Table 1. EFFECT OF VARIOUS TREATMENTS WITH PHA ON CUTANEOUS HYPERSENSITIVITY TO PERTUSSIS VACCINE IN THE RAT AND ITS EFFECT ON ACUTE INFLAMMATION

Treatment with PHA	Per cent suppression 24 h	48 h
Day before primary then daily up to challenge dose + 1 day	58	76
For 5 days daily before primary dose, then no more	58	72·8
For 3 days daily before challenge dose	0	0
Turpentine pleurisy	6 h	
Single dose before acute inflammation	0	
Twelve daily injections before acute inflammation	0	

injections of PHA also responded with normal acute inflammatory reactions in response to intrapleural turpentine. It thus appeared that the PHA did not act as a general anti-inflammatory agent.

Groups of rats were then treated for 5 days with daily intravenous injections of PHA before the primary injection of pertussis. Twelve days after the primary injection they were challenged and showed markedly reduced inflammatory responses. At 24 h there was again 58 per cent suppression and at 48 h a 73 per cent suppression of the reaction.

Finally, rats were given three daily injections of PHA immediately before the administration of the challenging dose of pertussis. This procedure failed to cause any suppression of the reaction.

From these observations it would seem that PHA given before the initial exposure to antigen will suppress the delayed hypersensitivity reaction. On the other hand, PHA given before the challenging dose of antigen fails to reduce the reaction. In addition, PHA does not owe its activity to a general anti-inflammatory action.

It seems possible that the PHA acts by causing a stimulation of the non-committed clones of immunologically competent cells, thus rendering them unable to respond for that period to antigenic stimulation of the type administered.

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Hydroxyproline Indices

When it was known that the excretion of hydroxyproline peptides in the urine was correlated with active growth, and varied in a characteristic way with age[1–3], Alison *et al.*[4] demonstrated that as a measure of growth the ratio of hydroxyproline : creatinine in a 24 h collection of urine was a great improvement on the hydroxyproline excretion/24 h, because the former eliminated to a great extent the effects of weight, and gave more consistent results for subjects of the same age. They found that the ratio fell in children between 1 and 5 yr, and then remained constant until puberty, after which it fell again to the adult level. Jasin *et al.*[1] had already introduced the factor of surface area to try to eliminate the effects of size, and had found that the results obtained were constant between the ages of 1 and 10 yr.

Whitehead[5,6], wishing to use random samples of urine for his work rather than 24 h collections, and not knowing the exact ages of the children in which he was interested, (*a*) satisfied himself of the constancy of the ratio of hydroxyproline : creatinine during 24 h by testing many random samples from the same individuals, and (*b*) added the parameter of weight to the ratio of hydroxyproline : creatinine, and developed what he called the hydroxyproline "index" as a measure of marginal malnutrition and of a failure to grow. This index had the same advantage that the hydroxyproline excretion/m²/24 h would have had in giving a constant figure for the age range in which he was interested. It has subsequently been realized that this "constancy" in a given range of weights is empirical, and may only hold for man. There is no such constancy in rats[7].

Table 1. HYDROXYPROLINE INDICES BASED ON HEIGHT AND WEIGHT IN 103 NORMAL CHILDREN

No. of children	Age (months)	Hydroxyproline (μm)/creatinine (μm)	Weight index: Weight measured in individuals	Weight index: Weight from tables	Height index
20	1–6	0·59	3·6	3·6	33
23	7–12	0·38	3·1	3·4	26
17	13–24	0·27	2·7	2·8	22
6	25–36	0·22	2·6	2·7	20
21	37–48	0·18	2·7	2·6	18
22	49–72	0·19	3·3	3·3	20

Work now in progress had led us to examine parameters other than weight, which might be incorporated into an index to make it valuable in scientific studies of animal growth as well as in clinical medicine. Height appears to be a satisfactory one. Table 1 shows a comparison of the "index" based on weight, with a corresponding one based on height. The methods used were those described by Howells and Whitehead[8]. The weights of the individual children were all known, and the first figures given for the weight index were obtained by averaging the results for each individual child in the group. The height indices for children up to 3 yr were obtained in the same way. The second figures given for the weight index were obtained from tables[9] and the results were much the same. The heights of children of more than 3 yr were not always known, and the figures given for their height indices were obtained only from the tables. Two points are clear: (*a*) an index based on height changes with age like the one on weight, and (*b*) that, if a constant value is desirable between 1 and 6, height has a claim to a place in the index as good as or better than weight.

The use of a height rather than a weight index nullifies one criticism of Whitehead's work made by Anasuya and Narasinga Rao[10], namely, that the improvement in the index during the treatment of malnutrition was caused by the simultaneous changes in weight, and not by an increase in the excretion of hydroxyproline. In a study of forty-eight children by the index based on height, we have obtained the following results. Index on admission was $13{\cdot}5 \pm 6{\cdot}7$ and index on discharge was $21{\cdot}5 \pm 8{\cdot}0$.

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