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Observations on human isoagglutinins.

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It has been known for a long time that there are certain exceptions to the common blood grouping. This was pointed out repeatedly by one of the writers[1] as well as by others.[2]

It did not seem worth while to describe in detail some observations which we have made along this line since, at the present time, there is no practicable way of comparing such disconnected findings with similar ones of other workers and properly classifying them.

In our studies we have found instances of weak agglutination of a serum type I with another blood of the same type and recorded similar reactions with specimens of types II and III.

The reactions were chiefly observed at a temperature of about 15° C. or less. At higher temperatures they became gradually weaker and disappeared. Several times the clumps contained rouleaux.

The observation that at lower temperature atypical agglutinin reactions may occur between human bloods and sera of different individuals has already been described by Bialosuknia and L. Hirszfeld.[3] While the conclusion of these authors that the reactions are different from isoagglutination is questionable, they certainly gave a description of the fact. Similar phenomena were described in detail by Guthrie and Pessel.[4] Although it is

[1] Landsteiner, K., *Wiener klin. Wochenschr.*, 1901, xlvi, 1132. Landsteiner, K., *Oppenheimer Handb. d. Biochemie,* 1909, ii, 414. Landsteiner, K., *Zentr. Gynäkologie,* 1921, xlv, No. 19.

[2] V. Dungern, E., and Hirschfeld, L., *Z. Immunitatsf,* 1911, viii, 527. Ottenberg, R., *J. Exp. Med.*, 1911, xiii, 425. Unger, L. J., *J. Am. Med. Assn.*, 1921, lxxvi, 9. Guthrie, C. G., and Huck, J. G., *Johns Hopkins Hosp. Bull.*, 1923, xxxiv, 37. Hooker, S. B., and Anderson, L., *Am. J. Immunol.*, 1921, vi, 419.

[3] Bialosuknia, W., and Hirszfeld, L., *Przegladu Epidemjologicznego,* 1921, i, 437.

[4] Guthrie, C. G., and Pessel, J. F., *Johns Hopkins Hosp. Bull.*, 1924, xxxv, 33.

possible that an agglutination of this kind would not occur at body temperature yet the slight difference in the constitution of the blood might be sufficient to produce undesirable effects. Regarding the practical application, the observations suggest the use of direct cross tests before transfusion (in addition to typing); furthermore, it seems advisable to make these tests at low temperatures since in that way slight reactions may appear. This deduction has previously been made by Guthrie and Pessel.

Difficulty may be experienced in distinguishing isoagglutination at low temperatures from autoagglutination since the latter is favored by decreasing temperature.[5] To control this point, tests should be made using the cells of the individual from which the serum is taken and cells of several other individuals, in case an irregular reaction is observed.

The finding of "atypical" isoagglutinin reactions does not alter the fact that the division of human blood in four groups is a fair approximation but there is at least one addition to the established facts concerning isoagglutination[5, 6] which can already be classified and easily detected.

V. Dungern and Hirschfeld[7] found that after absorption of a serum, type III[8], with a certain blood II, agglutinins remained for a number of blood samples II and not for others of the same group. To explain the phenomenon, one may assume the existence of a special agglutinable substance in those which reacted. Analogous observations were made in an elaborate study by Guthrie and Huck.[9] They designated the agglutinable substance of group II detected in this way and by a special serum, with the letter "C".

Coca and Klein[10] discovered a similar agglutinable element by means of a serum, group I, absorbed by a certain blood II. Since they found their factor, "x," present in about 78 per cent of bloods belonging to group II while Guthrie and Huck had found

[5] Landsteiner, K., *Münch. med. Wochenschr.*, 1903, 1812.

[6] von Decastello, A., and Sturli, A., *Münch. med. Wochenschr.*, 1902, 1090.

[7] V. Dungern, E., and Hirschfeld, L., *Z. Immunitatsf.*, 1911, viii, 527.

[8] According to the American Nomenclature, *J. Am. Med. Assn.*, 1921, lxxvi, 130.

[9] Guthrie, C. G., and Huck, J. G., *Johns Hopkins Hosp. Bull.*, 1923, xxxiv, 37.

[10] Coca, A. F., and Klein, H., *J. Immunol.*, 1923, viii, 477.

not more than 25 per cent, they concluded that the two agglutinogens are probably not identical. In a recent communication, however, Guthrie and Pessel[11] state that the frequency of the finding is higher than previously considered.

We have found an agglutinable factor in group II blood other than the common "A" by making tests with a serum of a patient, Barnett. The corpuscles of this individual were agglutinated by all sera I, II, III and, therefore, had to be put in group IV. The serum, on the other hand, agglutinated a number of bloods of group II and one of group IV. They behaved thus like certain absorbed sera I and III in the experiments of v. Dungern and Hirschfeld, Guthrie and Huck, Coca and Klein.

The reactions in our tests were not very strong but quite distinct. They disappeared almost entirely at 37° C. (The tests were made at 20° by mixing equal parts of serum, 2.5 per cent blood and saline.)

Of 21 bloods, type II, tested, 16, *i. e.*, about 76 per cent, gave positive reactions, 5 negative reactions, with serum Barnett in agreement with the figure found by Coca and Klein.

We made parallel tests with a number of bloods, type II, using the serum Barnett and serum A. F. C. (I) absorbed with blood Levine (II). This material was kindly furnished us by Dr. Coca. There was conformity of the reactions in all 15 cases as indicated by the following table containing a part of the tests.

	1	2	3	4	5	6	7	8	9
Barnett	+	±	±	±	±	+	0	+	0
A.F.C. absorbed with Levine	+	±	±	tr.	tr.	±	0	±	0

The corpuscles of blood Barnett were not affected by serum of A. F. C. absorbed with corpuscles Levine. They, evidently, do not contain the agglutinable element on which the serum acts. Another blood IV tested by us does contain this element. We have found an agglutinin of a similar kind as that described in another of several sera, group IV, tested. Thus the occurrence is apparently not unique.

According to our results group IV contains two sub-groups. In one there is an agglutinin in the serum, in the other, none.

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[11] Guthrie, C. G., and Pessel, J. F., *Johns Hopkins Hosp. Bull.*, 1924, xxxv, 23.

They may be designated as follows:

	IV (1)	IV (2)
Serum	—	c.
Corpuscle	A.B.C.	A.B.

The agglutinable factors "c" or "x" in cells of group II and IV found by previous workers and in our cases are probably identical.

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Filter-passing bacteria in the nasal passages of animals.

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Anaerobic cultures of the filtered nasopharyngeal secretions from man reveal a varied bacterial flora. There have thus far been described, *Bacterium pneumosintes,*[1] obtained from fresh cases of typical epidemic influenza, and three distinct groups[2] of Gram-negative, filterable, anaerobes, derived from patients with influenza, obscure upper respiratory affections, or common colds, as well as from persons supposedly healthy. To the latter three groups may be added another related species which will be described later and which has been isolated from a number of cases of infectious common cold.

The object of the present study was to determine whether, and to what extent, this class of microorganisms is distributed among laboratory animals. Accordingly, the filtered materials obtained from the nasal mucosa of 10 monkeys, 7 horses, 17 dogs, 5 cats, 20 rabbits, 20 guinea pigs, and 20 rats were cultured by the same methods which had yielded growth of the different species of bacteria from human secretions.

Suspensions in one per cent dextrose Ringer's solution were prepared of the nasal mucosa, dissected or curetted away from the underlying bone of recently killed animals, or of the nasal secretions collected on cotton swabs of living ones. The suspensions were filtered through Berkefeld "V" candles, impervious

[1] Olitsky, P. K., and Gates, F. L., *J. Exp. Med.*, 1921, xxxiii, 713.