PLANT ANTI-H HEMAGGLUTININS

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The principle of a new method of obtaining anti-H reagents was developed in connection with the discovery of natural plant hemagglutinins specific to human antigens, including antigen H (O) [8].

We have set out to find whether anti-H agglutinins are present in the seeds of plants growing in the Soviet Union, and to determine their properties. The preparation of plant extracts and the investigation of their power of agglutination of blood were made by the method described previously [1, 2].

EXPERIMENTAL RESULTS

Good anti-H agglutinins were obtained from the seeds of Cytisus sessilifolius (C. s.), Laburnum wateri (L. w.), Lotus tetragonolobus (L. t.); after centrifugation of the tubes for 2 min at 1500 rev/min the titer with respect to erythrocytes of group O was 1:128-1 : 512. However, extracts of seeds from Ulex europaeus, Laburnum alpinum, and Cytisus ruthenicus had a titer which did not exceed 1:16.

The titer of agglutinins C. s. and L. w. with respect to various blood samples of groups A, B, and AB showed a very wide variation according to the content of agglutinogen H in the erythrocytes studied. Samples of blood of group A_2 was also more readily agglutinated than were samples of group O blood, but the erythrocytes of group A_1 and B, containing a large amount of agglutinogen H were no less easily agglutinated. Erythrocytes of group A_4 were readily agglutinated by the extract.

The experiments demonstrated the ability of phytagglutinin anti-H to combine with the saliva of the "excretors" (Se) of antigen H. A proof of the specificity of this reaction is the failure of the agglutinins of salivary "non-

TABLE 1. Individual Differences in the Ability of the Saliva of "Excretors" and "Non-Excretors" of Group O to Bind Anti-H Phytagglutinin in the Delayed Agglutination Reaction

Dilution of extract	Samples of saliva of human subject type Se						Samples of saliva of human subjects of type se			Control
	1	2	3	4	5	6	1	2	3	
1:2	++++	+	++	+++	++++	—	+++	+++	+++	+++
1:4	++++	—	—	+++	++	—	+++	+++	+++	+++
1:8	∓	—	—	+	—	—	+++	+++	+++	+++
1:16	—	—	—	∓	—	—	+++	+++	+++	+++
1:32	—	—	—	—	—	—	+++	+++	+++	+++
1:64	—	—	—	—	—	—	++	+∓	++	++
1:128	—	—	—	—	—	—	—	∓	∓	∓
1:256	—	—	—	—	—	—	—	—	—	—

Note. The saliva was diluted 10 times.

TABLE 2. Qualitative Characteristics of Extracts of Anti-H C. s. (1) and L. t. (2), as Shown by Hemagglutination

Dilution of extract	Erythrocytes of group: 0		A_2		A_1		A_1		B		B		A_1B	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
No dilution	++++	++++	++++	++++	++++	—	++++	±	++++	++++	++++	+	∓	—
1:2	++++	++++	++++	++++	++++	—	++++	±	++++	++	++++	+	±	—
1:4	++++	++++	++++	++++	++++	—	+++	∓	++++	++	++++	±	±	—
1:8	++++	++++	++	++++	++++	—	+	—	++++	±	++++	∓	∓	—
1:16	++++	++++	++	++	++	—	+	—	++++	—	++++	—	—	—
1:32	+++	++	+	++	+	—	±	—	+++	—	++	—	—	—
1:64	+	+	+	∓	+	—	∓	—	+	—	+	—	—	—
1:128	∓	±	±	∓	∓	—	—	—	±	—	±	—	—	—
1:256	∓	∓	—	—	—	—	—	—	—	—	∓	—	—	—
1:512	—	—	—	—	—	—	—	—	—	—	—	—	—	—

excretors" (se) to bind the agglutinins. The results obtained confirm the results of many foreign authors concerning the use of phytagglutinins anti-H to determine the individual "excretion" of antigen H in the saliva [3-7].

In a comparative study of extracts of C. s. and L. t. qualitative differences in their content of the anti-H agglutinins were found (Table 2).

Thus, the anti-H phytagglutinins are effective reagents in no way inferior to anti-H sera, but actually exceeded them in titer and specificity.

The anti-H phytagglutinins from the seeds of C. s. and L. w. cannot be used for differentiation of blood of groups A_1 and A_2. Anti-H phytagglutinin from the seeds of L. t. shows qualitative features of inter-relationship of antigens A and H which depend upon the extent to which antigen A is present.

It is more economical and technically much simpler to obtain anti-H hemagglutinating plant extracts than to prepare them from the corresponding specific sera. Because the agglutinins in seeds and extracts keep well, the expensive freeze-drying method is not required.

SUMMARY

Agglutinins specific to the human H antigen are present in the seeds of Cytisus sessilifolius, Lotus tetragonolobus, Laburnum watereri, and in the seeds of some other plants growing in the Soviet Union. Their titer with respect to erythrocytes of group O blood is 1:128 - 1:512. To detect the H antigen in the erythrocytes and saliva, anti-H agglutinins may serve as reliable agents, in no way qualitatively inferior to the anti-H sera, and even being superior to them in titer and specificity. Somy phytagglutinins have properties analogous to the goat hetero-immune anti-H serum, whereas others possess a number of specific properties which may well be used for a more extensive and exhaustive study of the H antigen.

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