Faktoren der Empfänger



Whs. von Bedeutung: Varianten des spike Proteins

Butowt et al, ACS Chem. Neurosci. 2020

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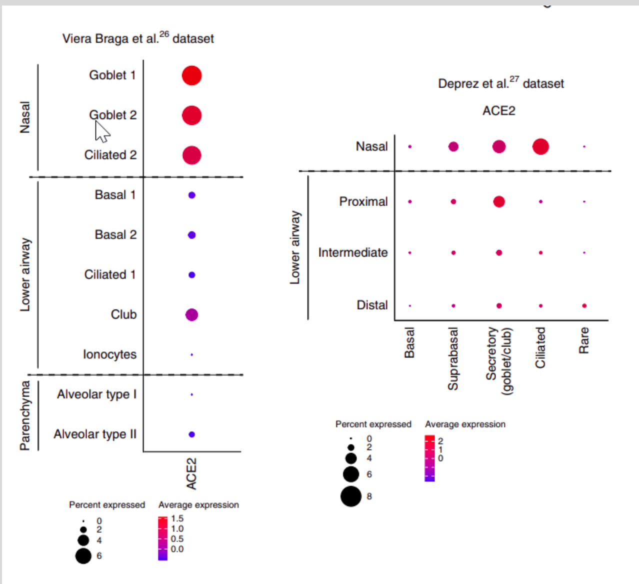
SARS - CoV2   Pathophysiologie

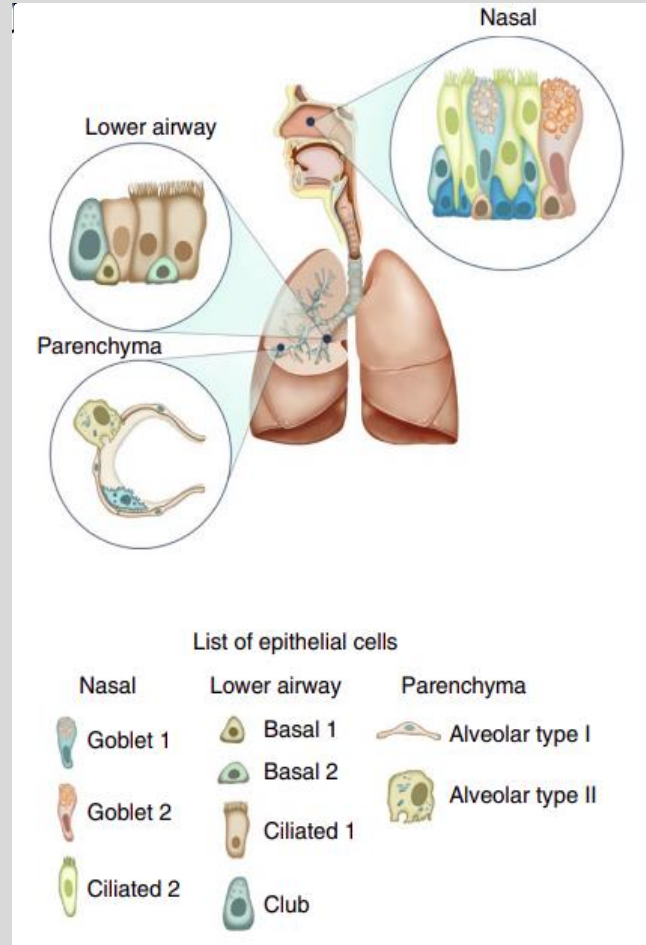
Bindungs Affinität S-protein und ACE2:

- Haupt-Determinanten der SARS-CoV Replikation und der Schwere der Erkrankung

Virus Eindringen hängt ab von

- TMPRSS2 Protease Aktivität
  Gen expression von ACE2 und TMPRSS2

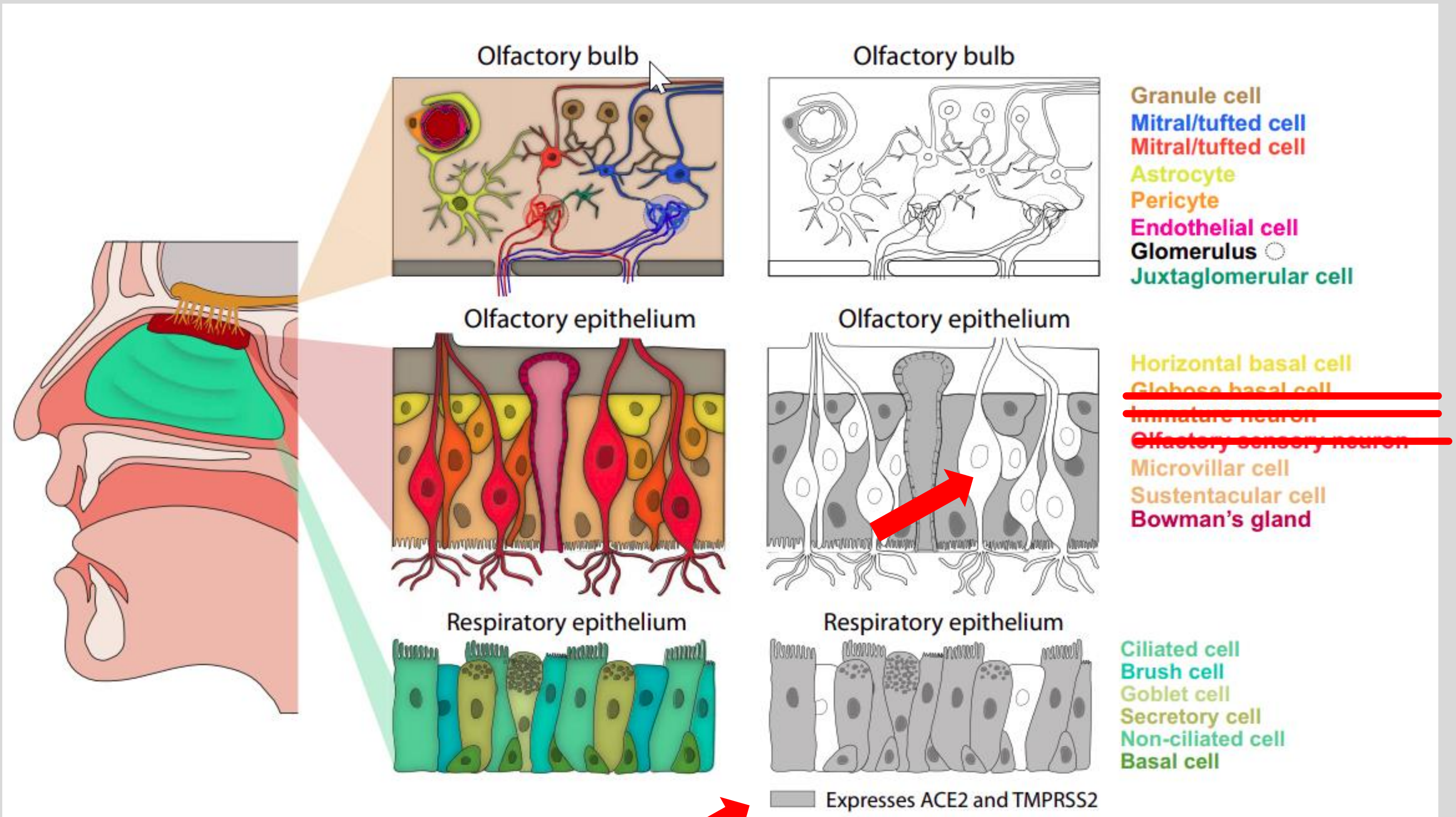




Sugnak et al, Nature Medicine 2020

SARS - CoV2 endonasal

Keine: ACE2 Rezeptoren in ONZ, aber in den Stützzellen und im respiratorischen Epithel



Cooper, Brann et al, Neuron 2020

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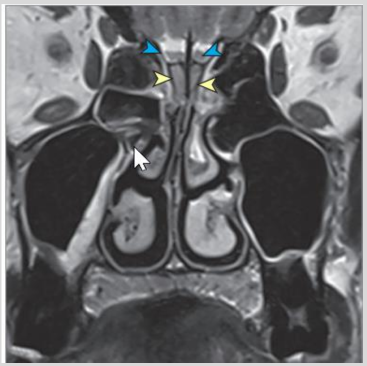
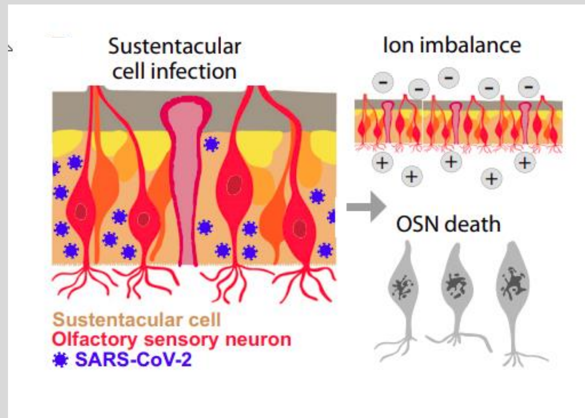
SARS - CoV2 Pathophysiologie

Lokalisierte Entzündung

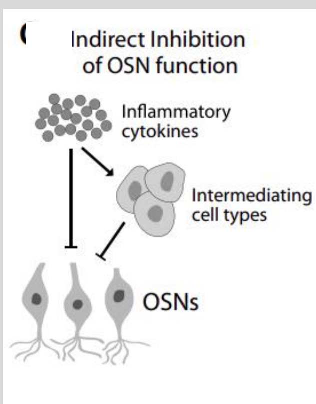
indirekte Mechanismen





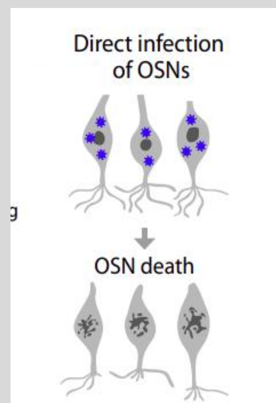
Veränderungen des Mukus, Ionen - Imbalance

Zelltod der ORZ / Dysfunktion und Anosmia



inflammatorische Zytokine

noch nicht bewiesen



Eliezier et al, Jama Otolaryngology, Head & Neck Surgery, Cooper, Brann et al, Neuron 2020

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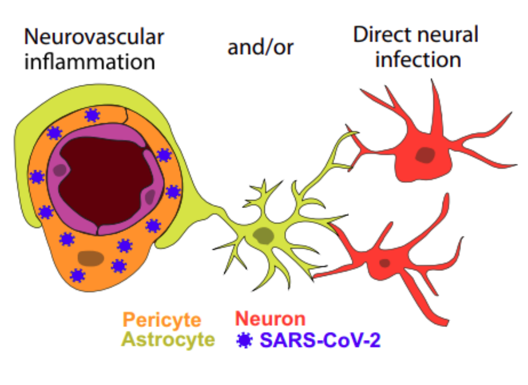
SARS - CoV2 Pathophysiologie

Zentraler Schaden

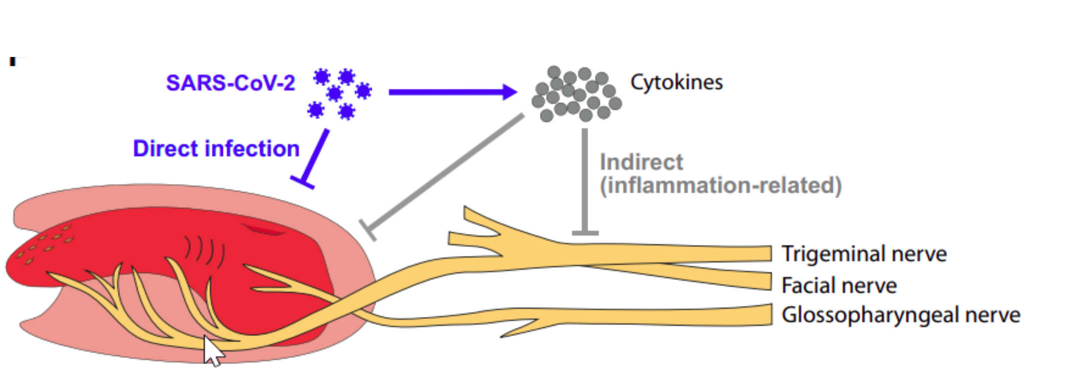


indirekte Mechanismen

ACE2: vasculäre Perizyten (bei Mäusen), Wahrnehmung beeinflusst

- direkt (via Veränderungen der Perfusion)
- indirekt (via Entzündungsreaktion)

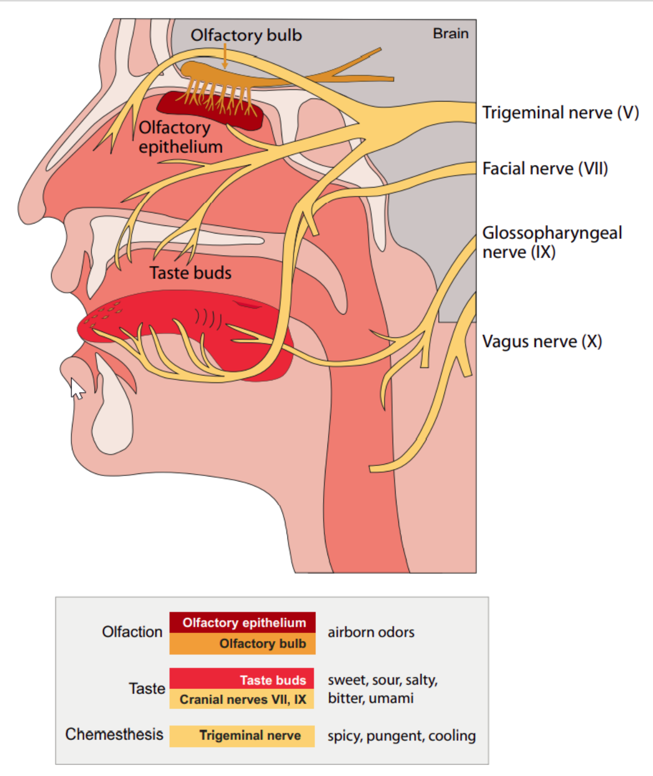
Schmecken und trigeminale Funktion: separat beeinträchtigt



ACE2 expremiert von Typ III (sauer) Schmeckrezeptoren und Typ II (bitter / süss / umami) TRC

Cooper, Brann et al, Neuron 2020

SARS - CoV2 Pathophysiologie



Cooper et al, Neuron 2020

Chemical Senses, 2020, Vol XX, 1–14
doi:10.1093/chemse/bjaa041
Original Article
Advance Access publication 20 June 2020

OXFORD

Original Article

More Than Smell—COVID-19 Is Associated With Severe Impairment of Smell, Taste, and Chemesthesis

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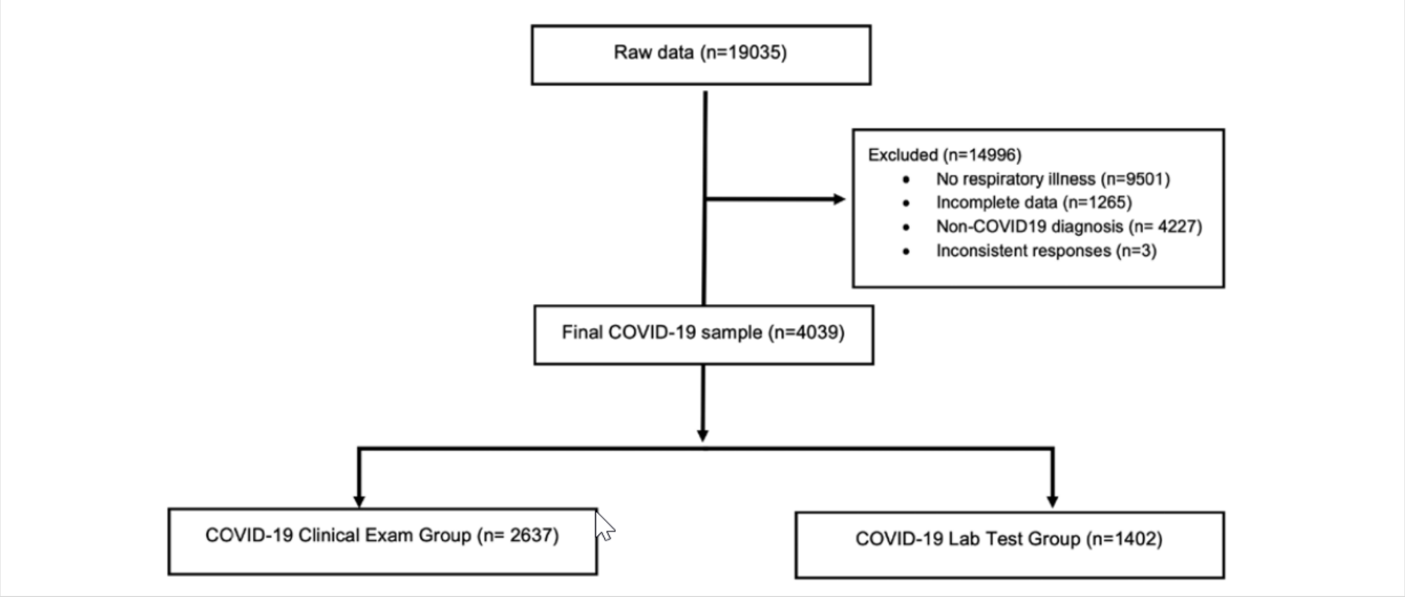
Members of GCCR Consortium

SARS-CoV2

Datensammlung mit Hilfe eines Fragebogens in 10 Sprachen

England, Frankreich, Deutschland, Italien, Japan, Candada, Norwegen, Spanien, Schweden und Türkei

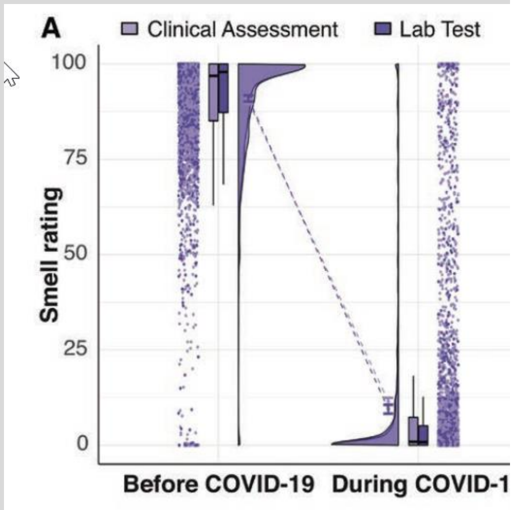
Zeitspanne: 3 Wochen im April 2020

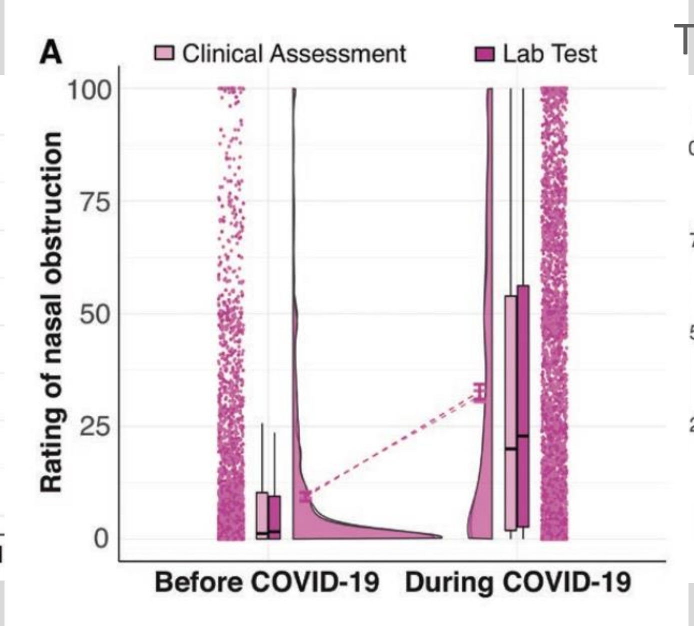


SARS-CoV2

Subjektive Verminderung des Riech-, Schmeck- und Fühlvermögens

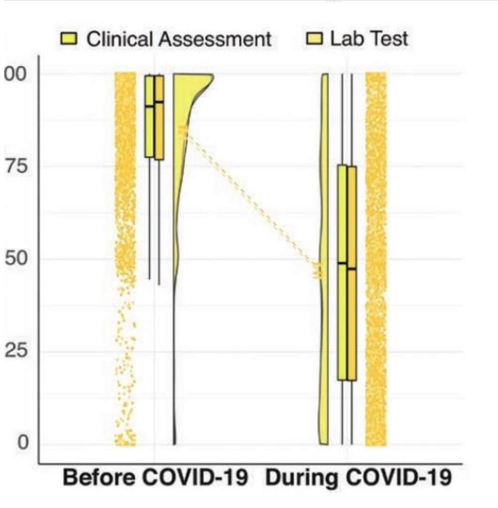
Riechen





moderate nasale Obstruktion

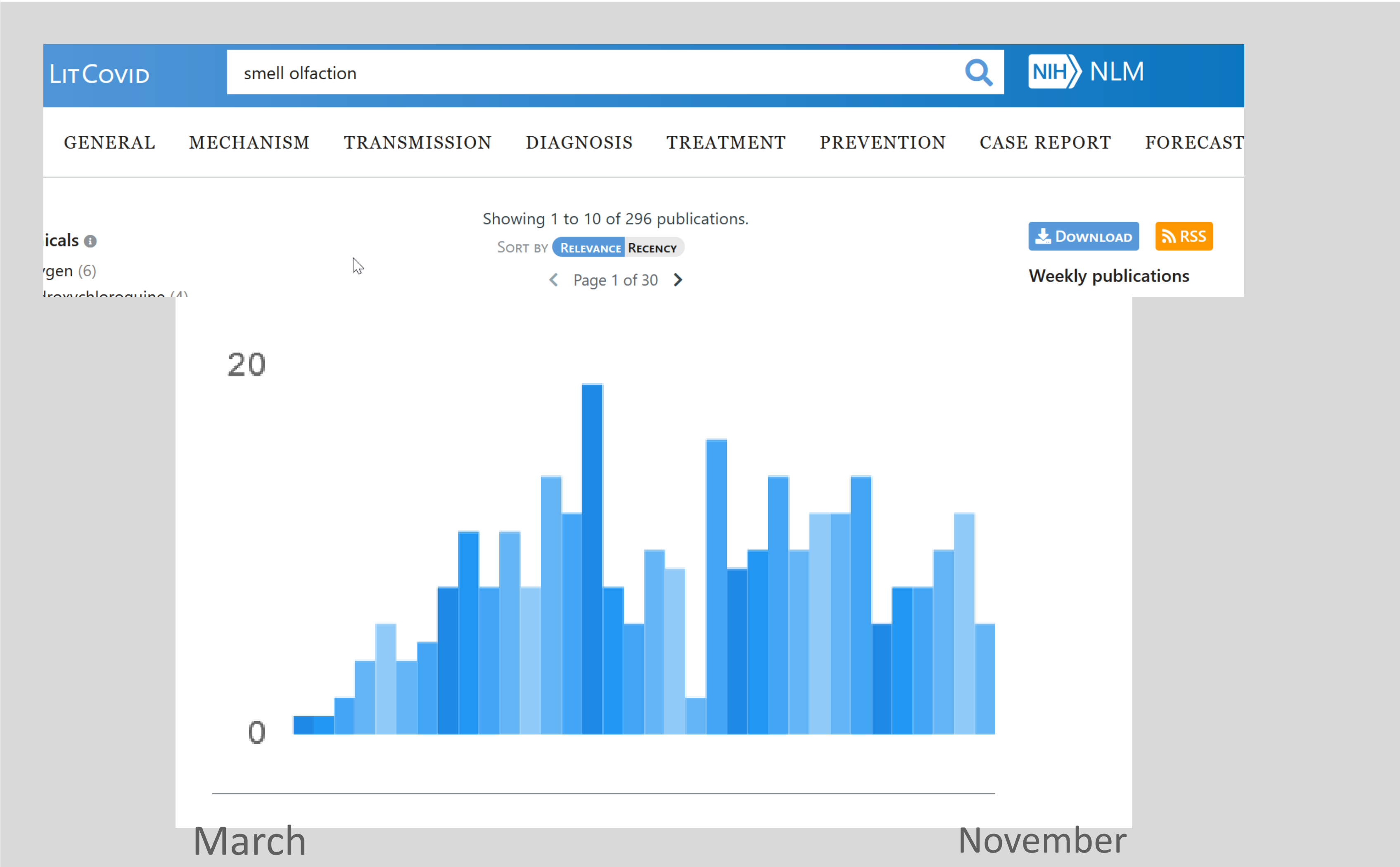
Trigeminale Funktion



Kein Unterschied zwischen klinischer und Labor bestätigter Diagnosegruppe

Shortcomings: kulturelle Unterschiede, keine Differenzierung Hyp-/Anosmie

SARS - CoV2 Publikationen



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SARS - CoV2 Prävalenz

Systematischer Review / Metaanalyse I

Received: 21 April 2020 | Revised: 4 July 2020 | Accepted: 21 July 2020
DOI: 10.1111/coa.13620

SYSTEMATIC REVIEW AND META-ANALYSES

WILEY

Is loss of sense of smell a diagnostic marker in COVID-19: A systematic review and meta-analysis

Lead Author	n COVID-19 positive	N with OD	Percentage with OD	Average age with OD	Proportion Female	Setting	Location
C Menni	579	344	59%	41	69%	Outpatient based	UK based
J Lechian	417	357	86%	No data	No data	Inpatient and Outpatient	Belgium, Spain, France, Italy
C Yan	59	40	68%	No data	No data	Outpatient based	USA
ST Moein	60	58	97%	47	33%	Inpatient	Iran
L Mao	214	11	5%	No data	No data	Inpatient	China
Totals	1329	819	62% prevalence of OD in COVID + ve population				

Abbreviation: OD, olfactory dysfunction.

n= 1329 Pat., olfaktorische Dysfunktion: 62.0%

Juli 2020

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SARS-CoV2

Systematischer Review / Metaanalyse II

Table 1. Characteristics and Outcomes of Assessment of Risk of Bias for the Included Studies.

First author	Study design	Country	Quality[a]	Sample size	Instrument used
Abalo-Lojo[5]	Cross-sectional	Spain	Good	131	Self-reporting questionnaire
Aggarwal[6]	Retrospective	United States	Good	16	Questionnaire
Beltrán-Corbellini[7]	Case-control	Spain	Good	79	Questionnaire
Bénézit[39]	Cross-sectional	France	Good	68	Web-based questionnaire
Carignan[8]	Case-control	Canada	Good	134	Telephone interview questionnaire
Coelho[9]	Cross-sectional	United States	Good	93	Web-based survey
Giacomelli[48]	Cross-sectional	Italy	Good	59	Questionnaire
Gudbjartsson[40]	Cross-sectional	Iceland	Good	1221	Questionnaire
Hopkins[12]	Cross-sectional	United Kingdom	Good	382	Online survey
Hopkins[41]	Cross-sectional	United Kingdom	Good	2428	Survey
Kim[13]	Cross-sectional	South Korea	Good	213	Questionnaire based survey
Klopfenstein[14]	Retrospective	France	Fair	114	Medical files
Lechien[42]	Cross-sectional	France	Good	86	Nutritional health and nutritional examination survey
Lechien[43]	Cohort	France	Good	417	Questionnaire
Lechien[44]	Cohort	France	Good	2013	Sniffin' sticks and questionnaire
Lee[17]	Cross-sectional	South Korea	Good	3191	Telephone interview
Levinson[45]	Cross-sectional	Israel	Good	42	Questionnaire and phone interview
Liguori[19]	Cross-sectional	Italy	Good	103	Anamnestic interview
Liu[20]	Cohort	Taiwan	Good	321	Open access data
Mao[21]	Cross-sectional	China	Good	214	Electronic medical records
Menni[22]	Cross-sectional	United Kingdom	Good	7178	Smartphone based app
Merza[23]	Cross-sectional	Iraq	Fair	15	Questionnaire
Moein[24]	Cohort	Iraq	Good	60	Pennsylvania Smell Identification Test
Paderno[46]	Cross-sectional	Italy	Good	508	Survey-based questionnaire
Speth[26]	Cross-sectional	Switzerland	Good	103	Telephone questionnaire
Spinato[27]	Cohort	Italy	Good	202	Questionnaire
Vaira[47]	Cohort	Italy	Good	345	Connecticut Chemosensory Clinical Research Center Orthonasal Olfaction Test
Vaira[49]	Cross-sectional	Italy	Good	72	Connecticut Chemosensory Clinical Research Center Orthonasal Olfaction Test
Vaira[29]	Cross-sectional	Italy	Good	320	Medical records
Yan[50]	Case-control	United States	Good	59	Internet-based platform
Yan[31]	Cross-sectional	United States	Good	169	Self-reported questionnaire
Zayet[32]	Retrospective	France	Fair	95	Questionnaire

[a]Quality rated as poor, fair, or good.

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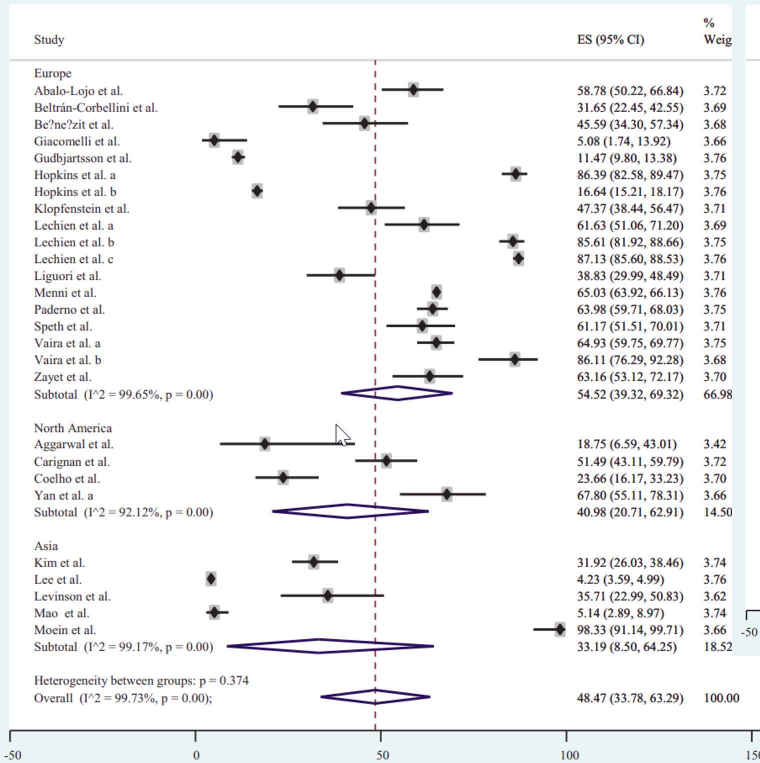
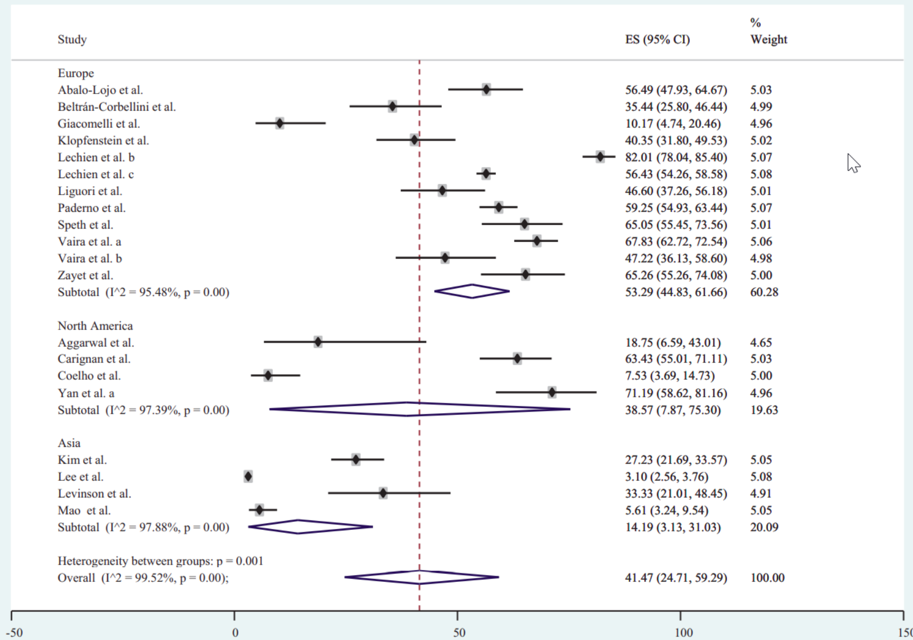
August 2020

SARS-CoV2

Systematischer Review / Metaanalye II





Gustatorische Dysfunktion:

41.2% (95% CI 24.71% - 59.29%)

Olfaktorische Dysfunktion

August 2020

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SARS - CoV2

Positiver Vorhersagewert COVID – 19 ?

Real-
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OR: 6.74

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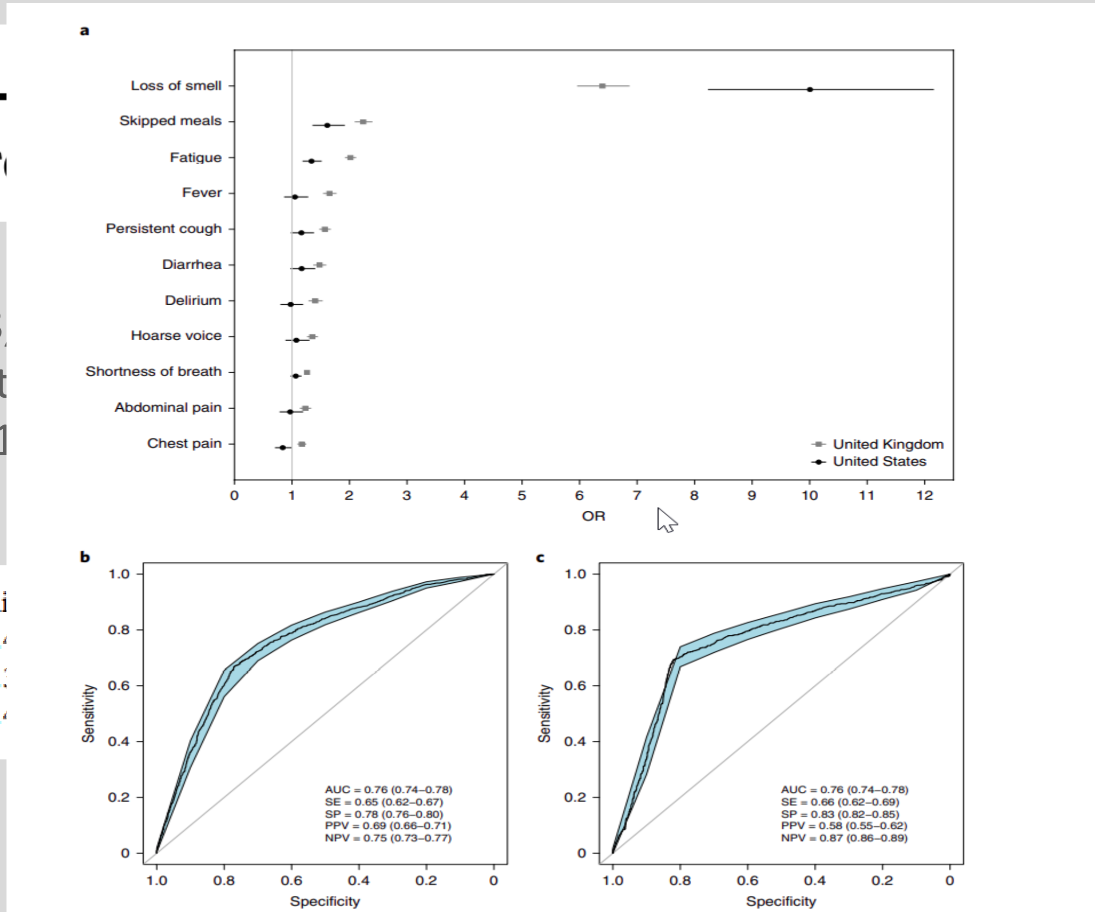

Vorhersagerate von 17.4% für alle App Benutzer

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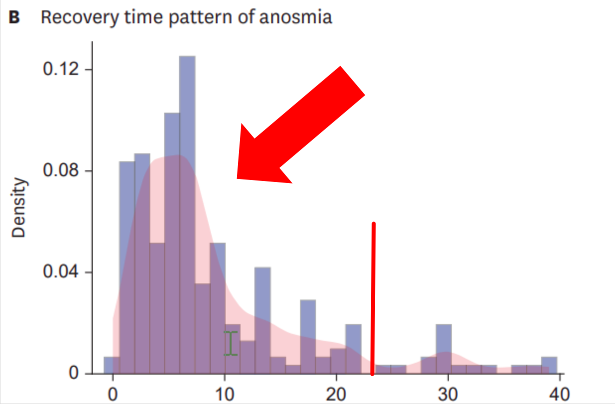
SARS - CoV2 Prognose?

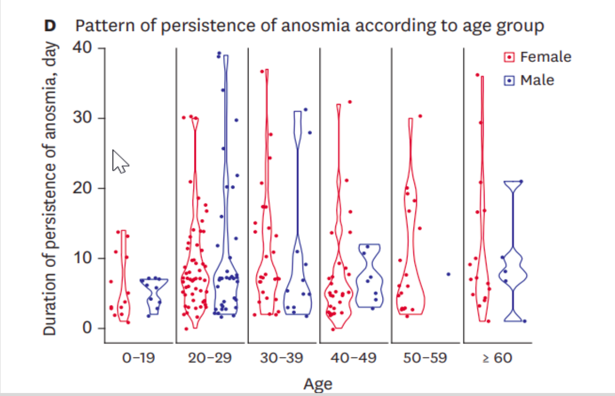
Erholung der olfaktorischen Funktion

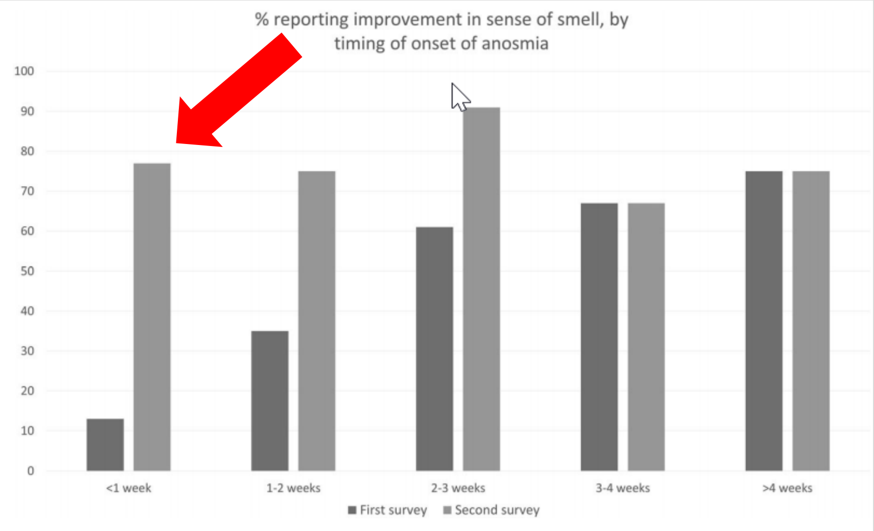
Durchschnittliche Erholung: zwischen 7 und 20 Tagen



Median: 7 Tage, meistens innerhalb von 20 Tagen

Lee et al, 3191 pat. (survey)





Jüngere Personen brauchen etwas länger

79% nach 7 Tagen

Hopkins et al, 382 pat. (survey)

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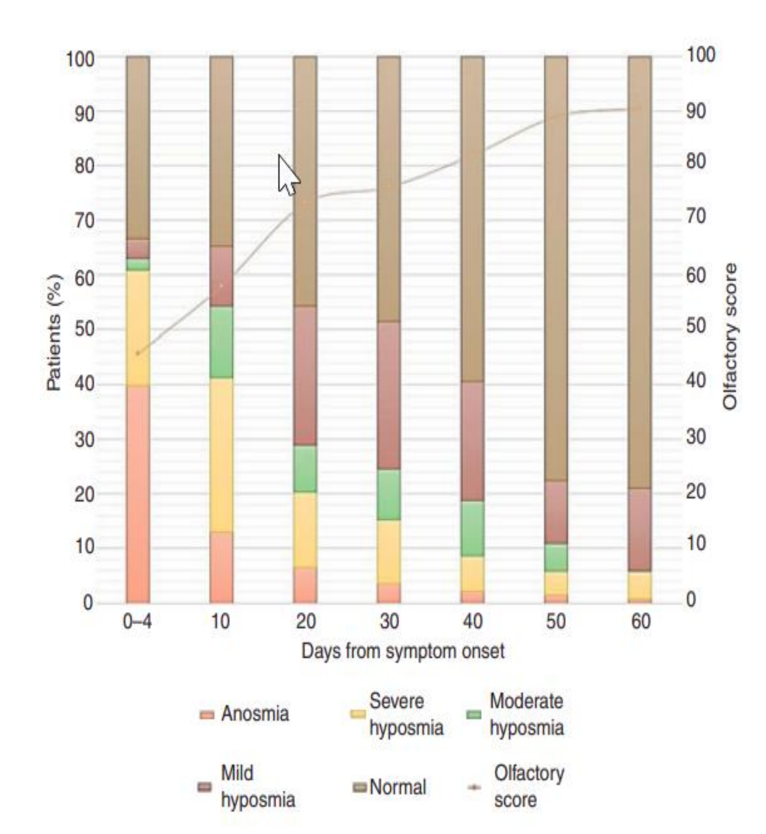
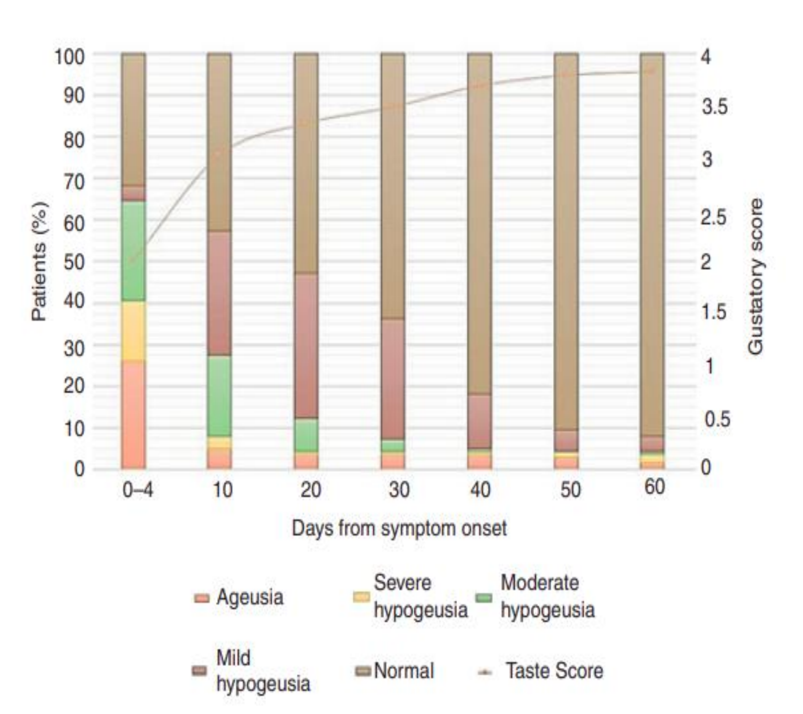
SARS - CoV2 Prognose ?

Wiederholte psychophysische Messung n = 138 Pat)





80% haben wieder ein normales Riechvermögen nach 2 Mt.

Vaira et al, 2020

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SARS - CoV2 Therapie

Therapie ?

Source	Study Type	Study Population	Results
Olfactory Training			
Al Aïn et al,[31] 2019	Prospective, controlled	Healthy participants (n = 12)	Intensive, modified OT results in improved olfactory function and increased cortical thickness in olfactory-eloquent regions
Hummel et al,[32] 2018	Prospective, controlled	Postinfectious olfactory loss, idiopathic smell loss (n = 23)	EOG responses more frequently obtained following OT
Langdon et al,[33] 2018	Prospective, controlled	Posttraumatic olfactory dysfunction (n = 21)	OT significantly improved odor threshold score but not BAST-24 score or subjective smell function
Oleszkiewicz et al,[34] 2017	Prospective, controlled	Postinfectious, idiopathic olfactory dysfunction (n = 108)	OT with odor mixtures or alternating odors does not significantly improve function compared with single-molecule odor training

JAMA Otolaryngology–Head & Neck Surgery | Review

Clinical Diagnosis and Current Management Strategies for Olfactory Dysfunction

A Review

Katherine L. Whitcroft, BSc, MBChB (Hons), MRCS, DOHNS; Thomas Hummel, MD

2019

Geißler et al, 2014	Prospective	Postinfectious olfactory loss (n = 39)	Longer duration (≥32 weeks) increased effectiveness of training
Konstantinidis et al,[43] 2013	Prospective, controlled	Posttraumatic and postinfectious olfactory loss (n = 119)	Significant improvement in both groups
Haehner et al,[44] 2013	Prospective, controlled	Patients with Parkinson disease (n = 70)	Significant increase in olfactory function
Fleiner et al,[45] 2012	Retrospective	Olfactory loss due to differing causes (n = 46)	Improvement of olfaction

SARS - CoV2 Therapie

+ Vitamin A Nasentropfen Hummel et al, 2017 ✔

+ Budenosid Spülungen ?

Budesonide irrigation with olfactory training improves outcomes compared with olfactory training alone in patients with olfactory loss

Teresa P. Nguyen, BS and Zara M. Patel, MD

?

Natriumcitrat ?

The effect of intranasal sodium citrate on olfaction in post-infectious loss: results from a prospective, placebo-controlled trial in 49 patients

Whitcroft, K.L.,*[†‡a] Ezzat, M.,*[a] Cuevas, M.,* Andrews, P.[†‡] & Hummel, T.*

Intranasal sodium citrate solution improves olfaction in post-viral hyposmia*

K.L. Whitcroft[1#], C. Merkonidis[1,2#], M. Cuevas[1], A. Haehner[1], C. Philpott[3,4], T. Hummel[1]

Rhinology 54: 368-373, 2016
DOI:10.4193/Rhino16.054

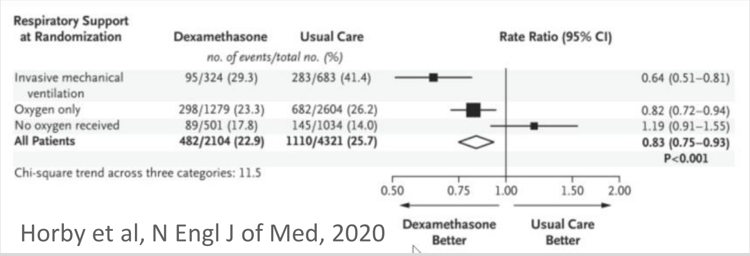
statistisch, aber nicht klinisch signifikant

?

SARS - CoV2 Therapie

Systemische Steroide?

positiver Effekt bei Schwerer-krankten, aber möglicherweise ansonsten schädigend:
Evidenz: schwach !



Horby et al, N Engl J of Med, 2020

Keine Empfehlung dafür innerhalb der ersten Wochen !

?

https://www.bbc.com/news/health-54027269

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SARS - CoV2 Zusasmmenfassung

- Prävalenz von Riechstörungen: 50-60%, zudem oft auch Schmeck- und trigeminale Störungen
- Meistens rasche Erholung innerhalb von 7-20 Tagen, Schmeckstörungen erholen sich schneller und weitgehender
- Etwa 10 (- 20?)% der Störungen dauern mehr 2 Monate
- Therapeutische Option: Riechtraining, Vit A Tropfen (korrekt appliziert)
- Systemische Steroide: CAVE !

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