Autograft Rejection, Temporary Transplantation of Autografts to Allogeneic and Xenogeneic Hosts Within and Without Diffusion Chambers

The rejection of autografts temporarily transplanted, for short periods of time, to allogeneic and xenogeneic hosts has been described[1]. In the present communication we report the effects of prior transplantation of the autografts within millipore chambers to allogeneic and xenogeneic hosts.

Six groups of animals were used for the grafting procedures. White male Hebrew University strain and hooded Lister rats, weighing 100–120 g, were employed. The skin grafting technique employed in our laboratory has been described previously[2,3]. In Group 1, auto-transplantations were performed, the grafts were removed 24 h later, biopsied, and retransplanted to the donor rat. In Group 2, grafts were enclosed within millipore chambers (pore size 0.22 μ) and inserted into a subcutaneous pocket prepared on the back of the autogeneic rat. The millipore chambers were withdrawn 24 h after operation, the grafts were biopsied and retransplanted to the autogeneic rat. Groups 3 and 4 consisted of animals which previously rejected a skin allograft. Skin grafts were exchanged between Hebrew University strain and hooded Lister rats and on the fifth post-rejection day each rat received a second transplant from the respective donor. In Group 3 the grafts were transplanted in the usual manner, biopsied 24 h after the operation, and retransplanted to the original donor. The grafts in Group 4 were transferred in millipore chambers, biopsied 24 h after operation and retransplanted to the original donor. In Groups 5 and 6, xeno-autotransplantations were performed; 24 h following transplantation to a rabbit, the grafts were transferred back to the original donor. In Group 5, the grafts were transplanted to the rabbit's ear, and in Group 6 the skin grafts were introduced into diffusion chambers, and inserted s.c. Grafts were inspected daily, biopsies were taken between the 10th and 12th post-operative day.

All interval biopsies exhibited degenerative changes of the epidermis and skin appendages. In Groups 1, 3 and 5 there was a moderate to severe inflammatory infiltration in the dermis consisting of lymphocytes, granulocytes and a few plasma cells. Interval biopsies pertaining to Groups 2, 4 and 6 were devoid of any inflammatory infiltration. The results of the experiments are summarized in the accompanying Table. In Group 1, 22 of 24 auto-autografts were accepted. Out of 16 auto-autografts (Group 2), which had been transferred in millipore chambers, 13 were accepted. 18 of 21 second-set allo-autografts which had been placed in millipore chambers were accepted on retransplantation to the autogeneic host. This sharply contrasted with the rejection of all second-set allo-autografts (26 of 26) which had not been protected by millipore filter (Group 3). Most grafts transplanted to xenogeneic animals were rejected upon retransfer to the autogeneic host, whether or not they had been placed in millipore chambers (Groups 5 and 6).

Our findings suggest that allo-autograft rejection is a biphasic process. An irreversible change occurs in the grafts within 24 h of transplantation to the presensitized intermediate host, while the actual rejection process takes place on the autogeneic rat. The insertion of grafts in diffusion chambers prevents the first stage of this process and the grafts were accepted upon retransplantation to the autogeneic rat. No such biphasic process was evident in xeno-autotransplantations. Even xeno-autografts placed in diffusion chambers were rejected upon retransplantation to the autogeneic rats.

It is concluded from these experiments that the inflammatory cells of intermediate host origin play an important role in allo-autograft rejection. On the other hand, in xeno-autotransplantation, fixation of heterologous plasma proteins and/or natural antibodies[4] suffice to induce a reaction leading to rejection[1]. The present experiments do not resolve the question as to whether allo-autografts are destroyed by the inflammatory cells of intermediate host origin per se, by the autogeneic animal's own immune response directed against allogeneic white blood cells transferred within the autografts or against 'new' antigens brought about by the damage to graft cells in the intermediate host.

Fate of autografts transplanted to intermediate hosts within and without diffusion chambers

	Control grafts			Grafts placed in diffusion chambers		
	Auto-autografts	Second-set allo-autografts	Xeno-autografts	Auto-autografts	Second-set allo-autografts	Xeno-autografts
Number of rats per group	24	26	14	16	21	20
Number of accepted grafts	22	0	5	13	18	6
Statistical significance				$X^2 = 0.95$	$X^2 = 36.11$ $p < 0.0001$	$X^2 = 0.13$

Résumé. Des autogreffes transférées à des hôtes allogéniques, sensibilisés auparavant pendant 24 h, ont été rejetées après une retransplantation orthotopique au donneur original. Les greffes qui ont été transférées dans des chambres millipores ont été acceptées. Des autogreffes qui ont été transférées à des animaux xénogéniques possesseurs ou non de chambres à diffusion ont été rejetées dans la plupart des cas.

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