Morphological Changes in Submandibular Lymph Nodes after Subcutaneous Implantation of Gold Alloys

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Functional activity of cells in regional lymph nodes of the major salivary glands was studied in rats after subcutaneous implantation of gold alloys. Alloy 900 modified the function of regional lymph nodes.

Key Words: *salivary glands; biocompatibility; cell composition of submandibular lymph nodes; gold alloys*

Xenobiotic materials are now widely used in dentistry, particularly in implantology. However, the mechanisms of biocompatibility of these materials and tissues remain little studied. The effects of function of metal alloys on the function of the lymph system became the object of experimental and clinical investigations only in recent years [3-6].

The concept according to which the lymph system in general and a regional lymph node (LN), draining a tissue region, in particular, are sensitive indicators of environmental pressing [2] became the basis for this study. Toxic effects of metals or their inertness for the body tissues can be evaluated by changes in specialized structures in LN [1].

We studied the morphofunctional transformations in submandibular LN after subcutaneous implantation of gold alloys (GA).

MATERIALS AND METHODS

Dental GA (alloy ZlSrM - alloy 900; Super KM and Super TZ) were implanted (0.7 g; with consideration for the aggravation coefficient K=10) subcutaneously into the back to random-bred rats of both sexes (250± 10 g; *n*=50). Medical glass was used as the control. All methods conform to ISO 10993-6, 1994, part 6 "Tests for Local Effects after Implantation".

The animals were sacrificed 12 weeks after implantation of GA with due consideration for euthanasia philosophy. Regional LN were isolated. The material was fixed in neutral formalin, and 5-μ histological sections were made. The preparations were stained with hematoxylin and eosin.

RESULTS

No deviations in LN structure were detected in rats 12 weeks after implantation of medical glass in the back (Fig. 1, *a*).

The most pronounced changes in morphological structure of LN were detected after implantation of alloy 900. The cortex and medullary matter of LN were poorly discriminated in this groups. Solitary lymph nodules with germinative centers were seen in LN, which attests to enhanced functional activity of the lymphoid tissue (Fig. 1, *b*). Large fused macrophages infiltrating the lymphoid tissue were seen in many centers of the nodule multiplication; "stars in the sky" picture indicated nonspecific intensification of macrophagic reaction, characteristic of inflammatory processes.

The medullary substance in LN was sharply widened sinuses were unevenly filled with cells. Numerous devastated sinuses (Fig. 1, *b*) and sinuses with adherent cells forming cellular conglomeration of lympho-

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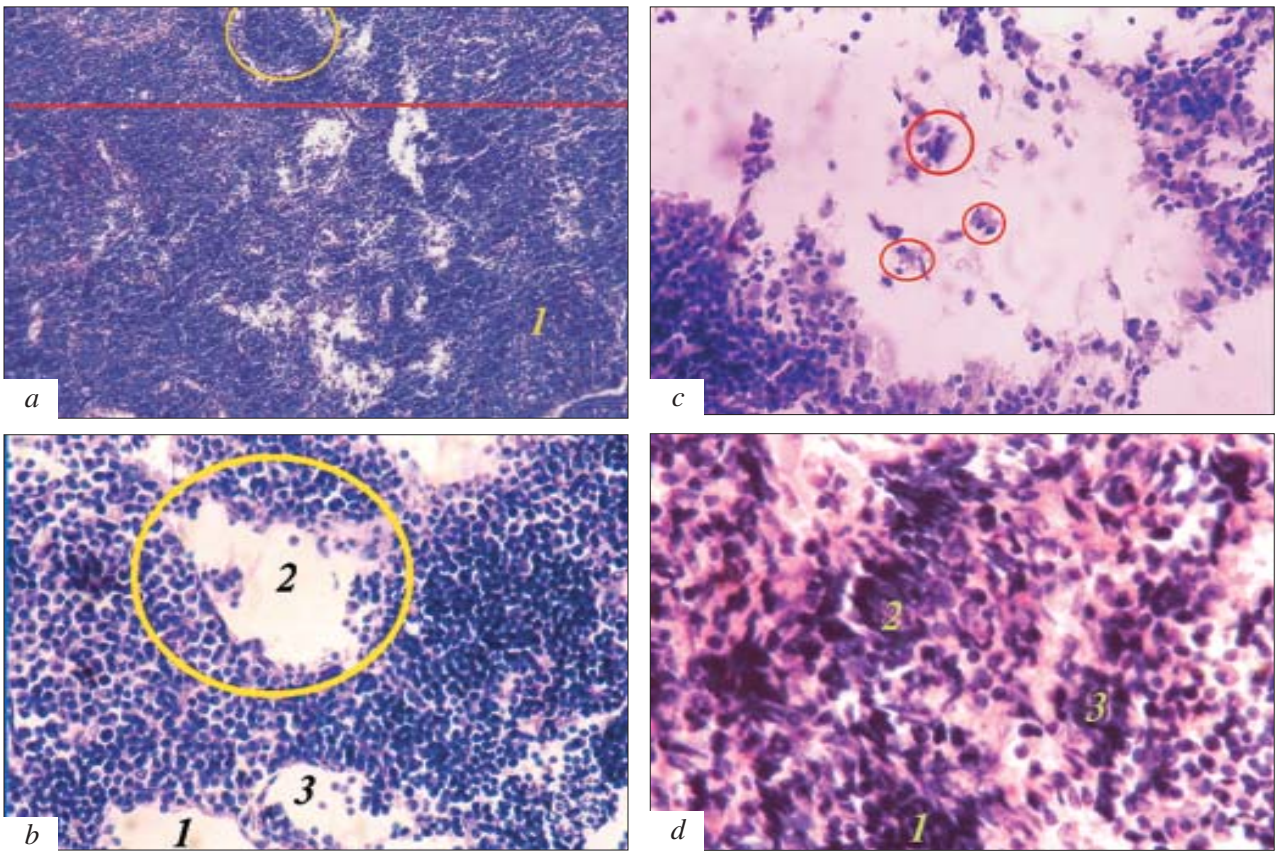

Fig. 1. Rat lymph node regional for submandibular salivary gland 12 weeks after alloy implantation. Hematoxylin and eosin staining. *a*) control (male), implantation of medical alloy. Red line: paracortical zone; *1*) medullary substance; lymph nodes in the cortex are encircled with a yellow line; *b*) implantation of alloy 900 (female). *1-3*) selected fragment: devastated sinuses; *c*) implantation of alloy 900 (male). Peripolesis in the lymph node sinus is selected; *d*) implantation of Super KM allow (male), *1-3*) fibrosis in cortical matter and destruction of lymphoid cells, ×100 (*a*), ×400 (*b*, *c*), ×650 (*d*).

cytes and plasma cells (peripolesis of cells with disordered associations with reticular cells, Fig. 1, *c*) were seen. Other sinuses were densely packed with plasma cells.

Virtually the entire LN stroma was impregnated with fibrocytes as a result of acute injury to the lymphoid tissue. Cell fragments (cell detritus) and cells with destruction signs were seen. Vascular lumens in the cortex and paracortical zone were filled with erythrocytes (congestion phenomena) and lymphoid cells (signs of cell migration).

Plasma cells were scanty in the medullary and cortical sinuses; lymphocytes and destructive cells predominated; no lymphocyte hyperplasia was observed.

The cortical plateau in LN was sharply fibrosed. Fibrosis, a manifestation of lymphoid tissue damage, was observed in all groups with GA implants (Fig. 1, *d*).

Our data on the reaction of submandibular LN to GA implantation are in line with previous reports [3,4], which describe structural and functional changes in the lymphoid cells under the effect of GA and necessitate studies of submandibular structures (LN, submandibular and sublingual salivary glands) for evaluation of biocompatibility of dentistry materials.

Hence, microscopic analysis of the structure of regional LN in the salivary glands 12 weeks after implantation of GA 900 revealed damage to the lymphoid tissue in LN (fibrosis, destruction, congestive phenomena, and low plasma content in the organ).

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