

stration of collagen production (ALLGÖWER and HULLIGER⁶). If the fate of only one cell type is to be investigated, it is adequate to take these cells from a female animal and mix them with or transplant them to a male⁷.

Zusammenfassung. In frisch isolierten Kaninchenfibroblasten- und Leukocyten kann kein Geschlechtsdimorphismus festgestellt werden. Nach einigen Tagen Zell-



Fig. 9. Sex chromatin negative nuclei from fibrocyte-like male cells in leucocyte culture after 10 days.

Table II

Sex	Sex chromatin negative (%)	Sex chromatin positive (%)		
		one peripheral	one central	two bodies
♂	100	—	—	—
♀	10	73.0	16.0	1.0

kultivierung findet man in 84–93% (durchschnittlich 91,5%) der weiblichen Fibroblasten den Geschlechtschromatinkörper. Nur 0–2% (durchschnittlich 0,5%) der männlichen Fibroblasten weisen ein dem Geschlechtschromatinkörper ähnliches Gebilde auf. In Leukocytenkulturen sind die entsprechenden Zahlen 82–90% (durchschnittlich 89%) für weibliche, 0–1% (durchschnittlich 0,3%) für männliche Zellen. Diese Daten lassen den Geschlechtschromatinkörper als brauchbaren Zellmarkierer beim Kaninchen erscheinen.

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⁶ M. ALLGÖWER and L. HULLIGER, *Surgery* 47, 603 (1960).

⁷ *Acknowledgments.* This research was supported by a grant of the Schweizerischer Nationalfond. The authors are indebted to Miss A. ARCON for her skilled assistance.

Histamine Formation in Human Wound Tissue

The discovery of a singularly high rate of histamine formation in rat pregnancy¹ encouraged studies on a possible connection between histamine formation and certain kinds of rapid tissue growth characterized by a high rate of cell multiplication. Subsequently, a high histamine-forming capacity (HFC), i.e. high rate of decarboxylation of histidine, was found in embryonic rat² and mouse³ tissues, and in wound and granulation tissues in rat skin wounds⁴. A high correlation between HFC and mitotic index of multiplying cells was seen in the Landschütz I ascites tumor in the mouse⁵. The rat bone marrow also has a spectacularly high HFC⁶.

In vitro histamine formation by human tissues, including skin, was studied by WATON⁷, who reported no histidine decarboxylase activity. However, *in vitro* histamine formation has been demonstrated in human basophil blood cells^{8,9} and skin¹⁰ by isotopic technique.

The cooperation of Dr. GÖSTA JÖNSSON, Head of the Urology Clinic of the University of Lund, made possible the examination of the HFC in human skin wounds. An incision, 2–3 cm in length, was made through the entire thickness of the skin of the lower abdominal region and closed by sutures. Circular pieces of skin, including the full length of the incision, were excised at 24 or 48 h after wounding. Normal tissue to serve as controls was obtained from the excised piece at sites maximally distant from the incision. Specimens are defined as follows. Skin: epidermis and dermis at control sites excised to the same depth as wound tissue; subcutis: subcutaneous layer of control

sites excised at the same depth as granulation tissue; wound tissue: tissue immediately surrounding the incision to a depth of 2–3 mm; granulation tissue: tissue from the depth of the wound. The HFC was measured in terms of ¹⁴C-histamine formed on incubating minced tissue with ¹⁴C-histidine for 3 h. The results in Table I are expressed in counts per min per g tissue. With the ¹⁴C-histidine used, 1 µg ¹⁴C-histamine formed corresponded to about 5000 counts per min. The isotopic technique employed in this laboratory has been described elsewhere¹¹. The results summarized in Table I indicate that in the majority of

¹ G. KAHLSON, E. ROSENGREN, and H. WESTLING, *J. Physiol.* 143, 91 (1958).

² G. KAHLSON, E. ROSENGREN, and T. WHITE, *J. Physiol.* 151, 131 (1960).

³ E. ROSENGREN, *Exper.* 18, 176 (1962).

⁴ G. KAHLSON, K. NILSSON, E. ROSENGREN, and B. ZEDERFELDT, *Lancet* II, 230 (1960).

⁵ G. KAHLSON, E. ROSENGREN, and C. STEINHARDT, *Nature* 194, 380 (1962).

⁶ G. KAHLSON and E. ROSENGREN, *Exper.*, in press (1963).

⁷ N. G. WATON, *Brit. J. Pharmacol.* 11, 119 (1956).

⁸ W. J. HARTMAN, W. G. CLARK, and S. D. CYR, *Proc. Soc. exp. Biol. Med.* 107, 123 (1961).

⁹ S. E. LINDELL, H. RORSMAN, and H. WESTLING, *Acta Allerg., Kbh.* 16, 216 (1961).

¹⁰ J. DEMIS, M. WALTON, D. WOOLEY, N. WILNER, and G. MCNEIL, *J. invest. Derm.* 37, 513 (1961).

¹¹ G. KAHLSON, E. ROSENGREN, H. WESTLING, and T. WHITE, *J. Physiol.* 144, 337 (1958).

cases the HFC is elevated in the wound and granulation tissue as compared with the respective controls.

Since human skin mast cells are known to form histamine¹², it was essential to investigate possible changes in the number of mast cells in the tissues under study. The determinations summarized in Table II were done in the laboratory of Dr. H. RORSMAN of the Dermatology Clinic of the University of Lund and show that the number of mast cells in the immediate region of the wound is not higher than at the control sites. It should be mentioned that in the rat the number of mast cells is reported to be decreased in the region of skin wounds in the first 24 h¹³.

Table I. HFC expressed as counts per min per g tissue. In specimens Nos. 1, 3, 4 and 7 tissues from two incisions, in No. 5 from three incisions were pooled. Nos. 1–5 were excised 24 h after wounding, Nos. 6–8 at 48 h

No.	Tissue	HFC	Patient Age	Sex	Diagnosis
1	Skin	30	67	♂	Hyperplas. prostatae
	Wound tissue	<1	65	♂	Adenocarc. prostatae
	Granulation tissue	110			
2	Skin	60	69	♂	Cancer prostatae
	Subcutis	15			
	Wound tissue	40			
	Granulation tissue	60			
3	Skin + Subcutis	<1	62	♀	Cancer ves. urin.
	Wound tissue +	40	69	♂	Hyperplas. prostatae
	Granulation tissue				
4	Skin	110	45	♂	Fistula urethrae
	Subcutis	35	69	♂	Hyperplas. prostatae
	Wound tissue	180			
	Granulation tissue	110			
5	Skin	<1	53	♂	Nephrolith. dx.
	Subcutis	10	21	♂	Haemangiom. scrot. dx.
	Wound tissue	<1	72	♂	Papilloma ves. urin.
	Granulation tissue	15			
6	Skin	20	50	♂	Cancer ves. urin.
	Wound tissue +	30			
	Granulation tissue				
7	Skin + Subcutis	110	16	♂	Nephrolith. dx.
	Wound tissue +	160	44	♀	Pyelonephr. chron. ren. dx.
	Granulation tissue				
8	Skin	<1	64	♀	Pyelonephr. chron.
	Subcutis	15			
	Wound tissue	240			
	Granulation tissue	<1			

Alkaloide aus *Schizozygia caffaeoides* (Boj.) Baill.

Die Apocynacee *Schizozygia caffaeoides* (Boj.) Baill., ein in Ostafrika heimischer Strauch, dient in der Volksmedizin Tanganjikas zur Bereitung eines Absudes, der zur Behandlung von Schwindelanfällen Verwendung findet. Inhaltsstoffe dieser Pflanze sind bis jetzt nicht bekannt geworden. Im Rahmen unserer Arbeiten über Apocynaceenalkaloide untersuchten wir im Ulangadistrikt (Tanganjika) gesammelte¹ Wurzeln, Zweige und Blätter von *Schizozygia caffaeoides*² auf ihren Alkaloidgehalt. Aus der von den einzelnen Pflanzenteilen gewonnenen Fraktion der tertiären Basen liess sich durch Kristallisation ein einheitliches Hauptalkaloid abtrennen, das wir Schizozygine nennen. Die Schizozygine-Mutterlaugen wurden durch 20-

Table II. Number of mast cells per unit in tissues of the wound and control sites

Age	Sex	Patient Diagnosis	Wound			Control		
			A	B	C	A	B	C
45	♂	Fistula urethrae	238	713	262	152	262	279
69	♂	Hyperplas. prostatae	457	812	172	421	795	426
69	♂	Hyperplas. prostatae	437	1000	156	600	746	254
62	♀	Cancer ves. urin.	388	1279	271	354	853	213
		Mean:	380	951	215	382	664	293

A: Section through total cutis.

B: Section through uppermost dermis.

C: Section through lower dermis.

It thus appears that the elevated HFC found in the present experiments resides in cells other than mast cells. The great range in the HFC of 'normal' skin tissues may in part be due to the fact that the skin specimen excised from the patient is small, particularly so in No. 4, and therefore the control tissues obtained at sites rather near the wound may represent different intermediary states. Whatever the reason for the wide variations, it appears that in man, as previously shown in the rat, elevation of HFC is associated with reparative growth in healing skin wounds.

Zusammenfassung. Wund- und Granulationsgewebe bildet beim Menschen nach Hautschnitt in den ersten Tagen erhebliche Mengen von Histamin durch Dekarboxylierung von Histidin. Diese Fähigkeit zur gesteigerten Histaminbildung kann dabei nicht den Mastzellen zugeschrieben werden.

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¹² S. E. LINDELL, H. RORSMAN, and H. WESTLING, *Acta Dermatoven.* 41, 277 (1961).

¹³ B. WICKMANN, *Acta path. microbiol. scand. Suppl.* 108, 1 (1955).

stufige Craig-Verteilung bei pH 3,4 in vier Fraktionen zerlegt, von denen jede durch Chromatographie an Aluminiumoxyd weiter aufgetrennt wurde. Die physikalischen und analytischen Charakteristika der dabei isolierten Nebenalkaloide sind mit denjenigen des Schizozygins in der Tabelle zusammengefasst.

Die Mehrzahl der *Schizozygia*-Alkaloide sind strukturell offenbar nahe verwandt. Mit Ausnahme von Schizophyllin und Tabernoschizin besitzen sie die für N-Acyl-indolin-

¹ Herrn Apotheker F. HAERDI danken wir bestens für das Sammeln des Pflanzenmaterials.

² Die botanische Identität wurde am East African Herbarium, Nairobi, unter der Leitung von Dr. VERDECOURT geprüft und bestätigt.