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# The relation between the accumulation of globulins and the appearance of agglutinins in the blood of newborn calves.

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A study has been made to determine the protein fractions of colostrum and of serum which carry the agglutinins produced against *Bacillus abortus*. Data have been obtained indicating that the agglutinins from serum and colostrum are almost completely precipitated with the globulin fraction separating at 14.2 per cent. of sodium sulfate; complete precipitation occurs at 16.4 per cent. of sodium sulfate. That such a separation is not the result of adsorption due to precipitation is shown in experiments in which casein was removed from colostrum with acetic acid; the casein removed did not have agglutinins associated with it but agglutinins did appear with the subsequent fractions.

The coincident appearance of the globulin fractions and of the agglutinins in the blood of newborn calves has been shown by direct comparison of the appearance of the proteins and the agglutinins. Where globulins precipitated by concentrations of sodium sulfate less than 17.4 per cent. have not been absorbed agglutinins have not been absorbed, on the other hand the absorption of globulins has been demonstrated in cases where the agglutinins for *B. abortus* were not present. A case in which agglutinins have been presented to a newborn animal without the associated globulins, if such is possible, has not been considered.

The evidence presented is associated with the observations of Little and Orcutt[1] and of Howe.[2] In the first case it was shown that the blood of newborn calves before ingesting colostrum did not contain agglutinins against *B. abortus* but that after the ingestion of agglutinin-containing colostrum the blood had a titer related to the agglutinin content of the colostrum. The observation of Howe demonstrated that the blood serum of a newborn calf does not contain appreciable quantities of proteins precipitable by concentrations of sodium sulfate equal to or less than 17.4 per

[1] Little, R. B., and Orcutt, M. L., *J. Exp. Med.*, 1922, xxxv, 161.

[2] Howe, Paul E., *J. Biol. Chem.*, 1921, xlix, 115.

cent. of the anhydrous salt, euglobulin and pseudoglobulin I. After the ingestion of colostrum containing these globulins relatively large quantities of the proteins appeared in the serum. Subsequent data have shown that there is evidence of absorption of the proteins within 3 to 4 hours and a very marked accumulation of the proteins 6 hours after receiving colostrum. Furthermore, we have one case in which both the agglutinins (Little) and the globulins decrease in amount with increasing age. The time and conditions of the formation of the globulins is being studied. The demonstration that the agglutinins are associated with the globulin fractions of the proteins of blood and colostrum and their absorption by young animals tends to support the idea of direct absorption into the blood of newborn calves of certain protein fractions present in colostrum.

The conception of a direct absorption of agglutinins and protein by the young animals based upon biological reactions has appeared repeatedly in the literature relating to the transmission of immunity. The absence of a substance reacting with colostrum antiserum in the blood of newborn calves which is acquired after the ingestion of colostrum has been demonstrated by Langer.[1] The acquirement of relatively large quantities of particular protein fractions by the newborn and the association of the agglutinins with these fractions we believe to be a new demonstration.

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## The effect of saline purgatives on the absorption of other drugs.

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It is well known that the pharmacodynamics of saline purgatives consists chiefly in the poor absorbability of certain ions such as those of magnesium, sulphate, phosphate, etc., and the accumulation of fluid in the intestinal canal through the osmotic action of the unabsorbed salt which, instead of being absorbed, actually draws fluid into the intestinal lumen. This peculiar

[1] Langer, *Verhandl. d. Gesellsch. f. Kinderheilk.*, 1907, xxiv, 70.