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**ROLE OF MOTHER'S MILK AS A FACTOR OF  
TRANSMISSION OF HERPESVIRUS INFECTION  
FROM AN INFECTED MOTHER TO THE  
NEWBORN**

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It is known that mother's milk is the most important feeding stuff for an infant [1]. Although the technologies in production of food and baby food are developing, human breast milk is considered by specialists to be beyond compare with other stuffs of babies' nutrition [2]. It is specified that breast milk of a healthy woman contains all nutrients necessary for an infant in amount and ratio which mostly correspond to the needs of a growing organism. Mature milk keeps average composition (physical and chemical properties) more or less constant during the whole lactation period and contains a wide range of easily digestible proteins, fats, carbohydrates, biologically active substances (enzymes, vitamins, hormones, antibodies). For the last time bactericidal properties of breast milk have been studied well enough. However, its antibacterial agent, i.e. lactenin (a substance of enzymatic nature), provides bactericidal action of the milk for some micrococci, lactic acid streptococci as long as it has low temperature. When storage conditions are wrong, the milk easily becomes favourable environment for preservation and development of microorganisms [3, 4]. Bactericidal action of breast milk does not affect colon bacilli, causative agents of typhoid fever, tularemia. There have been described cases when some viral infections (such as Q-fever, epidemic hepatitis, poliomyelitis) were transmitted with mother's milk. According to the opinion of investigators, a sufficient deficiency in the problem of lactogenic transmission of viral diseases is the lack of objective information about the role of human milk for spread of herpesvirus infection from a mother to the infant [5].

For this purpose clinical and laboratory researches were performed to determine the role of mother's milk as a factor of transmission of herpesvirus infection.

**Materials and methods**

Used as material of research were peripheral blood, cerebrospinal fluid and breast milk, which were taken from seropositive puerperants (n=112) and their newborns (n=114) with provisional diagnosis of HSV-infection; intrauterine growth retardation syndrome. The materials were tested in one, three, five days after the labor. These terms of milk sampling were determined particularly by physiological aspects, associated with the dynamics of lactogenesis and stages of formation of the mature milk which was to have relatively stable morphofunctional properties and chemical composition. Thereat, individual features of every woman (i.e. the number of pregnancy) and the main parameters of lactation (rate, volume) had to be taken into account. The results were compared with the control data. Used as controls were the group of healthy, full-term newborns from seronegative mothers (n=84).

Traditional methods of investigation were used to detect herpesvirus markers in the blood serum of the newborns and the puerperants.

Immunoenzymatic test (IET) by means of test system "Herpes Screen" manufactured by "Niarmedik A.S" (Moscow) was performed to detect the HSV- antigen. Quantitative indices of optical density (OD) of the specimens being tested and the controls were determined at 492 nm wave length with regard for the controls (positive and negative). The specimens with staining intensity exceeding critical OD index were concerned as positive (OD critical = 2 x OD<sub>k</sub>-). The diagnostics by polymerase chain reaction (PCR) was performed traditionally.

**Results and discussion**

The research demonstrated that 52 newborns from 114 (which make 45,6 ± 5,3 %) had HSV-infection. The herpesvirus diagnosis of the latter was proved by HSV DNA in the blood, cerebrospinal fluid by means of PCR. 32 infants from the 52 (which make 61,3 ± 3,8 %) proved to have cerebral form and 20 infants (which make 38,5±3,5%) proved to have generalized form of herpes neonatorum. Specimens of breast milk were taken from 9 HSV-sepopositive patients, who gave birth to 9 infants with intrauterine growth retardation and diagnosed cerebral form of herpesvirus infection. At the same time serological examination of the blood from the newborns and their mothers was performed. By indications, cerebrospinal fluid of the infants was tested for HSV-antigen. Detailed information on the immunoenzymatic test of the milk is given in the Table.

According to the Table data, 2 of the 9 specimens showed HSV-antigen. One of the specimens (No. 5) had optical density (OD) index of 0.515 o.u., which exceeds the critical OD by 0.115 o.u. The other positive specimen of milk (No. 9) had OD = 0.530 o.u., which exceeds the critical OD by 0.130 o.u. It was interesting that not in all seropositive mothers breast milk OD could be considered positive. Their milk could not prove their lactogenic transmission of HSV to an infant. On the other hand, seropositive mothers with negative results and relatively low OD of their milk had infants with intrauterine growth retardation (i.e. low general anthropometric parameters, US organometric parameters, insignificant organic changes in the structure of parenchymatous organs, cardiovascular system, brain).

Thus, increased level of HSV in breast milk specimens can be one of the reasons proving the factor of lactogenic transmission of infection from an infected puerperant to the newborn. Undoubtedly, further researches are needed to detect if a puerperant has infected breast milk and if the breast milk is the factor of transmission of HVI from a seropositive mother to her infant [6, 7].

However, even now it is definitely possible to confirm that lactogenic way is a very convenient way of HSV transmission, because breast milk has the corresponding cell pool (epitheliocytes, lymphocytes, polynuclears) [8, 9].

**Table.- Results of immunoenzymatic test of the mother's milk from puerperent woman**

N n/n	Designation for name of puerperent whose milk specimens were taken	Presence or absence of seropositivity	Index of mother's milk optical density (in o.u)	Results of tests
1	Puerperent N.	+	0,212	negative
2	Puerperent D.	+	0,221	negative
3	Puerperent G.	+	0,313	negative
4	Puerperent M.	+	0,283	negative
5	Puerperent C.	+	<b>0,515</b>	<b>positive</b>
6	Puerperent K.	+	0,220	negative
7	Puerperent Z.	+	0,326	negative
8	Puerperent P.	+	0,224	negative
9	Puerperent Zh.	+	<b>0,530</b>	<b>positive</b>
10	Puerperent Ts.	—	0,227	negative
11	Puerperent B.	—	0,231	negative
12	Puerperent V.	—	0,310	negative
13	Puerperent A.	—	0,331	negative

Note: OD critical. = 2x OD  $K_{cp}^-$  = 0,400 o.u.

Exactly these cells are the most suitable transport and reproductive link for HSV causative agent. Specialists indicate definite correlative dependence between presence of HSV and breast milk cytogram (level of lymphocytes, lactocytes, polynuclears in it). The higher quantity of the latter is, the lower the probability of detection of infected agent in the milk is, the more active lactation is. The higher quantity of lymphocytes is, the higher the probability of detection of infected agent is and the lower the lactation is.

### Conclusion

1. The immunoenzymatic research of 9 specimens of breast milk, taken from HSV-seropositive mothers, proved that 2 of the specimens had HSV-antigen.
2. Etyopathogenic role of breast milk as a factor of the disease transmission is supposed in 2 newborns with localized HSV-infection and intrauterine growth retardation syndrome born from HSV-seropositive mothers.

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Panchenko L.A., Torianyk I.I., Popova N.G.

This article presents information which proves pathogenic way of HSV-infection transmission from seropositive puerperants to their newborns with diagnosed syndrome of intrauterine growth retardation. Authors discuss clinical and laboratory, morphological arguments which prove possible participation of breast milk cell pool in transportation and reproduction of HSV causative agent.

**Key words:** Mother's milk, HSV-infection, factor of transmission, cell pool, puerperants.

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### РОЛЬ МАТЕРИНСКОГО МОЛОКА КАК ФАКТОРА ПЕРЕДАЧИ ГЕРПЕСВИРУСНОЙ ИНФЕКЦИИ ОТ ИНФИЦИРОВАННОЙ МАТЕРИ НОВОРОЖДЕННОМУ

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В данной статье представлены данные, свидетельствующие в пользу патогенного пути передачи HSV-инфекции от серопозитивных родильниц к новорожденным детям с установленным синдромом задержки внутриутробного развития. Авторами дискутируются клинико-лабораторные, морфологические аргументы, подтверждающие возможность участия клеточного пула грудного молока в качестве транспортного и репродуктивного звеньев для возбудителя HSV.

**Ключевые слова:** Материнское молоко, HSV-инфекция, фактор передачи, клеточный пул, женщины-родильницы.

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### РОЛЬ МАТЕРИНСЬКОГО МОЛОКА ЯК ФАКТОРА ПЕРЕДАЧІ ГЕРПЕСВИРУСНОЇ ІНФЕКЦІЇ ВІД ІНФІКОВАНОЇ МАТЕРІ НОВОРОЖДЕНОМУ

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У даній статті наведені дані, які свідчать на користь лактогенного шляху передачі HSV-інфекції від серонегативних породіль новонародженим дітям зі встановленим синдромом затримки

внутрішньоутробного розвитку. Автори дискутують клініко-лабораторні, морфологічні аргументи, що підтверджують можливість участі клітинного пулу грудного молока в якості транспортної та репродуктивної ланки для збудника HSV.

**Ключові слова:** Материнське молоко, HSV-інфекція, фактор передачі, клітинний пул, жінки-породіллі.

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