

trols (4). On a cell-to-cell basis, leukocytes contain more polyamines than do erythrocytes (1). Nevertheless, owing to the dominance of the erythrocytes, the bulk of blood polyamines are associated with these cells when calculated for 1 ml whole blood. Concerning the separate amines, the concentration of spermine in leukocytes is about twice that of spermidine. It is known that the polyamine content of erythrocytes declines with the age of the cell (1). The polyamine concentration as related to age of the leukocytes remains to be examined. Further work is required to elucidate the blood polyamines in psoriasis.

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Immunopotential of Allergic Contact Dermatitis in the Guinea Pig with *C. parvum* (*P. acnes*)

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Abstract. An aqueous suspension of killed *C. parvum* (*P. acnes*) substantially immunopotentiates the acquisition of allergic contact dermatitis to low molecular weight allergens in the guinea pig. Damage to the skin from the adjuvant is slight.

Key words: Dermatitis, contact; Guinea pig; Dinitrochlorobenzene; *Propionibacterium acnes*; Adjuvant, immunologic

The guinea pig is the animal of choice for the prospective testing of low molecular weight chemicals that might be significant contact allergens in man (3, 4). A number of techniques are used in such testing to render the guinea pig more susceptible to contact sensitization. Magnification of immunological reactivity is necessary for the identification of weak contact sensitizers since under ordinary conditions such allergens have a low incidence of sensitization (viz. one per thousand or less). The use of complete Freund's adjuvant (CFA) is a particularly decisive way to intensify the induction of delayed-type hypersensitivity to simple chemical allergens in the guinea pig. However, CFA as an immunological adjuvant has the disadvantage that local draining inflammatory reactions form at the sites of CFA injections, and migratory granulomas, in the skin and elsewhere, often develop after the injection of CFA (1).

Table I. Potentiation of allergic contact dermatitis to DNCB with *C. parvum*

Group	Day 0	Day 6	Day 7		Day 8	
			0.5%	0.15%	0.5%	0.15%
I	<i>C. p.</i> 100 µg DNCB	Challenge with 0.5% and 0.15% DNCB	2.5±0.7	2.2±0.8	1.9±0.7	1.2±0.3
II	<i>C. p.</i> 30 µg DNCB	Challenge with 0.5% and 0.15% DNCB	3.0±0.0	2.4±0.5	1.8±0.3	1.5±0.5
III	Saline DNCB	Challenge with 0.5% and 0.15% DNCB	1.4±0.9	1.2±0.4	1.1±0.5	0.5±0.5
IV	—	Challenge with 0.5% and 0.15% DNCB	0.0±0.0	0.0±0.0	0.0±0.0	0.0±0.0

Two groups of 5 female Hartley guinea pigs were injected intradermally on the left flank with 0.1 ml of an aqueous suspension of 100 µg *C. parvum* (Group I) or 30 µg *C. parvum* (Group II); Group III guinea pigs were treated in parallel with saline. A few minutes later, 0.02 ml of 0.5% DNCB in acetone was applied to the injected sites. All groups, as well as a non-sensitized control group, were challenged on Day 6 on the opposite flank with 0.5% and with 0.15% DNCB in dibutyl phthalate. The average intensity of the reactions ($\pm$ the standard deviation) of the guinea pigs of each group is shown.

We now report the immunopotentialization of allergic contact dermatitis by killed *Corynebacterium parvum* in the guinea pig. The increase in delayed hypersensitivity is substantial and the local inflammatory reaction in the skin from the *C. parvum* injections is minor and transient.

MATERIAL AND METHODS

Animals

Female Hartley guinea pigs were purchased from the Charles River Breeding Laboratories, Wilmington, Mass. The animals were housed in a light-cycled temperature-controlled animal room in stainless steel cages with wood shavings for bedding. They were fed fresh Purina Guinea Pig Chow and had access to water *ad lib*. The health of the animals, as judged by their clinical appearance and consistent weight gain, was excellent; no unintentional losses occurred.

Chemicals

Corynebacterium parvum (currently designated *Propionibacterium acnes*) was obtained, as a killed aqueous suspension at a concentration of 14 mg of micro-organisms per ml, from the Burroughs Wellcome Company (through the kindness of Dr Richard L. Tuttle). Fresh solutions of DNCB (1-chloro 2,4-dinitrobenzene, Eastman Laboratories, Rochester, N.Y.) and of NDMA (*p*-nitroso-*N,N*-dimethyl aniline; K and K Laboratories, Inc., Plainview, N.Y.) were made up immediately prior to their use.

Sensitization and challenge

Guinea pigs were sensitized by the application of sensitizer, with disposable glass pipettes, to a clipped area measuring about 1 cm in diameter on one side of the back of the animals. Challenge was made on clipped normal skin on the opposite dorsal flank. The reactions were read

at 24 and 48 hours. The quality of each reaction was recorded and later graded according to the degree of induced erythema and thickening; scores ranged from 4+, for very substantial reactions, to 0 for no definite reactions. The details of the testing and scoring method have been published previously (5).

RESULTS

In a typical experiment, three groups of 5 guinea pigs each were clipped on the left flank. Animals in different groups were injected intradermally with *C. parvum* in saline, or with saline alone. Subsequently, a sensitizing solution of 0.5% DNCB in acetone was applied over the injected sites. Six days later all groups, as well as a toxicity control group, were challenged in different sites with 0.5% DNCB and with 0.15% DNCB in dibutyl phthalate on the right flank. The protocol and results are set down in Table I. Pretreatment of the sensitization site with 100 µg *C. parvum* or with 30 µg of *C. parvum* substantially increased the induced sensitivity. We obtained a similar result with an unrelated sensitizer. Thus, in untreated guinea pigs, intradermal preparation of the sensitization site substantially increased the hypersensitivity induced to the contact sensitizer NDMA (Table II).

DISCUSSION

Much work has demonstrated that non-specific modulation of the immune response of the host can be obtained following systemically administered *C.*

Table II. Potentiation of allergic contact dermatitis to NDMA by *C. parvum*

Group	Day 0	Day 6	Day 7	Day 8
I	<i>C. p.</i> 30 µg	Challenge with 0.5% NDMA	1.2±0.3	0.8±0.3
II	Saline – NDMA	Challenge with 0.5% NDMA	0.5±0.5	0.3±0.4
III	–	Challenge with 0.5% NDMA	0.0±0.0	0.0±0.0

Two groups of 10 guinea pigs each were sensitized to NDMA by the application of 0.02 ml of 0.5% NDMA in acetone to the skin of the dorsal right flank. A few minutes earlier, the sensitization site had been injected intradermally with 0.1 ml of 30 µg *C. parvum* (Group I) or with saline (Group II). The average intensity of the challenge reactions ($\pm$ the standard deviations) at 24 and at 48 hours, to testing with 0.2% NDMA in dibutyl phthalate is shown for the sensitized groups as well as for a toxicity control group.

parvum. However, the issue is complex in that both stimulation and inhibition of T-cell immunity may occur, depending on the conditions of the experiment (2). A local specific immunoadjuvant effect of *C. parvum* with respect to the induction of tumor immunity in mice has been described when *C. parvum* is given with antigen (6). We have found that killed *C. parvum* can act as a substantial immunoadjuvant for allergic contact dermatitis in the guinea pig. The induced hypersensitivity to contact allergens is increased by injecting a suspension of killed *C. parvum* into the sensitization site. The local skin toxicity from *C. parvum* is minor and transient. It is likely that *C. parvum* can be incorporated into protocols to enhance the sensitivity of bioassays of potential human sensitizers in the guinea pig.

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The Isomorphic (Koebner) Phenomenon in Cutaneous Mastocytosis

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Abstract. A patient with cutaneous mastocytosis is described who developed diffuse mast-cell infiltration in two burned areas of the skin in a Koebner-like manner. This appears to be the third instance of the isomorphic phenomenon in cutaneous mastocytosis reported in the literature.

Key words: Mastocytosis; Koebner phenomenon; Isomorphic phenomenon

The Koebner (isomorphic) phenomenon is known to occur in a wide variety of dermatological conditions. It is a distinguishing feature of psoriasis, but it also occurs in lichen planus, Darier's disease, pityriasis rubra pilaris, vitiligo, and many other dermatoses. The Koebner response is a rare event