

paralleled by a decrease in leukocyte and neutrophil counts and a simultaneous increase in their functional activities (Table 1). The absolute count of actively phagocytizing neutrophils per mm³ of blood corresponded to the normal values. By the end of the third-fourth week after transplantation the neutrophil phagocytic activity normalized.

Thus, the results permit a conclusion that fetal therapy effectively arrested RA symptoms, which was best of all seen in patients with exacerbated process; the treatment corrected immunity and stimulated hemopoiesis.

Despite the good results of fetal cell transplantation, some problems concerning differentiated effects of individual hormones on the immunity of RA patients are still unclear. It is evident that assessment

of the immune status of RA patients should be complex, including studies of the cellular and humoral immunity and nonspecific defense factors.

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Exchange of Sialic Acid-Containing Compounds in Chronic Osteomyelitis

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Serum content of free, oligosaccharide and protein-bound sialic acids, seromucoid components, and activity of sialidase are measured in rabbits with osteomyelitis induced by intraosteal administration of *St. aureus*. During chronic stage of purulent osteomyelitis the content of oligosaccharide-bound sialic acids is increased, while the content of seromucoid hexosamines is decreased.

Key Words: *osteomyelitis; sialic acids; seromucoids*

Changes in the content of sialic acids (SA) and glycoproteins are associated with the intensity of osteomyelitis [1]. The evidence that SA of oligosaccharides, glycopeptides, and glycoproteins are involved in cell-to-cell contacts, reception, and immunomodulation [7] opens new prospects in the investigation of the metabolism of SA in osteomyelitis.

In this study we determined serum content of free, oligosaccharide-, and protein-bound SA (FSA, OSA, and PSA, respectively), seromucoid components (orosomucoids), and serum activity of sialidase in experimental chronic osteomyelitis.

MATERIALS AND METHODS

Experiments were carried out on rabbits weighing 1.5-2.5 kg. Acute osteomyelitis was induced by injecting *St. aureus* into the upper third of the left femur [2]. The development of osteomyelitis was confirmed by clinical, laboratory, and roentgenological data [2]. The animals developed acute inflammation and local pathology of the upper shin on days 3-6 after the injection. Purulent fistulas formed on days 12-16. *St. aureus* colonies were grown from the pus. Destructive focus markedly increased in size after 21-30 days, and the process became subacute. The pathology became chronic (formation of stable fistulas) on days 35-40.

TABLE 1. Contents of FSA, OSA, PSA, Proteins, and Hexosamines in Serum Seromucoids (mg/liter) in Chronic Osteomyelitis ($M \pm m$)

Day of experiment	Number of animals	FSA	OSA	PSA	Seromucoids	
					proteins	hexosamines
Control	11	26.6±0.6	62.7±1.9	584±30	1070±49	126±4.6
5-6	14	51.1±1.2*	123.2±6.0*	1197±62*	2364±92*	274±9.6*
9-10	13	34.5±1.2*	1103±7.2*	878±58*	1849±87*	207±9.1*
14-15	11	29.6±3.3	122.6±6.3*	1214±78*	1647±82*	152±6.4*
24-25	10	30.1±3.1	115.9±3.2*	916±70*	1465±73*	143±8.3
40-45	10	25.8±1.2	97.0±5.4*	665±35	1216±74	122±9.1
60-65	10	28.7±1.3	76.4±2.6*	656±33	1206±64	123±7.8
90-95	9	29.8±2.6	75.9±2.8*	668±34	1224±58	121±6.2

Note. * $p < 0.05$ compared with the control.

Blood was collected on days 5-6, 9-10, 14-15, 24-25, 40-45, 60-65 and 90-95. Intact rabbits served as the control. Serum contents of FSA, OSA, and PSA [5] and activity of sialidase (EC 3.2.1.18) were determined as described elsewhere [3,6]. Seromucoids were isolated from blood serum, and their contents of protein (Lowry) and hexosamine [4] were measured.

RESULTS

Rabbit serum contained not only PSA but also FSA and OSA, which is consistent with the literature data [5].

The FSA content increased only during acute phase of inflammation (days 5-6 and 9-10), while the OSA content remained increased throughout the observation period.

Serum concentration of PSA, which reflects the total serum content of sialoglycoproteins, increased considerably (by 104%) by the 5th-6th day after infection and remained at high level by the 24th-25th day of experiment, when the transition to subacute phase occurs [4].

Serum content of seromucoids was determined by protein and hexosamine contents. Both parameters increased during the acute phase of osteomyelitis (Table 1). Qualitative changes in seromucoids were assessed by the protein-hexosamine ratio. In intact rabbits this parameter was equal to 8.49. In rabbits with acute osteomyelitis, it increased, respectively, by 1.5, 5.1, 27.5, 20.6, 17.3, 15.4 and 19.0% on days 5-6, 9-10, 14-15, 24-25, 40-45, 60-65 and 90-95.

Trace activity of sialidase was detected in intact rabbits. On days 5-6, 9-10, 14-15 and 24-25 of chronic osteomyelitis, it was, respectively, 8.12 ± 0.14 , 9.17 ± 0.15 , 2.09 ± 0.11 , and 2.56 ± 0.10 $\mu\text{g/ml/h}$.

Seromucoids and the majority of sialoglycoproteins are acute-phase proteins. Changes in the con-

centration of these proteins reflect the intensity of the inflammatory process.

An increase in the activity of sialidase, which catalyzes SA cleavage from sialoglycoproteins and is derived from staphylococci and lysosomes, may account for the transient increase in blood FSA content. Presumably, the enzyme is then blocked by antihydrolases and antibodies.

A stable increase in the OSA content observed in chronic osteomyelitis is probably caused by enhanced degradation of proteins, including glycoproteins, in the focus of purulent inflammation, which leads to a steady decrease in the hexosamine content of seromucoids. This suggestion is consistent with enhanced urinal excretion of glycopeptides in osteomyelitis [1]. These metabolic shifts may promote the development of chronic inflammation.

Thus, our results confirm the participation of sialoglycoproteins in acute inflammation. The parameters reflecting qualitative shifts in the structure of sialoglycoproteins during the development of chronic osteomyelitis have been identified. A steady increase in serum content of OSA and a decrease in the hexosamines content of seromucoids in chronic osteomyelitis can be employed for the prognosis of osteomyelitis.

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