

PEPTIDE FOR THE PREVENTION AND TREATMENT OF INFLUENZA AND OTHER RESPIRATORY VIRAL INFECTIONS

DESCRIPTION OF THE TECHNOLOGY

The Oral Microbiome research group of FISABIO has identified a peptide of human origin for use in the prevention and treatment of influenza virus, as well as a method to determine *in vitro* the level of this peptide, which may be a risk factor for influenza in an individual.

The research carried out has allowed us to identify a peptide, produced by the innate immune system, which blocks the union between the hemagglutinin of the influenza virus (HA) and the sialic acid of the epithelial cells of the nostrils, throat and lungs, inhibiting the stage of adhesion of the virus and therefore the first stage of infection. The peptide has been found to be over-expressed during viral respiratory infections of several kinds.

Also, the project allows the development of a kit to determine the concentration of this peptide, which may be related to the level of resistance of an individual to be infected with influenza virus from a saliva sample, and therefore allow preventive measures to be taken if necessary.

According to data from the National Network of Epidemiological Surveillance (ISCIII), the incidence rate of influenza in the 2016-2017 season exceeded the established baseline (55.7 cases/100,000 inhabitants) reaching a maximum peak of 229.1 cases/100,000 inhabitants.

In 2009 alone, Spain registered almost one and a half million outpatient cases of influenza A and 3,025 hospitalizations. At an economic level, according to a study carried out in 2009, the cost associated with influenza epidemics in Spain is 1,000 million € per year.

Due to the burden of disease associated with influenza viruses, several strategies have been developed to combat this infectious agent such as annual vaccination campaigns for people at higher risk. However, a vaccine produced one year may not be effective the next due to the frequent and rapid mutations the virus undergoes, and the variable dominance of the different strains. On the other hand, the treatment is only symptomatic and in the most severe and hospital cases it is only for maintenance of constants, since antiviral drugs generally have a very limited efficacy and do not lack toxicity.

For all these reasons, the implementation of new strategies that prevent and/or reduce the effects of influenza and other respiratory viral pathogens such as SARS-CoV-2 will imply enormous savings in the health system, both in hospital expenses as well as in sick leave and loss of performance.

MARKET APPLICATION SECTORS

Pharmaceutical and clinical diagnostics sector.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

The advantages of the identified peptide are the following:

- It is a human protein, with all the advantages that this entails: low incidence or risk of allergies, toxicity and resistance.
- At the treatment level, it inhibits the first stage of virus infection and it is therefore potentially effective against different strains of influenza virus. Its efficacy has already been tested *in vitro* against the H1N1 and H3N2 subtypes.
- It allows detecting the risk of contracting influenza due to low peptide production on an individual basis, and therefore to make a diagnosis and recommendations for its prevention.
- In terms of prevention, it could help protect mucous membranes against infection by several respiratory viruses.

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CURRENT STATE OF DEVELOPMENT

Tests have been carried out on an *in vitro* model, demonstrating the technical feasibility of the invention and lack of toxicity. Infection tests on cell lines with the live influenza virus and SARS-CoV-2 have been planned in FISABIO's level 3 security laboratories.

Peptide levels have also been measured in resistant and susceptible populations to flu infection. The results obtained in the ongoing proof of concept will allow obtaining the necessary information to validate the technology, determine the basal levels of the peptide in the population, and will set the basis for a diagnostic test that identifies individuals with a predisposition to suffer from viral respiratory infections due to low levels of the peptide or a variant of the same with low efficacy. The next step would be to develop infection tests in animal models.

INTELLECTUAL PROPERTY RIGHTS

Patent-protected technology (priority year 2020); ownership of the result: FISABIO.

COLLABORATION SOUGHT

License or co-development agreement with companies interested in the development and commercialization of the product.

License or co-development agreement with companies interested in the diagnostic kit.

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