

Coronavirus treatment with colostrum

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Abstract

Summary of the necessity of implementation and practical goals of the project: Lactoferrin glycoside is an 80-kDa protein capable of binding to iron. By absorbing iron from the environment, this protein can prevent viral pathogens that need environmental iron for their function. Because the new coronavirus posed a high risk of death and did not receive definitive treatment due to the viral mutation, this study aimed to monitor the effect of lactoferrin on boosting the immune system in patients with COVID-19. **Summary of project implementation method:** According to statistics obtained from children with COVID-19 disease and adults in Iran, Arab countries, and India, this research was conducted in a completely randomized plan. After ensuring that the data is normal, using one Sample Kolmogorov-Smirnov Test, analyzing the data from the lactoferrin effect on increasing the strength of the immune system using 19 SPSS software, one-way analysis of variance (one way ANOVA), and a comparison with Duncan's multidimensional test between different treatments were performed. $P < 0.05$ was considered significant.

Keywords: Colostrum, COVID-19, Virus, ANOVA

INTRODUCTION

The milk that is secreted during the first days after delivery is called colostrum. Colostrum is a rich source of nutrients, antibodies, minerals, vitamins, bioactive substances, and growth factors [1, 2]. Colostrum products contain immunoglobulin, and some colostrum-based products are available as daily supplements for humans. Today, clinical trials are underway in many countries to increase the potential of safe milk products as a preventive treatment against antibiotic-resistant infections in humans [3]. Lactoferrin can be refined from milk, especially colostrum. Lactoferrin is found in most secretions, including milk, tears, saliva, as well as in large amounts in specific neutrophil granules. It is a glycoprotein with a molecular weight of 80 kDa, which has a strong tendency to bind to iron [4, 5]. Lactoferrin (Lf), an iron-binding protein, belongs to the non-specific natural defense, and the first function attributed to it is antimicrobial activity, which depends on its capacity to contain iron [6]. Its biological properties include regulating iron absorption in the intestine, anti-inflammatory properties, regulating the immune system, and antibacterial, viral, and tumor activity [7]. Its protein structure consists of two parts, amino (N-lope) and carboxylic (C-lope), each of which has the ability to bind to free iron [8, 9]. Lactoferrin's ability to carry out antiviral activity by binding to host cells and/or viral particles promotes the idea that lactoferrin is an important brick in the mucosal wall that is effective against microbial and viral attacks. By absorbing free iron, lactoferrin deprives the environment of this element, thus depriving the bacteria and pathogens that need iron for their growth and reproduction to live and are unable to survive. Accordingly, lactoferrin indirectly inhibits infection [10]. One of the pathogens that has disrupted the

health and economy system around the world today is the new coronavirus or COVID-19. Human coronavirus is one of the most common pathogens that cause respiratory infections in humans. SARS-CoV-2 has enveloped virions that have a positive RNA genome and are about 50-200 nanometers in diameter [11]. COVID-19 transmission modes are through respiratory droplets, physical contact, and airborne particles. There is evidence that the virus can be transmitted from human to human [12, 13]. The incubation period of COVID-19 is about 2 to 14 days, but infected people transmit the virus through close contact and respiratory droplets, even before symptoms appear. There is currently no effective vaccine against COVID-19 [14]. Therefore, the treatment of this disease is one of the most important medical challenges in the present age. Research on more effective treatment is a medical priority, and since lactoferrin is said to play a role in suppressing viral infections, this study looked at the effect of

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lactoferrin on cholesterol in boosting the immune system and fighting the coronavirus.

Definition of words:

Colostrum: milk secreted during the first days after delivery.

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Lactoferrin (Lf): An iron-binding protein belonging to the non-specific natural defense.

SPSS: The most popular statistical software for data analysis is an application in the field of statistical analysis that can compute descriptive statistics, including chart and various charts, mean calculations, standard deviation, variance, and mean.

Objectives & Hypotheses

1. Children are less likely to develop COVID-19 than adults.
2. The amount of food in adults has decreased by 60% compared to children.
3. The most important factor in the saliva is to prevent the coronavirus lactoferrin virus.
4. Arab countries and India have prevented the outbreak of coronavirus because they use dairy products more than other countries.

A. General Objectives

Since lactoferrin in milk has been shown to have antiviral effects in many viral infections and its inhibitory effects on viral infections have been successful, this study aimed to investigate the effect of lactoferrin in inhibiting coronavirus infection.

B- Specific Objectives:

Investigation of the effect of lactoferrin on COVID-19 inhibition. This material can free the environment from this element by absorbing free iron. As a result, viral pathogens that need iron to survive, grow, and reproduce are deprived and unable to survive. In this way, lactoferrin indirectly inhibits infection.

C- Hypotheses / Research Questions:

1. Does lactoferrin cause the absorption of iron and prevent viral infection?
2. Can lactoferrin inhibit COVID-19 in coronary heart disease patients?
3. Can lactoferrin prevent the spread of COVID-19 virus?
4. Do children get the disease less than adults?

METHODS AND MATERIALS

A- Type of study:

Specify the type of study and explain the items in front of the paragraph in the "Method" section.

Marking area	Type of study	Items that must be explained in the project implementation method
	Case series	Definition of disease - population under study - locations studied
	Cross-Sectional	Population under study - the name of variables - sampling methods
X	Case / Control	Defining the case group (e.g. patients) and how to select them - defining the control group and how to select them - the ratio of control to the case - the name of the main independent variable under consideration
	Cohort	Prospective or retrospective definition of population study - the exact definition of confrontation - the exact definition of outcome - how to deal with the loss
	Interventional or clinical trial	Type of study - the type of human or animal sample - definition of how to intervene and its exact amount (duration of the dose used, etc.) - the existence of control group - how to divide into different groups (allocation) - how to blind study - how to deal with examples of studying (withdrawal, loss) - the exact definition
	Experimental	The exact definition of the course of action - the exact definition of the results
	Study to make medicine or devices	Detailed definition of medicine or supplies - does it have a similar externality?
	Launch a scientific/executive method or system	
	Check the tests	The accurate definition of testing - accurate definition of the gold standard test - how to accept patients and healthy people
	Check methods	Accurate specifications of the method - accurate specifications of the routine method - accurate definition of differences - how to accept patients and healthy people
	Qualitative studies	The accurate definition of the groups in question - how to conduct meetings and lead discussions - introduce meeting managers and their expertise - how to draw conclusions
	Health System Management Studies	

B- Variables

Row	Variable title	Variable in terms of their role in research				Variables in terms of type		Variables in terms of scale				Scientific-practical definition	The method of measurement	
		Independent	Dependent	Interferer	Underlaying	Quantitative		Qualitative	Nominal	Ordinal	Interval			Ratio
						Continuous	Discrete							
	Monitoring the effect of lactoferrin on increasing the strength of the immune system	X				X							Discrete scales are more advanced than ranking scales, and in addition to having a feature or attribute, they can also specify quantitative or large values.	In the descriptive statistics on this scale, all the indicators of the central trend, including mode, mean and median, which is the average score, as well as all the indicators of the distribution, including variance, deviation from the standard and the range of changes are used.

C- Research environment:

Arab countries, Iran and India

D- Society and research sample:

Coronavirus-infected patients include children and adults in Arab countries, Iran and India

E - Sampling method and sample size:

None

F- Information collection method and information collection tool specifications:

Non-laboratory-study, library-articles

The information collected was from reading books and articles via the Internet.

G- Method:

Reviewing statistical data using statistical methods such as SPSS

H- Method of data analysis:

The collected information will be included in the relevant section after reviewing the statistical results, and the information obtained in each section will be analyzed according to the descriptive statistics.

I- How to observe ethical points:

Educational researchers will adhere to the highest possible and reasoned standards in research, education, practice, and service delivery, and will work based on knowledge resulting from professional science and competence, and with professional honesty and integrity.

Educational researchers will conduct training, practice, and service research only within their competence and based on the training they have received, the skills they have acquired, or the appropriate professional experience.

They are well versed in up-to-date knowledge and professional information in their field of work and are committed to continuing their efforts to maintain their professional competence.

They will conduct research, training, and service delivery in new areas and creative ways, relying solely on the knowledge that has led to practical competence in these areas.

Educational researchers will not start any research without the conscious consent of the participants in that research or their legal guardians.

Predicting the time required for the full implementation of the plan

"Schedule of work implementation and progress".

Row	Description of each of the executive activities of the project separately	Period	Execution period			
			1 month	2 months	3 months	...
	1. Catechism studies					
	2. Study articles					
	3. Separation of statistical population					
	4. Comparative study of age group					
	5. A comparative study between countries					

6. Statistical review with measurement software
7. Review the results with design assumptions
8. Record the results

Possible executive problems in carrying out the plan and the method of solving it:

Executive problems can be part of moral constraints, or they cannot be implemented for a variety of reasons, such as budget and non-cooperation. There may also be an error in the analysis of subsequent results, and the necessary arrangements will be made to prevent these errors in advance.

Literature review & references:

In a 2005 study, Valenti et al. found that lethal iron-independent microbial activities in lactoferrin require direct interaction between these cationic protein and microbial surface components. The study led to many other antimicrobial and antiviral functions since then attributed to lactoferrin. Lactoferrin has also been shown to bind to iron released from transferrins, which prevent the spread of viruses and viral attacks [6]. Volusamy et al. showed that the tendency of lactoferrin to absorb iron is considered to be a major component of the host's non-specific defense system against countless pathogens [15]. In 1987, Lou et al. demonstrated lactoferrin antiviral activity for the first time in mice infected with polycythemia induced by the FVC-P virus [16]. Since 1994, the powerful antiviral activity of hLf (human lactoferrin) and bLf (bovine lactoferrin) against enveloped and unenveloped viruses has been demonstrated. Studies have shown that lactoferrin binds to surface proteins on viruses or host cells, or both [6]. In general, the role of lactoferrin against many viruses is known, for example, several of these functions are seen in the table below.

Table 1. The role of lactoferrin in inhibiting several types of viruses

Virus type	How to inhibit viral function by lactoferrin	Data results	Ref.
Cytomegalovirus (CMV)	When negatively charged groups were added to lactoferrin with the suctioning process (a type of post-translational change), antiviral power was greatly reduced, while the addition of positively charged groups to lactoferrin increased protein amino acid activity. It was antiviral	These data suggest that lactoferrin may exert its effects by inhibiting virus entry instead of stimulating the immune system.	[17, 18]
Herpes simplex virus (HSV)	HLf activity has been confirmed against HSV-1 infection by cultured cells and has shown that bLf, Mn-bLf, and Zn-bLf are important inhibitors of HSV-1 and HSV-2 infections by binding to the cell. They are hosts and HSV particles.	The inhibition of HSV-1 contamination by lactoferrin depends on its interaction with GAG chains on the cell surface of viral HS and CS viral glycoproteins on host cells.	[19-21]
Human immunodeficiency virus (HIV)	When negatively charged groups were added to lactoferrin by the suctioning process, there was a strong antiviral effect on HIV-1 and HIV-2, while the addition of positive charges to lactoferrin through aminogenesis destroyed antiviral activity. Became HIV.	Both hLf and bLf lactoferrin and high-strength charged proteins bind to the V3 ring of the gp120 envelope protein, thereby inhibiting virus fusion and entering the culture cells.	[22]
Rotavirus	Iron-saturated BLf inhibits rotavirus proliferation in a dose-dependent manner.	Iron-linked lactoferrin prevents the virus from binding to cell surface receptors by binding to viral particles. Therefore, it both prevents the rotavirus hemagglutination and prevents the virus from attaching to susceptible cells.	[23]

A study by Ji et al. showed that the New Coronavirus-2019 is a chimeric virus between the bat coronavirus and a coronavirus of unknown origin. Compared to other animals, they found that snakes were most likely the reservoir of the new Coronavirus-2019 [24]. A study by Benonato et al. showed that the new Coronavirus-2019 is very closely related to the coronavirus isolated from certain types of Chinese bats (chrysanthemum-headed) [25]. Chan et al. confirmed that the new Coronavirus-2019 is a new coronavirus that is highly associated with bat SARS-like coronavirus [26]. Zhou et al. and Wu et al. found that the sequence similarity between the new Coronavirus-2019 and the SARS-like Coronavirus was 79.5%. They also found that the new 2019 Coronavirus had high homology with the bat coronavirus. Thus, current evidence strongly confirms that the new Coronavirus-2019 was obtained from bats, although the middle or intermediate hosts of the new Coronavirus-2019 are not yet known [27,28].

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