



Carragelose[®]

First Data Show Neutralizing Effect on SARS-CoV-2



August 2020

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What is Carragelose® ?

A causative treatment for viral upper respiratory infections



Carragelose®

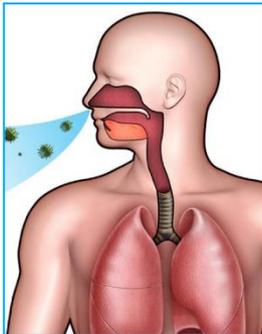


- Carragelose® is iota-carrageenan, a natural extract from red seaweed.
- Carragelose® can be used as a broadly active treatment of colds and viral infections of the upper respiratory tract, **directly addressing the cold viruses**, not only the symptoms.
- It is clinically proven to safely protect against a multitude of respiratory viruses.^{(1), (2)}
- It can **shorten the duration of common cold symptoms** caused by viruses and **reduce the resurgence** of virus-related symptoms.
- Carragelose® is marketed since 2008 and is available in nasal sprays, a throat spray and lozenges in over 40 countries. The products are **well tolerated and safe** and can be used by children and adults as well as by pregnant and lactating women.
- Its use may be particularly attractive for **risk groups** such as oncology or immune compromised patients.

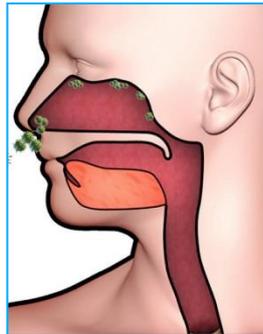
(1) Ludwig, M. et al., 2013, (2) Koenighofer, M. et al., 2014

Unique mode of action

Carragelose® blocks viral attachment to cells via an unspecific physical mechanism



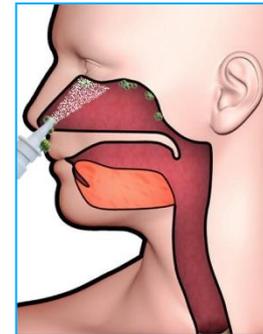
Colds are caused by more than 200 different respiratory viruses and spread by aerosols released by infected individuals



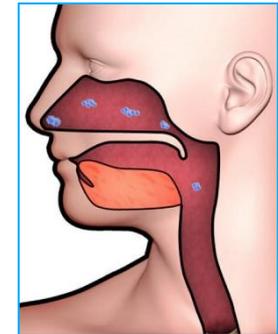
Cold viruses bind to the surfaces of the upper respiratory tract, initiating the infection

Carragelose®

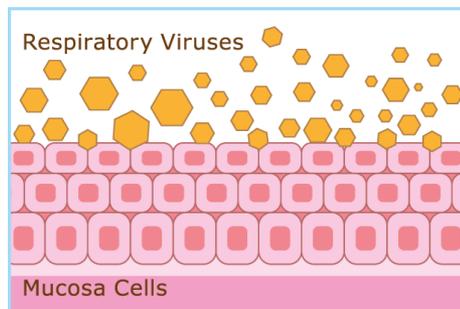
Preservative- and sugar-free. Can be used from an age of 1 year as well as during pregnancy and lactation



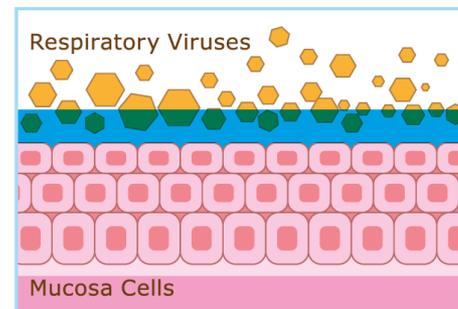
Carragelose® creates a protective layer that reduces the spreading and proliferation of the virus particles



Clotted viruses leave the body via the natural route → cold is either prevented or is significantly shorter in duration



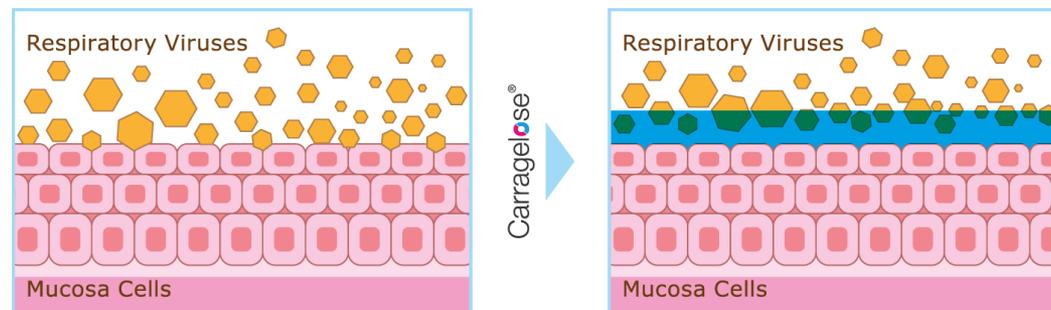
Carragelose®



Carragelose[®] protects against respiratory viruses

The protective effect has been shown in several studies

- Carragelose[®] forms a protective layer on the mucosa of nose and throat. **Virus particles** entering the nasal and pharyngeal cavity become trapped in the viscous layer of Carragelose[®], as a consequence they **cannot infect mucosal cells**.
- The **physical barrier** restricts the spread of a multitude of **different viruses**, including the Rhinovirus and other already known coronaviruses. This has been shown in 4 clinical trials in the past.⁽¹⁻⁴⁾
- Also, newly synthesized virus particles that are released from the cell become trapped thereby **preventing that new cells become infected**. This unspecific mechanism is supported by clinical data.



(1) Eccles, R., 2010, (2) Fazekas, T. et al., 2012, (3) Ludwig, M. et al., 2013, (4) Koenighofer, M. et al., 2014

New study shows that Carragelose® is effective in protecting cells against SARS-CoV-2



SARS-CoV-2 in-vitro neutralization assay reveals inhibition of virus entry by iota-carrageenan

Martina Morokutti-Kurz, Philipp Graf, Andreas Grassauer, Eva Prieschl-Grassauer

doi: <https://doi.org/10.1101/2020.07.28.224733>

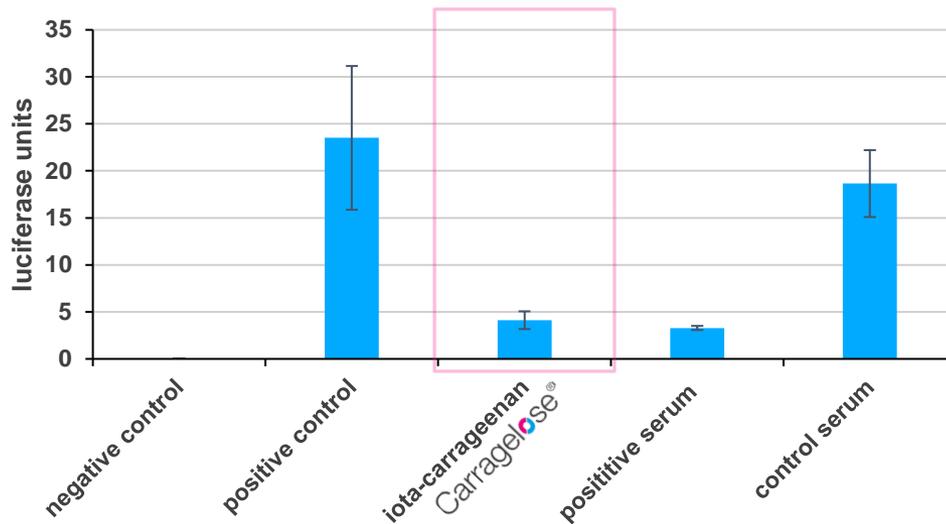
This article is a preprint and has not been certified by peer review [what does this mean?].

- Scientists at Marinomed showed that Carragelose® has a **neutralizing effect on SARS-CoV-2** in cell culture
- Carragelose® prevents the infection of cells in the **same way as a human serum** with antibodies against SARS-CoV-2

These findings show that the virus-neutralizing effect of Carragelose® also applies to SARS-CoV-2, the virus causing the disease COVID-19.

Virus Neutralization of SARS-CoV2

In vitro results show the virus neutralizing action of Carragelose®



In this test, the extent of the infection is determined by measuring the activity of an enzyme called luciferase: **the higher the luciferase activity, the more cells are infected by the virus.**

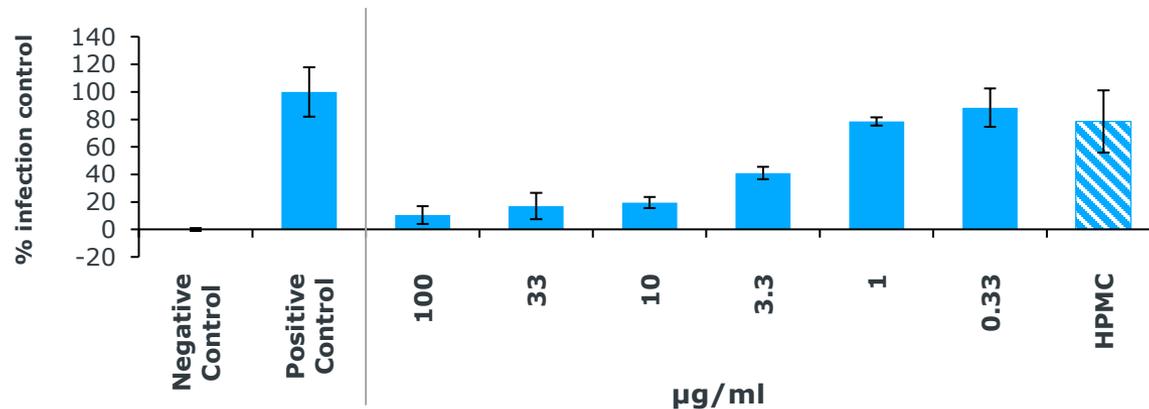
- Carragelose® is highly active in a virus neutralization assay. The results show, that **Carragelose® prevents the infection of cells** in the same way as a human serum with antibodies against SARS-CoV-2 („positive serum“ from a COVID-19 patient in the graph on the left).
- **Carragelose® prevents an infection of the cells by more than 90%**, meaning that less than 10% of the virus remain

The virus neutralization assay is considered to be the "gold standard" for detecting and measuring antibodies that can neutralize viruses and is used in the development of vaccines.

Carragelose[®] already effective at lower doses



- Carragelose[®] yields excellent results already at lower doses for protection against viral infection and is at the same time safe.
- Higher concentrations of Carragelose[®] have even better control of infection - concentrations of 100 µg/ml result in a 90% control of the infection.
- The well-known polymer HPMC (hydroxypropylmethylcellulose) was used as a control to test if an increase of viscosity would result in inhibition of the virus.



The marketed nasal and throat sprays contain **1.2 mg/ml Carragelose[®]** while already a concentration as low as 6 µg/ml reduced infectious viral particles by more than 99.99%.

Carragelose[®] effective at low concentrations against multiple coronavirus types



- In clinical studies, Carragelose[®] was shown to be effective against the coronavirus type **hCoV OC43**.⁽¹⁾
- **hCoV OC43** and **SARS-CoV-2** belong to the same virus family of beta-coronaviridae
- In the new in vitro study, the effect of Carragelose[®] (iota-carrageenan) and kappa-carrageenan on **viral replication** was tested on both hCoV OC43 and SARS-CoV-2⁽²⁾
- The data show that SARS-CoV-2 is similarly sensitive to Carragelose[®] as hCoV OC43. This means that Carragelose[®] **effectively prevents both viruses from replicating**, in a dose-dependent manner.⁽²⁾
- Carragelose[®] inhibits both **hCoV OC43** and **SARS-CoV-2** at much lower doses than kappa-carrageenan:⁽²⁾

Virus strain	IC ₅₀ virus contact (µg/ml Carragelose)	IC ₅₀ infection (µg/ml Carragelose)	IC ₅₀ virus contact (µg/ml kappa-carr.)
SARS-CoV-2	2.58 (1.68-3.48)	0.43 (0.28-0.58)	>10 µg/ml
hCoV OC43	0.33 (0.01-0.65)	0.33 (0.01-0.65)	>100 µg/ml

What is IC₅₀? IC₅₀ is the *half maximal inhibitory concentration* and measures the potency of a substance. Here it shows how much of Carragelose[®] and kappa-carrageenan is needed (in vitro) to inhibit the virus replication by 50%.

(1) Ludwig, M. et al., 2013, (2) Morokutti-Kurz, M. et al., 2020

Independent research group confirms the inhibition of SARS-CoV-2 by Carragelose®



Iota-carrageenan and Xylitol inhibit SARS-CoV-2 in cell culture

Shruti Bansal, Colleen B. Jonsson, Shannon L. Taylor, Juan Manuel Figueroa, Andrea Vanesa Dugour, Carlos Palacios,  Julio César Vega

doi: <https://doi.org/10.1101/2020.08.19.225854>

This article is a preprint and has not been certified by peer review [what does this mean?].

- The results published by Marinomed were independently confirmed by scientists in Argentina and the USA
- The data support the findings by Marinomed on SARS-CoV-2: Using a formulation identical to the Carragelose® nasal spays (1.2 mg/ml iota-carrageenan in 0.5% NaCl) diluted to 6 µg/ml they saw a **reduction of virus titre / replication by more than 99.99%**.
- The marketed products contain 1.2 mg/ml Carragelose® which is far more than the amount shown in the studies to be effective at neutralizing the virus.

Clinical efficacy of Carragelose[®] against SARS-CoV-2



Independent clinical studies confirm findings

In addition, a **clinical study** with a combination of iota-carrageenan and Ivermectin was conducted in Argentina with 229 health care workers:

- They used the iota-carrageenan nasal spray 5 x times/day into the nostrils and into the throat plus 1 drop of Ivermectin onto the tongue. In the control group with standard of care they observed virus positive cases in 11% within four weeks while **in the treatment group no infection with SARS-CoV-2 could be detected**. These results are highly significant and are the first clinical data with iota-carrageenan against SARS-CoV-2.⁽¹⁾
- Another placebo controlled clinical trial will follow to show the protective properties of Carragelose[®].

(1) Source: <https://www.clinicaltrials.gov/ct2/show/NCT04521322>

Carragelose[®] is effective against SARS-CoV-2



The protective effect has been shown in *in vitro* studies in July and August 2020

- New data from cell culture studies underscore the **protection** Carragelose[®] provides against **SARS-CoV-2**, the virus causing **COVID19**.⁽¹⁻²⁾
- The formulation used in the cell culture study was identical to the one used in the marketed Carragelose[®] nasal sprays.⁽²⁾
- **Carragelose[®] prevents the infection of cells** in the same way as a human serum with antibodies against SARS-CoV-2⁽¹⁾

The **virus neutralizing activity** of Carragelose[®] applies to SARS-CoV-2⁽¹⁻²⁾ and even if Carragelose[®] cannot prevent completely an infection, it may strongly **reduce the risk of an infection and virus spread**.

Carragelose[®]

Stay Healthy!

...and further reduce the risk by following these rules





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