

**On the agglutinating action of human serum on certain pathogenic micro-organisms (particularly on the typhoid bacillus) / by Albert S. Grünbaum.**

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*On the Agglutinating Action of Human Serum on certain Pathogenic Micro-organisms (particularly on the Typhoid Bacillus). By ALBERT S. GRÜNBAUM, M.A., M.B. (Cantab.), M.R.C.P.*

The serum of an animal immunised against the typhoid bacillus or other motile pathogenic micro-organism has a peculiar action on an emulsion (in bouillon) of the bacillus of the corresponding disease. If a drop of serum and a drop of emulsion be mixed, and examined under the microscope, the bacilli will be seen to collect together in clumps, and to lose their motility. This reaction is nearly specific, and can be used to differentiate or identify certain bacteria. The phenomenon, although noticed by Bordet, was first thoroughly studied and its importance recognised by Durham and Gruber. The latter termed the active conglomerating substances 'agglutinines,' and they seem to play an important part in immunisation.

The serum of normal guineapigs or rabbits does not, as a rule, cause any reaction. Human serum is very different in this respect. In a comparatively large percentage of individuals (particularly those affected with jaundice) the serum has a very distinct agglutinating action on the cholera, coli, and typhoid bacilli, generally more on one than on the other. But the action is so little specific that, in normal individuals, it may be equal on any two or on all three. This does not occur with the serum of immunised animals.

But the strength of action is incomparably smaller with human serum. That of a highly immunised animal can be diluted to one in a thousand or more, and still show a clumping effect, that of man hardly ever more than one in eight.

Only in cases of typhoid fever (and the action is here much more specific) does it react in a dilution of one to sixteen (or more). Hence the reaction can be used for purposes of diagnosis. The agglutination is sometimes more marked with the diluted than with the pure serum, possibly through there being separate substances for the inhibition of movement and the agglutination. Individuals who have had typhoid fever do not, apparently, preserve any excess of typhoid 'agglutinines' in their serum for any great length of time.

Agglutinines present in the maternal blood are not necessarily present in the child's blood (at birth); the former may react strongly, and the latter not at all. But in this case, and generally in man, the immunising power seems to be only very partly dependent on the agglutinating power of the serum.

