

Antigen Specificity of Retest Reaction in Contact Sensitivity

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ABSTRACT. Guinea pigs doubly sensitized to 2,4-dinitrochlorobenzene (DNCB) and oxazolone (OX) were tested with DNCB, OX and croton oil and retested by epicutaneous application of DNCB and OX at the sites of prior contact reaction at the various intervals following skin testing. Antigen specificity of retest reaction to DNCB was demonstrated when retest of DNCB was performed 21 and 28 days after the skin testing. The significance of the findings is discussed.

Key words : Retest reaction — Contact sensitivity — DNCB — Oxazolone — Croton oil

The so-called retest reaction in tuberculin skin test was already recorded in the early years of this century, and the observation has been clinically and experimentally confirmed several times. However, relatively few works on the reaction in contact sensitivity have been carried out.¹⁻⁵⁾ The term "retest reaction" is used here to describe an accelerated reaction which appear at a previous positive skin test site after renewed local administration of antigen. The mechanism by which the reaction is produced is still largely unknown. The present paper will show the results of an experiment in which guinea pigs doubly sensitized to 2,4-dinitrochlorobenzene (DNCB) and oxazolone (OX) were cross-retested in order to investigate the antigen specificity of the reaction in contact sensitivity.

MATERIALS AND METHODS

Animals : Male Hartley strain guinea pigs, weighing 400-500 g were used.

Sensitization : Guinea pigs were doubly sensitized to DNCB and OX by an application of 0.025 ml of 5% DNCB ethanol solution and by two intradermal injections of 0.1 ml of a 2.5% OX acetone solution on the nape.

Skin testing : Seven days after sensitization the animals were tested for contact sensitivity by applications of 0.01 ml of 0.2% DNCB ethanol solution and 0.25% OX acetone olive oil (4 : 1) solution on the clipped back skin. 0.01 ml of 20% croton oil (CR) in olive was also painted on the back. Applications of 0.01 ml of 0.1 and 0.2% DNCB ethanol solutions and 0.25% and 0.125% OX acetone olive oil (4 : 1) solution were given to the previous test site and virgin site 7, 14, 21 and 28 days after the previous skin testing. Contact reactions were graded on an arbitrary scale as follows : 0.5, isolated

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red spots ; 1, diffuse slight redness ; 2, marked redness and slight swelling ; 3, deep redness and considerable swelling. The degree of test reactions was expressed as the total of two readings.

RESULTS

Animals doubly sensitized to DNCB and OX were tested with DNCB, OX and CR 7 days after sensitization and retested by epicutaneous application of DNCB and OX at the same sites at various intervals following skin testing. At 9 hour after the antigenic challenge, the reactions to DNCB at DNCB test sites were significantly more intense than those at the new sites (Fig. 1-4, Table). They waned to some extent at 24 hour. A similar acceleration of reactions to DNCB was also obtained at the site of prior test reaction to OX and CR 7 and 14 days after skin testing (Fig. 1 and 2, Table). The reactions at these nonspecific retest sites did not differ appreciably from those at new sites 21 and 28 days after skin testing (Fig. 3 and 4, Table). This shows antigen specificity of

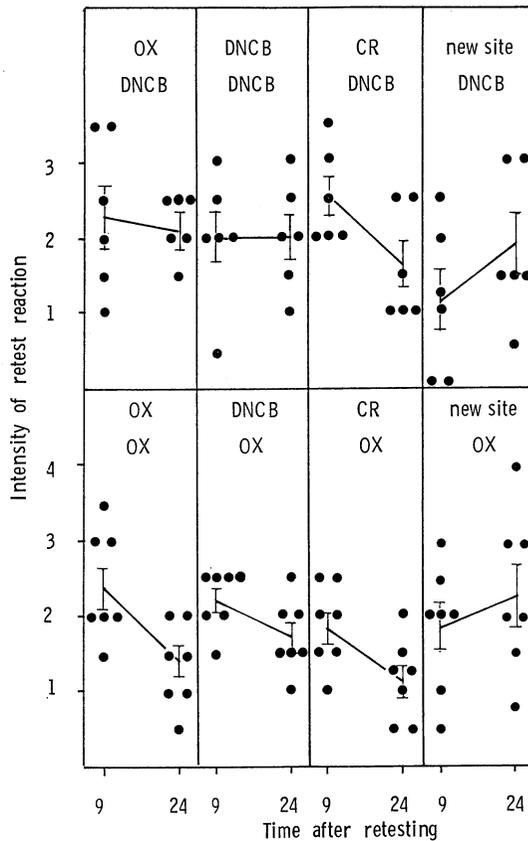


Fig. 1. Reactions on retest with DNCB and OX at the sites of prior contact reactions to OX, DNCB and CR 7 days after the testing. The intensities of the retest reactions, their means and standard errors are illustrated.

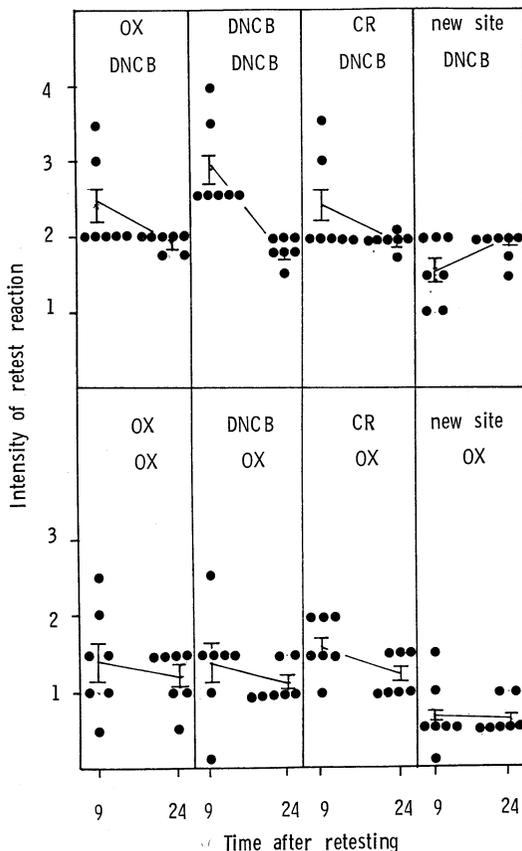


Fig. 2. Reactions on retest with DNCB and OX at the sites of prior contact reactions to OX, DNCB and CR 14 days after the testing. The intensities of the retest reactions, their means and standard errors are illustrated.

retest reaction to DNCB. Retest reaction to OX was also observed at a previous skin test sites 14 days after skin testing, but antigen specificity of retest reaction to OX was not demonstrated in the present experiment (Fig. 2).

DISCUSSION

The so-called retest reactions in contact sensitivity have been reported earlier^{1,2)} but the details were not clear. The experiment in which guinea pigs doubly sensitized to dinitrophenylated guinea pig albumin and toxoid were cross-retested with these antigens showed an antigen specificity of retest reaction in delayed type hypersensitivity.⁶⁾ In the present study, specificity of retest reaction in contact sensitivity to DNCB were also demonstrated.

It is of interest that specificity of retest reaction and duration between testing and retesting are closely related. The specific acceleration of reaction to DNCB was obtained at the site of prior test reactions to DNCB 21 and 28 days after the skin testing. On the other hand, the reactions at nonspecific

TABLE. Retest reaction to DNCB at previous skin test sites with DNCB, OX and CR at various intervals after skin testing.

Duration between testing and retesting	Testing with	Intensity of retest reaction to DNCB* ± S.E.
7 days	DNCB	2.0±0.3
	OX	2.3±0.4
	CR	2.5±0.4
	new site	1.1±0.4
14 days	DNCB	2.9±0.2
	OX	2.4±0.2
	CR	2.4±0.2
	new site	1.6±0.2
21 days	DNCB	2.9±0.2
	OX	1.9±0.2
	CR	2.3±0.3
	new site	1.8±0.3
28 days	DNCB	3.1±0.2
	OX	2.4±0.1
	CR	2.1±0.2
	new site	2.5±0.2

* The reactions were read 9 hours after testing.

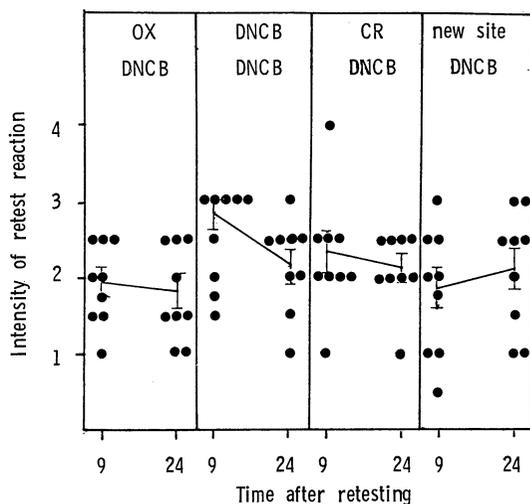


Fig. 3. Reactions on retest with DNCB at the sites of prior contact reactions to OX, DNCB and CR 21 days after the testing. The intensities of the retest reactions, their means and standard errors are illustrated.

retest sites were also significantly more intense than those at the virgin site 7 and 14 days after skin testing. Polak *et al.* have claimed that antigen-sensitive cells previously involved in test reaction can still be present in the cell infiltrate at the site of the old contact reaction.⁷⁾ It is suggested that antigen-sensitive cells remain specifically at the old test site of the antigen relatively for long time after testing.

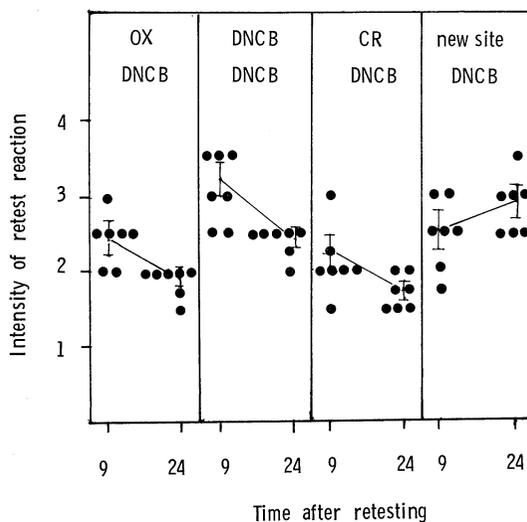


Fig. 4. Reactions on retest with DNCB and OX at the sites of prior contact reactions to OX, DNCB and CR 28 days after the testing. The intensities of the retest reactions, their means and standard errors are illustrated.

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