Inhibition of Sebaceous Glands by Topical Application of Oestrogen and Anti-Androgen on the Auricular Skin of Rabbits

Histometric Studies of the Activity of the Sebaceous Glands

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Zusammenfassung. Juvenile New Zealand White-Kaninehen wurden orchi-
ektomiert und spä ter während 4 Wochen mit insgesamt je 2000 mg des Depot-
androgens Triolandren® systemisch behandelt. Anschließen trug man während
weiterer 4 Wochen auf genau markierten Applikationsfeldern an den Ohrmusche-
llnenseiten der Tiere 20 mal 0,05 ml von Lösungen mit je 20% G/G 17β-Oestradiol
oder 17α-Methyl-B-nortestosteron in Dimethylsulfoxid (30%/)-Aceton (70%/)
auf (Flächengesamtdosen: 32 und 31 mg Steroid pro cm² Haut); je eine Kontrollgruppe
erhielt nur das Vehikel appliziert bzw. keinerlei topische Behandlung. In Biopsien,
die vor und nach den lokalen Applikationen entnommen wurden, bestimmte man
mittels histoplanimetrischer Verfahren die Talgdrüsengröße.

Das Oestrogen und insbesondere das Antiandrogen entfalteten an diesem
Modell einen deutlichen und gut quantifizierbaren Hemmeffekt auf die durch
Triolandren® und das Vehikel induzierte massive Talgdrüsienhyperplasie. Aus der
Fachliteratur werden tierexperimentelle und klinische Befunde über die Talgdrüs-
Hemmwirkung von Oestrogenen und Antiandrogenen sowie deren Verwendung in
der Therapie der Acne vulgaris kurz referiert.

Summary. Juvenile New Zealand White rabbits were castrated and treated
systemically for a period of 4 weeks with a total dose of 2000 mg of Triolandren®,
a depot androgen preparation. Thereafter, for a further four weeks, well defined
areas on the inner side of the animals' ears were treated topically, five days a week,
with 0.05 ml of solutions containing 20%/ w/w 17β-oestradiol or 17α-methyl-B-nor-
testosterone in dimethylsulphoxide (30%/)-acetone (70%/) (total surface dose:
32 and 31 mg steroid per sq.cm skin). One control group was treated with the
vehicle only and another received no topical treatment. Biopsies were performed
before and after topical treatment, and the size of the sebaceous glands was deter-
mined histoplanimetrically.

In this experimental model, the oestrogen and especially the anti-androgen
exerted a clear-cut and readily quantifiable inhibitory action on the sebaceous
glandular hyperplasia induced by Triolandren® and the vehicle. Published experimen-
tal and clinical findings concerning the inhibition of the sebaceous glands by
oestrogens and anti-androgens are reviewed briefly and the use of these substances
in the treatment of acne vulgaris is discussed.
Introduction

Since the mid 1930's [cf. 8,18,20,46,56 etc.] acne vulgaris, especially in postpubescent females, has been treated with oestrogens [3,15,16,19,21,23—25,27,30,31,34—41,44,52,53 etc.], "ovarian hormones" [8,18 etc.] and combinations of oestrogens and progestins [20,22,25,31,39,40,53 etc.]; the oestrogen-progestin combinations are only administered systemically, whereas oestrogens are also applied topically. The therapeutic regimens employed are largely a matter of individual preference, and the successes achieved as well as the incidence of side effects vary sometimes very markedly, from one author to another. It is, however, generally agreed that, in man and in various species of laboratory animal, oestrogens exert a pronounced inhibitory action on the histologically verifiable normal development and (androgen-induced) hyperplasia of the sebaceous glands, as well as on the measurable production of surface sebum [1,3,10,11,13—15,17,21,24,25,27,30,31,36,38—41,53,54 etc.]. On the strength of experimental findings, it was hoped that the anti-androgens would elicit a similar or an even better therapeutic effect on the sebaceous glands and in acne [1,2,4,5,7,12,17,22,24,28,29,32,42,43,53,55 etc.]; but, as yet, the clinical results obtained with these substances are still limited and not at all consistent [cf. 1,2,5,7,22,24,28,32,43,53,55 etc.]. Judging from the practical experience gained with oestrogens and anti-androgens, and in view of their side effects [cf. 2,3,5,6,15,21,22,29,40—43,52,53 etc.], it seems preferable to apply stearadestatic agents, i.e. substances that inhibit the growth of the sebaceous glands or reduce existing hyperplasia and hence diminish the production of sebum, topically rather than administer them systemically.

Following upon our previous investigations [48—50], the present study was undertaken to find out whether typical oestrogens and anti-androgens also display a clear-cut inhibitory action on the auricular sebaceous glands of castrate, androgen-primed rabbits, particularly after exclusively local application.

Material and Methods

1. Animals

The animals used were male albino rabbits of the New Zealand White breed [cf. 49], supplied by F. Lanz, CH-4617 Gunzgen/SO, which were 9—11 weeks old at the start of the experiments and weighed between 1350 and 1550 g. Four of the original group of 18 rabbits had to be excluded because of heavy mite infections and resultant pathological changes in the skin of the ears. The animals were housed singly in wire cages in an air-conditioned animal room kept at a constant temperature of 20—22°C and a relative humidity of 60—70%/ and artificially illuminated for 14 h daily by fluorescent tubes. They were fed a diet of Nafag No. 84 pellets ad libitum, with a daily supplement of 30 g of carrots, and had free access to