

THE IMPORTANCE OF THE SIZE OF A HOMOGRAFTED SKIN FLAP AND ITS PERIOD OF SURVIVAL

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There is very little doubt at the present time that immunological mechanisms lie at the basis of death of homografts. From the abundant evidence of the immunological nature of tissue incompatibility may be mentioned the finding that the life of homografts is shortened with increase of their area in consequence of the enhanced immunizing power of the grafts [7-9]. However, these experiments were concerned with grafts of small dimensions, not exceeding a few cm².

In the course of work with skin homografts many times larger than those used by the authors cited [7-9], we came to a different conclusion. The basis for the present investigation was work on transplantation of large skin flaps, carried out by M. A. Vorontsova on cold-blooded animals [1].

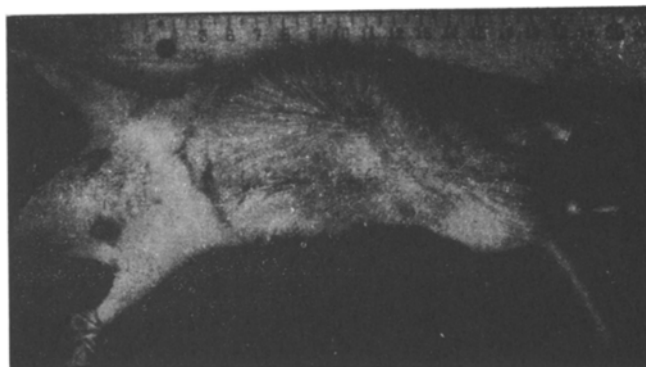
Period of Survival of Grafts in Relation to their Size

Homografts	Number of recipient animals	Survival period of homografts in days		
		less than 14	from 30 to 45	over 60
Large	23	10	8	5
Small	55	55	0	0

EXPERIMENTAL METHOD

For the experiments we used white rats of both sexes, weighing 100-150 g, and not closely related to each other. As an additional guarantee of absence of isoserological identity of the partners, the rats we used as donor and recipient for transplantation of large skin flaps were also from different nurseries. Areas of skin which covered the whole of the animal's spine and flank were transplanted. The area of the flaps varied between 30 and 60 cm². The operation was performed in the usual way under ether anesthesia and under sterile conditions. For transplantation full-thickness grafts were taken, not including the subcutaneous muscle layer. This layer was retained in the recipient, and it served as the base of the wound. Rats with small homografts (2-6 cm²) acted as control animals.

The viability of the grafts was judged by their clinical condition and also by the state of the circulation in the transplanted skin flap.



A rat with a homograft 2 months after transplantation. The graft has taken; its borders can be identified by the fact that the direction of growth of the fur of the graft is opposite to the direction of growth of the fur of the surrounding skin.

EXPERIMENTAL RESULTS

Material which we have collected over several years has shown that in none of 55 recipients has the survival time of small homografts exceeded 2 weeks.

We observed different results in experimental animals (see Table) with large grafts.

As may be seen from the Table, in 10 recipients the duration of survival of large homografts was no longer than usual. The homografts died during the first 2 weeks after operation. In 13 recipients the period of survival of large homografts was considerably lengthened: in 8 recipients they remained viable for up to 1-1½ months; in 5 recipients the period of survival of the homografts exceeded 2 months (see Figure) and moreover in two of these it was over 3 months.

In these recipients with comparatively lasting survival of the graft, the epithelium of the transplanted flaps began to desquamate 2 weeks after operation, and the fur fell out. In the majority of cases the fur did not grow again later, sometimes it did, but not so thickly as in areas of healthy skin.

It was an interesting feature that at the end of the 3rd or in the 4th week of their survival the homografts acquired a slight degree of pain sensation, and the animals began to react to the prick of a needle in the region of the transplanted skin flap.

The results of our experiments thus suggest that skin homografts of large size survive longer than small grafts. These findings may evidently be explained by the fact that the homotransplantation of large flaps of skin is accompanied by the entry of a large quantity of foreign antigens from the donor's tissues into the body of the recipient. This may lead to suppression of the immunological defense mechanisms of the recipient. There are indications in the literature of a possible fall in the immunological reactivity of the recipient under the influence of a large amount of foreign antigen [2-6].

There is also evidence in favor of the assumption that large homografts are more resistant to the immunological protective factor of the recipient than are small ones. However we are not yet able to give a sufficiently well-founded explanation of the distinctive features of the behavior of large homografts. This must be the subject of further investigation.

SUMMARY

Skin homotransplants 2 - 6 cm² in size perished within the first 2 weeks after the transplantation in rats which were not closely related to each other. Grafting of large skin flaps occupying all the back and sides of the rats (30 - 60 cm² in size) gave the following results in 8 rats (of the 23): the homotransplants remained viable for 1 to 1.5 months, in 3 - for more than 2 months and in 2 - for over 3 months.

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