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BETTER CHEMISTRY

BREATH PROTECT – RUDOLF informs

Hard facts to know...

2020-04-09 | Geretsried

Catch up on face masks with RUDOLF

The coronavirus SARS-CoV-2 poses a great challenge to our society and to us as **RUDOLF GROUP**. Each one of us can contribute to support our society in this crisis.

We as **RUDOLF GROUP** have made it our task to update and to set an example against the misleading and sometimes unfounded promises that are out there in the markets. In this extraordinary emergency situation, by claiming mechanisms of action that have not been medically proven, misleading and thus deliberately endangering frightened consumers often take place.

We thus endorse a consistent statement by the EU Commission:

„We will not accept that traders exploit consumer fears."
(responsible EU Commissioner Didier Reynders)

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It is essential to provide basic information to customers and consumers before promises regarding health protection are made:

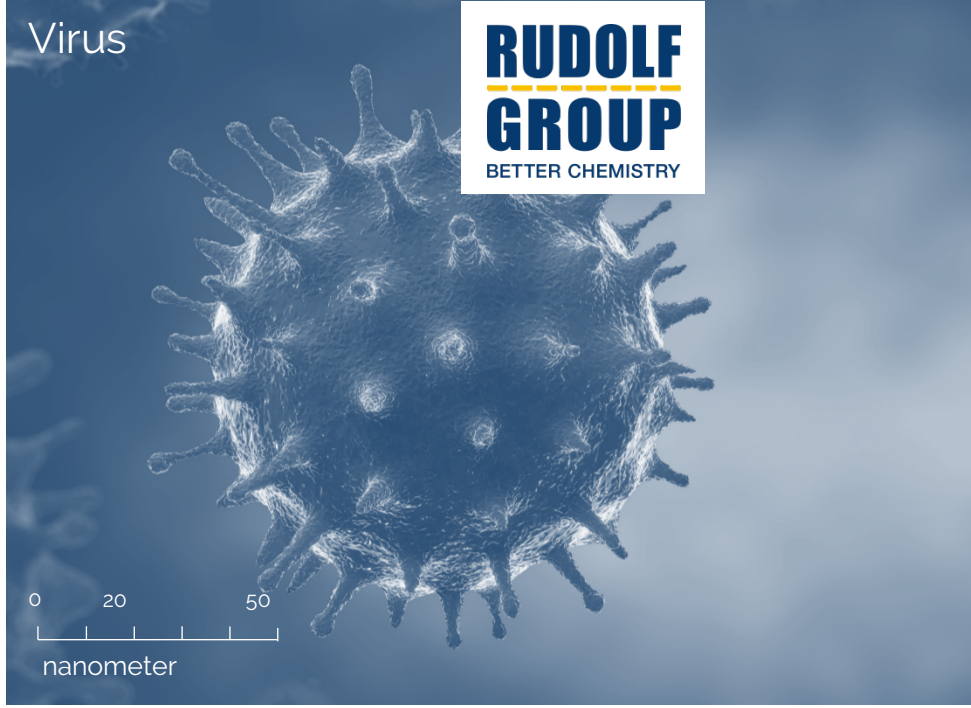
1. viruses vs. bacteria

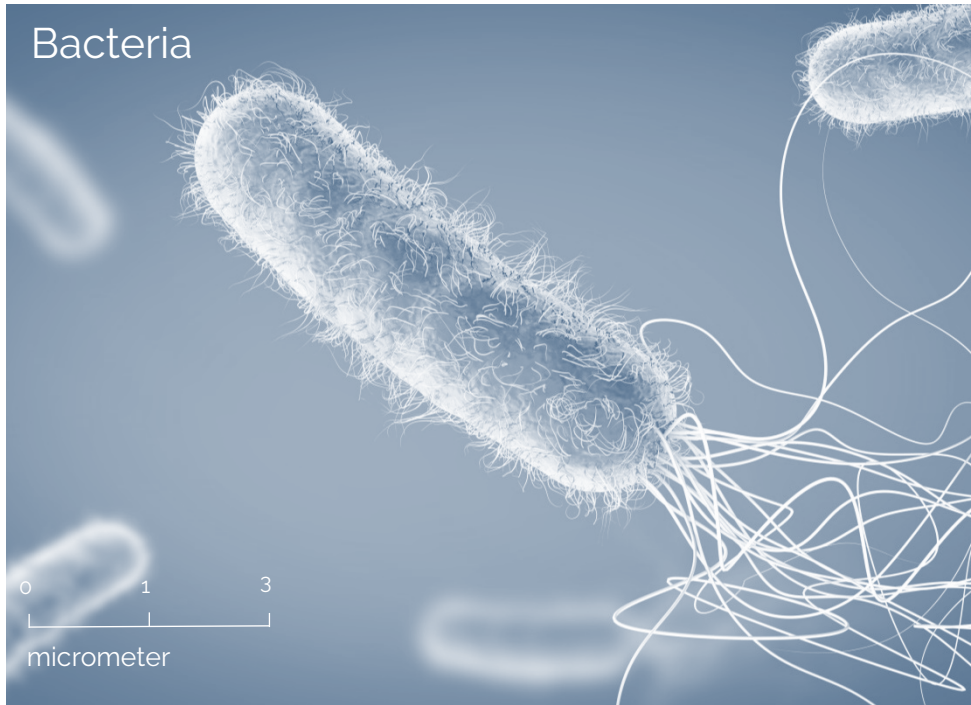
Common to both pathogens is that they can make us very sick.

The size

The difference between bacteria and viruses can be seen on the first glance.

Bacteria are very large with a diameter of about 0.6 to 1.0 micrometer and can be seen with a normal light microscope. Viruses are often about 100 times smaller and therefore only visible under an electron microscope.





The reproduction

Bacteria don't need a host. They are able to reproduce independently through cell division and, unlike viruses, are therefore also found in greater numbers on surfaces.

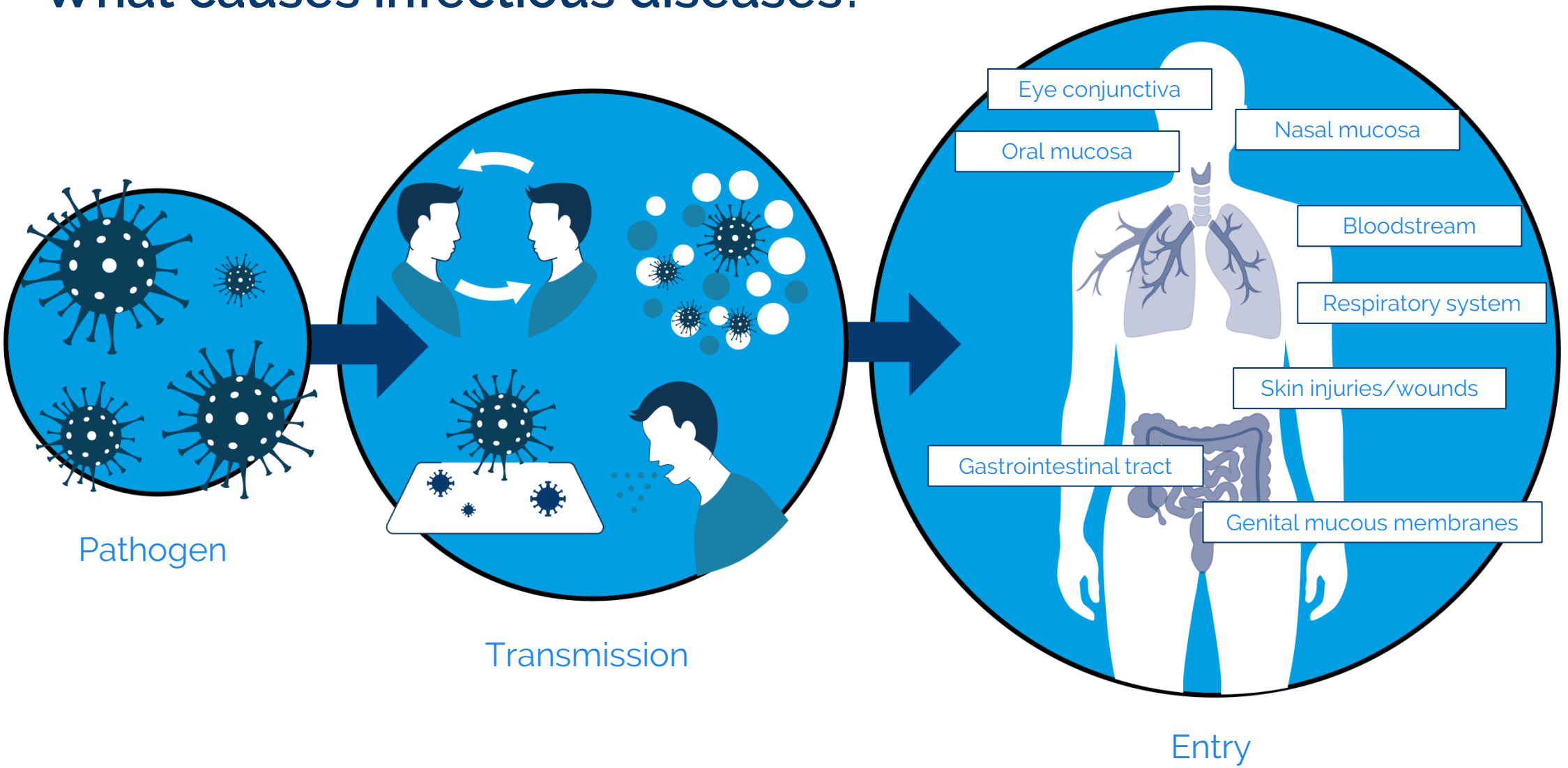
Viruses, on the other hand, always need a host to multiply. If they enter the body of a person, they attack a cell and pass on their genetic material. The "host cell" is then manipulated in such a way that it produces its own viruses with the inserted genetic material. The resulting new viruses leave the host cell, destroy it and infect other cells in order to manipulate them as well.

Differences at a glance

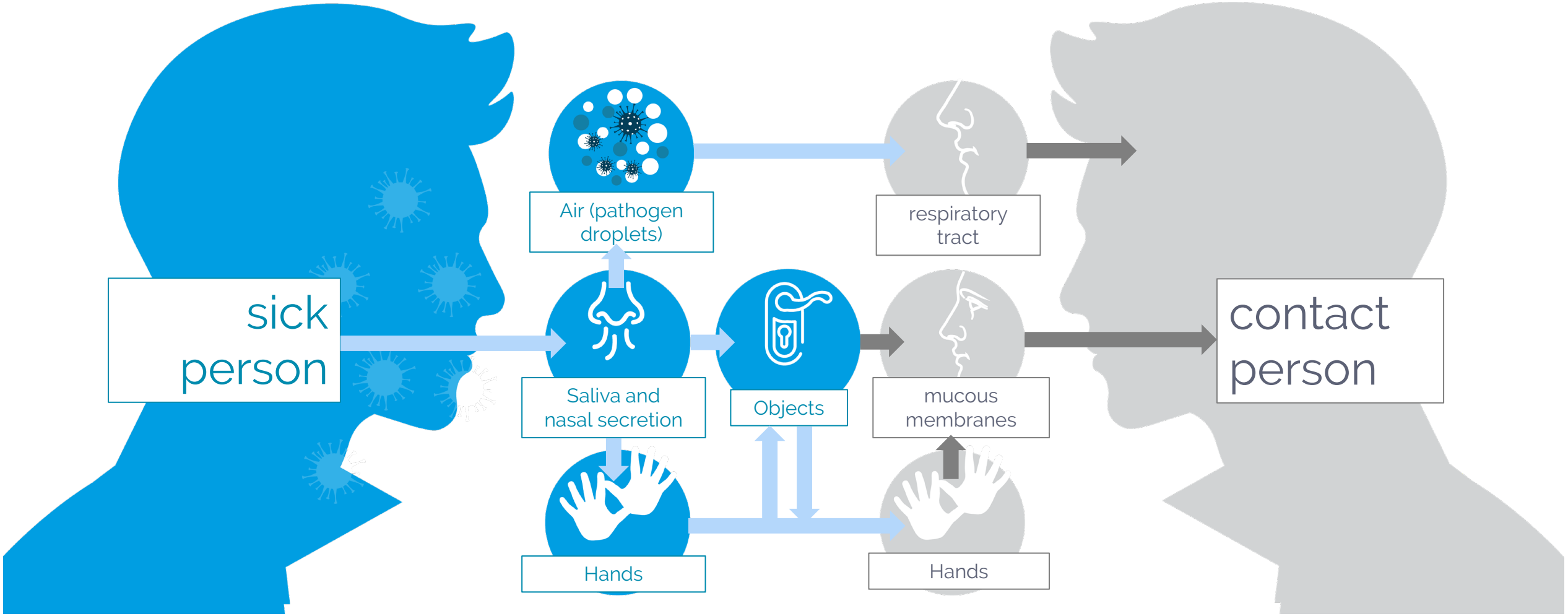
	Bacteria	Viruses
Living organism	yes	no
Type	Single cell	particle
Size	0.5 - 10 µm	0.02 - 0.35 µm
Reproduction	By cell division	Need living cells for reproduction
Metabolism	yes	no
Antibiotics	Effective against bacteria	Ineffective against viruses

2. Possible protective measures

What causes infectious diseases?



Transmission routes of respiratory tract infections



3. Possible protective measures

Besides contact minimization and distance keeping, thorough hand washing and protective masks are the easiest protectives measures available for us.

Washing hands thoroughly

"Many viruses spread particularly via the hands," says a person from the service team at KKH in Munich.

"It has been proven that regular and thorough hand washing reduces the risk of catching colds, flu and other infections."

Why you should sing "Happy Birthday" twice when washing your hands

Thorough hand washing usually takes 20 to 30 seconds. This time span is important because only long hand washing reduces the number of germs to a thousandth or less. If you cannot remember how long 30 seconds are:

Just sing "Happy Birthday" twice when you wash your hands!

However, it is not enough just to hold your hands under the tap, as the Federal Centre for Health Education (BZgA) explained on the occasion of World Hand Hygiene Day:

"You first hold your hands under running water, the water temperature is not important. Then you soap them thoroughly: the insides of the hands, the backs of the hands, the spaces between the fingers, fingernails and thumbs, which are often forgotten."

4. Why respiratory protection?

Mouth-nose protection

Since the spread of the coronavirus, however, there has been much reporting and discussion about "respiratory protection". However, not everyone always knows what kind of masks are involved: from simple self-made masks to medical masks, the demand is huge.

The mucous membranes of the mouth, nose and eyes are the main entry points for pathogens. A general mouth and nose protection can protect the person´s opposite from droplet infection.

Mouth and nose protectors do not fit tightly enough and are primarily intended to prevent the spread of droplets from the nasopharynx of the wearer. It therefore serves primarily to protect others. However, which breathing mask with which type of filter is the right one must be decided on a case-to-case basis.

Individual mask types

According to the German Hospital Association, two types of masks are currently used in hospitals: simple **surgical masks** made of non-woven fabric and protective masks of the **FFP2** and **FFP3** (Filtering Face Pieces) standards.

These are made of firm material. The coronavirus is very small, only the FFP masks are built in such a way that it cannot pass.

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Difference between FFP1, FFP2 and FFP3 particle filtering respirators

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	FFP1	FFP2	FFP3
Masks protect against	non-toxic dusts	solid and liquid dusts, smoke and aerosols harmful to health and from airborne pathogens	toxic and harmful dusts, smoke and aerosols and from airborne infectious agents
Filter capacity (min.) in percent	80	94	99
Leakage (max.) in percent	22	8	2
Possible use when dealing with	respiratory irritants	substances that irritate the respiratory tract and may cause long-term damage to lung tissue elasticity	With carcinogenic or radioactive Zubstances, viruses, bacteria and fungal spores
Use in industrial safety Use during Corona pandemic	construction or in the food industry as a hygiene measure, because they protect mouth and nose from contact by contaminated hands	for medical personnel, metal industry or also in mining for medical and nursing staff for hygiene measures in the treatment and care of patients with a SARS-CoV-2 infection	for medical personnel and in the chemical industry as FFP3 filters are very tight, breathing with these masks is difficult and is therefore only recommended for a short time only for medical and nursing staff
Protects the wearer of the mask from corona viruses	no	yes (with valve yes)	yes (with valve yes)
Protects the surroundings (environment) from corona viruses	conditionally	yes (with valve no)	yes (with valve no)

Quelle: https://www.pure11.de/glossar/ffp-schutzklassen

Who needs breathing masks?

According to the Ministry of Health, there are two main cases where wearing a protective mask is useful. It is absolutely necessary especially for medical personnel.

The second case occurs when a sick person has to move around in public places. In this case, wearing a mask cannot completely prevent the infection of others, but it can minimize the risk of infection.

The current discussion about a general obligation to wear protective masks in public places is also rises awareness of how to provide optimal care and protection.

5. What types of masks are available?

Mask types

"Community Masks":
makeshift mouth and nose masks; made of commercially available materials

Medical mouth and nose protection

Filtering half-masks:
protective masks with claimed protective effect; compliance with relevant legal requirements and technical standards

Mask types

Mask type	"Community mask"	Mouth and nose protection	Filtering half masks
Protection	**Private use**	**Foreign use**	**Self protection / industrial protection**
Intended use	No	Yes	Yes
Medical device or protective equipment	No	Yes, Norm DIN EN 14683:2019-6 CE-Certificate[1]	Yes, Norm DIN EN 149:2001-10 CE-Certificate[1]
Tests und Certification / Approval	by wearing the masks, the speed of the respiratory flow or saliva/mucus droplet ejection can be reduced and the masks can support the awareness of "social distancing" and health-related mindfulness of oneself and others	Protection against droplet ejection of the wearer	Protection of the wearer against solid and liquid aerosols

1 In order to cope with the current crisis situation regarding the containment of Covid-19, MNS and FFP masks that are marketable in the United States of America, Canada, Australia or Japan, and possibly also in Germany, are considered marketable even if they do not bear a CE/NE marking.

Community Masks: "Better than nothing"

They may not be placed on the market as medical devices or items of personal protective equipment and may not be advertised with corresponding performance or protective effects.

Wearers of the described "community masks" cannot rely on them to protect them or others from transmission of SARS-CoV-2, since no corresponding protective effect has been proven for these masks.

Nevertheless, the president of the Robert Koch Institute, Wieler, said that even a home-made mouth-nose protector holds back droplets when sneezing and coughing. It is therefore suitable for the protection of others.

Medical mouth-nose protection (e.g. surgical masks)

Medical Oral and Nasal Protection (MNS; surgical masks) is mainly used to protect the patient from exposure to potentially infectious droplets of the person wearing the protective mask.

Masks used as medical mouth-nose protection are marketed as medical devices and are therefore subject to medical device law (for more information, please refer to the website of the Federal Ministry of Health:

https://www.bundesgesundheitsministerium.de/themen/gesundheitswesen/medizinprodukte.html).

FFP masks

Filtering half masks (FFP) are items of personal protective equipment (PPE) used in the context of occupational health and safety and are intended to protect the wearer of the mask from particles, droplets and aerosols.

The design of filtering half masks varies: there are masks without exhalation valve and masks with exhalation valve. Masks without a valve filter both inhaled and exhaled air and therefore provide both self-protection and protection against foreign bodies. Masks with valve only filter the inhaled air and are therefore not designed for external protection.

In order to legally market FFP masks in Europe, they must undergo a conformity assessment procedure in accordance with the PPE Regulation (EU) 2016/425, after which the manufacturer attaches a CE label to them. The masks must regularly meet the requirements of the standard DIN EN 149:2001-10.

How long do FFP masks last?

FFP masks are normally worn during contact with infected patients and in suspected cases. It is recommended to wear them for about two hours the most. Then they should be taken off or be changed.

In Switzerland, the National Centre for Infection Prevention recommended several weeks ago that hospitals should now wear the masks for up to eight hours - even if this is not comfortable due to the moisture build-up.

6. What do I need to know about products with antiviral claims?

Advertisement with RUDOLF biocidal products according to EU Biocide Directive

Non-scientific methods and false information are being spread around the new corona virus. From food supplements, antibiotics and antiviral finishes for textiles: everything is currently available on the market. As already described, the exact claim of antiviral effectiveness is crucial for the legal basis.

Products that have not been sufficiently tested may not be placed on the market as articles of antiviral protective equipment and may not be advertised with corresponding performance or protective effects.

RUDOLF GROUP *therefore explicitely points out that according to the EU Biocide Directive and the American Environmental Protection Agency EPA, a claim with* ***RUDOLF*** *biocidal products can only be made for the protection of the textile against (odour causing) bacteria. A claim against protection from pathogenic/specific bacteria or even viruses is currently not possible, as neither sufficient tests nor the necessary authorisations are available!*

7. How can RUDOLF contribute to providing textile solutions for health protection?

How can RUDOLF contribute to providing textile solutions for health protection?

Based on many years of experience **RUDOLF GROUP** has compiled a series of technical recommendations for the production and improvement of protective textiles.

General mask construction

Layers	Construction and kind of fibre	Comments
(Most) outer/third layer	Thermo or spunbond nonwoven Polypropylene (PP), Polyester (PES) or mixtures	Mechanical stabilisation of the multilayer construction
Middle layer/second layer	Melt-blown or spunlaced nonwoven Polypropylene (PP), Polyester (PES)	This layer is the main filtering part. The filter material has an electrostatic charge (Electret). The function principle is that though the filter is permeable it can filter out small particles including aerosols by clinging to the dielectric filtering fiber.
Inner/first layer (Next to skin, mouth and nose)	Thermo or spun-bond nonwoven Polypropylene (PP), Polyester (PES) or mixtures	This layer is soft and without any chemical end-finishes.

Possible functional finishes for medical face masks

Third (most) outer layer

(Outer) layer with hydro-phobic function and laundry wash resistance

Second/middle layer

Fluffy layer
with protection against bacteria

First/inner layer

Soft layer next to skin/mouth/nose
without any chemical finish

Possible functional finishes for medical face masks

Layers	Target	RUDOLF's solution
(Most) outer/third layer	Rendering the fabric surface water repellent to prevent adsoprtion of infectious aerosol droplets that result from coughs or sneezes -> Hydrophobic fabric bears less infectious material	**RUCO-GUARD AFB6 Conc** applied by pad, lick roll or spray application
Middle layer/second layer	Improvement of textile's protection against bacteria ⇒ Improvement of layer's hygiene	**RUCO-BAC HSA CONC**, non-migrating antibacterial active quat. silan polymer (pad, lick roll, exhaust) Inactivating of bacteria, when getting in direct contact
Inner/first layer (Next to skin, mouth and nose)	No skin irritation	No chemical finishes are recommended

The possible effect of these finishes on filtration depends much on the regarding fabric/fibre ready to finish

Possible functional finishes for textile face masks

Third/(most) outer layer

Colored textil (outer) layer
with hydrophobic function

Second/middle layer

Fluffy layer
with protection against bacteria

First/inner layer

Soft layer next to skin/mouth/nose
without any chemical finish

Textile face masks with only two layers (inner layer/outer layer) are often found

Possible functional finishes for textile face masks

Layers	Target	RUDOLF's solution
(Most) outer/third layer	Rendering the fabric surface water repellent to prevent adsoprtion of infectious aerosol droplets that result from coughs or sneezes -> Hydrophobic fabric bears less infectious material	**RUCO-GUARD AFB6 Conc** applied by pad, lick roll or spray application **RUCO-LINK XCR** for enhanced laundry wash resistance
Middle layer/second layer (Masks with only two layers often offered)	Improvement of textile's protection against bacteria ⇒ Improvement of layer's hygiene	**RUCO-BAC HSA CONC**, non-migrating antibacterial active quat. silan polymer (pad, lick roll, exhaust) Inactivating of bacteria, when getting in direct contact
Inner/first layer (Next to skin, mouth and nose)	No skin irritation	No chemical finishes are recommended

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RUCO-BAC HSA CONC – Product Safety

Registrations, Listings, Approvals	Comments
OEKO-TEX Standard	All product classes I – IV
EPA-registration (Environmental Protection Agency, USA)	EPA-registration no. 91742-3-84189 In the context of registration at EPA under FIFRA acute toxicology, biocidal active products have to be approved according to following Health Effects Test Guidelines: - OPPTS 870.1100 Acute oral toxicity LD50 - OPPTS 870.1200 Acute dermal toxicity .LD50 - OPPTS 870 1300 Acute inhalation toxicity LC50 - OPPTS 870.2400 Primary eye irritation - OPPTS 870.2500 Primary dermal irritation - OPPTS 870.2600 Skin sensitization

RUCO-BAC HSA CONC – Product Safety

Registrations, Listings, Approvals	Comments
bluesign® APPROVED ZDHC version 2 (Zero Discharge of Hazardous Chemicals)	Thus listed in ZDHC Gateway level 3
Registered according to the European biocide product regulation in Germany	Registration no. N-46279 In the context of biocidal registration, the active ingredient of **RUCO-BAC HSA CONC** is approved based on the following toxic tests: - Oral toxicity (OECD 423) - Skin irritation (OECD 404) - Sensitization (OECD 406) - Mutagenicity testing (OECD 471)

8. Assistance needed?

We are happy to help!

Regarding our biocidal products, please contact:

Mr. Stephan Müller, Dipl.-Ing. (FH)
phone: 0049 8171 53291
e-mail: stephan.mueller@rudolf.de

Regarding our oil and water repellent finishing agents, please contact:

Dr. Luka Kovacevic
phone: 0049 8171 53340
e-mail: luka.kovacevic@rudolf.de

Source

https://www.bfarm.de/SharedDocs/Risikoinformationen/Medizinprodukte/DE/schutzmasken.html

https://www.rki.de/SharedDocs/FAQ/NCOV2019/FAQ_Liste.html#FAQId13545204

https://www.infektionsschutz.de/infektionskrankheiten/erregerarten/bakterien.html

https://www.infektionsschutz.de/infektionskrankheiten/erregerarten/viren.html#c6261

https://www.infektionsschutz.de/coronavirus/materialiendownloads.html

https://www.pure11.de/glossar/ffp-schutzklassen

https://www.bundesgesundheitsministerium.de/themen/gesundheitswesen/medizinprodukte.html).

Thank you.

RUDOLF GmbH
Altvaterstraße 58-64
82538 Geretsried
Germany

Phone + 49 8171 53 - 0
Fax + 49 81 71 53 - 191
E-Mail info@rudolf.de
www.rudolf-group.com