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Influence of Age on Amount of Normal Agglutinins in the Blood of Cattle.

EDWIN O. JORDAN.

From the Department of Hygiene and Bacteriology, University of Chicago.

The currently accepted explanation of the frequent presence in normal human adults, as contrasted with young children, of antibodies such as diphtheria antitoxin and the substance that neutralizes the virus of poliomyelitis, is that the antibodies have been specifically generated by an unnoticed or a subclinical infection. The occurrence of normal bacterial agglutinins in the blood of various adult domestic animals, as demonstrated by Burgi, Gibson and others, has suggested some observations upon the influence of age on the presence and abundance of these antibodies. These agglutinins are common in the blood of cattle, they are specific at least to the extent of being removed by absorption with specific bacterial cells and they comprise both the H and O antigenic types.

The standard macroscopic agglutination technique was used. The serum was freshly obtained from cattle brought to the Chicago stockyards, and was from 3 groups: (a) calves (under 1 year); (b) heifers (approximately 1-2 years); (c) "cows and steers". The table shows, as observed by others, that there is considerable variation in the amounts of agglutinins for different bacterial strains, and without exception, agglutination is greater, often in a very striking degree, in the serum of the older animals than in that of the calves. The animals classed as heifers appear to have about the same amount of bacterial agglutinins in their blood as the older animals, but the titers average somewhat lower. There also appears to be a sex difference, for simplification's sake not indicated in the table. The serum of females contains on the average a distinctly greater amount of agglutinins than that of males.

Some observers have used strains of the Salmonella group to test for the presence of normal agglutinins.[1] Since several members of this group, notably *S. aertrycke* and *S. enteritidis* are natural infecting agents in cattle and since overlapping of *salmonella antigens* is commonly observed, the results obtained by the use of these strains are open to more than one interpretation. On the other hand, the agglutination reactions obtained with cholera vibrios

[1] Lovell, R., *J. Comp. Path. and Ther.*, 1932, **45**, 27.

TABLE I.
Agglutination by Normal Bovine Sera.

Species	No. sera tested		Not agglutinating at 1:40	Maximum Titer 1:40	1:100	1:200	1:400 or higher
B. coli (human feces)	Calves	10	10	0	0	0	0
	Heifers	23	21	2	0	0	0
	Cows and steers	24	17	4	3	0	0
*B. aerogenes** (isolated from soil apparently non-contaminated)	Calves	41	40	1	0	0	0
	Heifers	23	0	5	13	5	0
	Cows and steers	57	0	10	30	17	0
B. dysenteriae Flexner	Calves	41	40	1	0	0	0
	Heifers	23	0	5	7	10	1
	Cows and steers	52	0	2	28	19	3
B. dysenteriae Shiga	Calves	20	20	0	0	0	0
	Heifers	23	13	9	1	0	0
	Cows and steers	21	9	12	0	0	0
B. dysenteriae Sonne	Calves	41	39	1	1	0	0
	Heifers	20	0	0	2	12	6
	Cows and steers	27	0	1	7	15	4
B. pyocyaneus	Calves	41	41	0	0	0	0
	Heifers	23	1	5	12	5	0
	Cows and steers	57	0	12	25	18	2
Vibrio cholera A	Calves	61	60	1	0	0	0
	Heifers	23	4	19	0	0	0
	Cows and steers	56	15	32	9	0	0
Vibrio cholera B	Calves	10	9	1	0	0	0
	Cows and steers	9	0	4	4	1	0
Vibrio metchnikovi	Calves	10	8	2	0	0	0
	Heifers	23	4	19	0	0	0
	Cows and steers	24	1	16	7	0	0

* Another strain of *Bact. aerogenes* isolated from human feces did not agglutinate at 1:40 with the serum of calves (41 specimens), heifers (20), or adult bovines (53).

and perhaps those with certain dysentery bacilli strains, as shown in the table, are not so readily to be referred to previous specific infection with these bacteria. It is evident that the older bovines contain in their serum specific bacterial agglutinins which are absent or very scanty in the young and which are not likely to have been generated by infection with the specific homologous bacteria.