Previous studies of cutaneous autografts in psoriasis have been difficult to interpret (1, 2, 3). This report presents the results of 90 split-thickness skin autografts which were done on 5 patients with psoriasis.

**MATERIALS AND METHODS**

Four men and one woman with psoriasis were the subjects in this study. The areas of skin to be used in grafting were prepared by scrubbing with Phisohex followed by the application of benzalkonium chloride tincture. One percent Xylocaine was injected intradermally for anesthesia. Split-thickness (mid-dermal) autografts were obtained with an 8 mm skin punch. Each graft was held in place by four 6-0 silk sutures. An atraumatic needle was used. Sterile plastic dressings (Telfa) were applied. The grafts were inspected daily. The sutures were removed on the 4th day. Photographs and 2 mm punch biopsy specimens were obtained at appropriate intervals. Where the site allowed, the superficial vessels were observed by stereomicroscopy.

The sets of autografts done on each patient were as follows:

A. Normal skin to normal skin. Two grafts interchanged.
B. Normal skin to a plaque of psoriasis. Three grafts interchanged with D grafts.
C. Psoriatic plaque to psoriatic plaque. Two grafts interchanged.
D. Psoriatic plaque to normal skin. Three grafts interchanged with B grafts.

The biopsy specimens were fixed in Cajal's solution, processed in paraffin, and sections were cut at 8 microns. The stains employed were hematoxylin and eosin, and the Gomori trichrome.

**RESULTS**

The results are summarized in Table I. Of 16 normal skin to normal skin autografts, 13 (81%) took in a normal fashion. Similarly 23 of 28 (82%) normal skin to psoriatic plaque autografts survived normally. Therefore, 36 of 44 (82%) normal skin autografts were successful.

In contrast, 2 of 16 (13%) psoriatic plaque to psoriatic plaque autotransplants took and 6 of 24 (20%) psoriatic plaque to normal skin autografts were successful. Thus only 8 of 46 (17%) psoriatic plaque autografts took.

The gross appearance of the autografts in one patient at 2 and 7 days is shown in Figures 1 and 2. At day 2 the normal skin transplants (A, B) appear cyanotic but are viable. By day 7 revascularization of the normal skin transplants is complete and the grafts have taken. (The crusted areas at the edges of 2 grafts are biopsy sites). In contrast, by day 2 three of the psoriatic transplants are necrotic and the other 2 show degenerative changes (C, D). At day 7 necrosis of all psoriatic transplants is apparent.

Representative microscopic findings are shown in Figures 3 through 8. Figure 3 shows the appearance of normal skin at the time of grafting. Figures 4 and 5 show a normal skin to psoriatic plaque autograft at 2 and 6 days respectively. Degenerative changes are minimal and the microscopic appearance is interpreted as indicating a normal take of the graft, thus confirming the gross impression.

Figure 6 shows the appearance of psoriatic plaque at the time of grafting. Figures 7 and 8 show the appearance of a psoriatic plaque to normal skin autograft at 2 and 6 days respectively. By day 2 degenerative changes in the epidermis are marked. At day 6 the epidermis is necrotic and there is hemorrhage and necrosis in the upper part of the dermis. There is an inflammatory infiltrate in the upper dermis consisting of both mononuclear and polymorphonuclear leukocytes along with considerable nuclear debris. The lower half of the dermis (not shown in the figure) appeared relatively normal.

**DISCUSSION**

There is general agreement that psoriatic epidermis is in a hypermetabolic and hypermitotic state. This is also probably true for the upper dermis where at least increased mitotic
Table I

<table>
<thead>
<tr>
<th>Type of Autograft</th>
<th>Total Number of Grafts</th>
<th>Number of Takes</th>
<th>Percentage of Takes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal skin to normal skin</td>
<td>16</td>
<td>13</td>
<td>81</td>
</tr>
<tr>
<td>Normal skin to psoriatic plaque</td>
<td>28</td>
<td>23</td>
<td>82</td>
</tr>
<tr>
<td>Psoriatic plaque to psoriatic plaque</td>
<td>16</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Psoriatic plaque to normal skin</td>
<td>30</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

Autografts in 5 patients with psoriasis

It seems important to be cognizant of this factor when dermatologic research involving autografts is contemplated. Thus, interpretation of grafts becomes difficult when they are taken from pathologic areas where a hypermetabolic state is either known to exist or is expected, or where the critically important superficial vessels are known to be altered. In particular, caution should be exercised in interpreting any degenerative changes noted in the graft as indicating an active rejection process. There was no evidence found which would indicate that an immune mechanism was involved in the failure of most of the psoriatic autografts to take in a normal fashion.

A second point worthy of comment is the criteria to be used in determining the take or non-take of skin grafts. There are no wholly acceptable ones at the present time (6). Gross criteria are based on observations of skin color, hair growth, necrosis, and scarring. Stereophotographs of psoriatic plaques before and after autografts are shown in Figs. 1 and 2.


activity is recognizable (4). In any graft there is a period of relative anoxia for the first 2 to 3 days following transplantation until revascularization occurs and normal circulation is restored. It is perhaps reasonable to assume that this period of relative anoxia would have more profound effects on tissues whose nutritional requirements are increased over those in a normal state. This seems the most plausible interpretation for the failure of most psoriatic autografts to take in a normal fashion as was found in this study.

Billingham and Silvers (5) have noted this in animals as they state in a recent book:

"In selecting a graft donor site it is particularly important to avoid areas of skin in which the hairs are in an active growth phase; since the metabolism of the skin in the affected area is heightened, it is abnormally thick and has an enriched blood supply, and it is particularly susceptible to ischemic necrosis if grafted."

Association of vulnerability to transplantation with active growth has long been recognized in horticulture where transplantation survival has been found best with plants in the dormant state.
microscopy aids in determining vascularization. Microscopic criteria are most important in making a final decision. Certainly there must be maintenance of the lower portion of the epidermis with persistence of the basement membrane and survival of appendages in the dermis. These microscopic criteria were not met in most of the psoriatic autografts done in this study.
Therefore it seems justifiable to term them "non-takes" even though the lower half of the dermis may have survived.

Previous studies of autografts in various dermatoses have been concerned primarily with donor versus recipient dominance, (1-3, 7-9) to determine whether transplants of abnormal skin to normal areas, or the reverse, assume the
Fig. 7. Psoriatic Plaque to Normal Skin Autograft—Day 2. Marked degeneration and necrosis of epidermis. (× 200).

Fig. 8. Psoriatic Plaque to Normal Skin Autograft—Day 6. Epidermal and upper dermal necrosis. Hemorrhage and cellular infiltrate in the upper dermis. (× 210).
characteristics of the new environment or retain their original features. Most of these studies have been in conditions such as vitiligo (1) and male-pattern baldness (2) in which the epidermis is not hyperplastic and in which alteration in the superficial vasculature is not a prominent feature. It is difficult to draw any firm conclusions regarding donor or recipient dominance in a disease such as psoriasis where the Koebner phenomenon is a factor. The development or lack of development of the Koebner phenomenon was unpredictable in this series of patients and was variable in its appearance in the same patient. For example, in the 13 normal to normal grafts which were successful, a Koebner reaction eventually developed in 7. In the 23 successful normal to psoriasis grafts, a Koebner reaction or, less likely, recipient dominance appeared only twice. In the 6 successful transplants of psoriasis to normal skin, all the sites persisted with features of psoriasis. These findings are more compatible with donor dominance rather than with recipient dominance; they probably are best compatible with trauma dominance in patients who are Koebner-positive.

SUMMARY

Ninety autografts were done in five patients with psoriasis. Normal skin could be transplanted to either normal or psoriatic recipient sites without difficulty. Less than 20% of psoriatic plaque transplants were successful. It is postulated that hypermetabolic skin is unusually susceptible to the effects of the temporary anoxia which occurs following grafting and that this accounts for the poor survival noted.

REFERENCES