

## Development of Faecal Immunoglobulins and Coproantibodies in Infants after Artificial Oral Colonization with *E. coli* 083

Antibody in the stool during acute enteric infection was first demonstrated by Davies<sup>1</sup> and was later termed coproantibody by BURROWS et al.<sup>2</sup> Many investigators have studied viral and bacterial agglutinating antibodies which occur in stool during natural enteric infections and following immunization with enteric organisms in man<sup>3-5</sup> and in experimental enteric infections in animals<sup>6-8</sup>. Antibody appears earlier in intestinal mucus than in the serum, suggesting that the intestine has an immune system of its own with cells which may produce antibody following local antigenic stimulation. The antibody in intestinal mucus also contains a greater proportion of IgA than in serum<sup>9-11</sup>. Protection against certain intestinal infections in animals is better correlated with levels of actively-produced or passively acquired coproantibody than with serum antibody titers.

In our previous work<sup>12</sup> we reported that the guts of new-born infants can be colonized with a non-pathogenic *E. coli* 083 serotype which stays in predominance for several months. Such an antigenic stimulus evokes the formation of circulating antibodies considerably earlier, and at a higher titer, than the antibody production against other random *E. coli* serotypes.

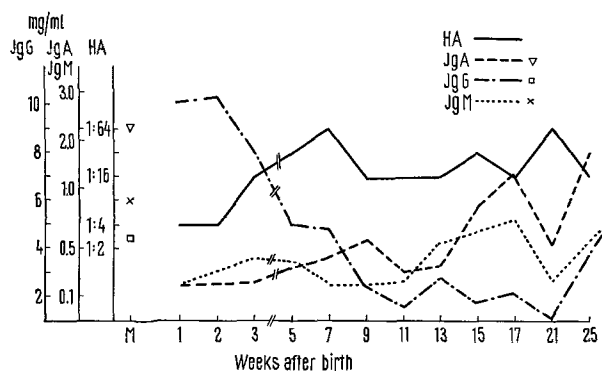


Fig. 1. Infant Š. The levels of IgA, IgG and IgM in the serum. HA, hemagglutinating titre of the antibody against *E. coli* 083; M, the level of immunoglobulins in the serum of the mother at the birth.

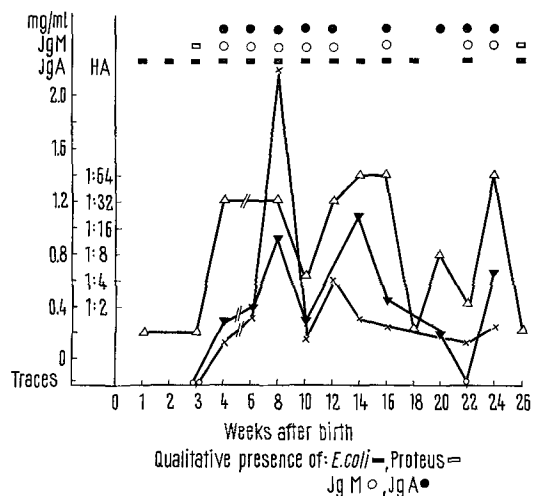


Fig. 2. Infant Š. The levels of IgA and IgM in stool filtrates. ×, quantitative IgM level; ▲, quantitative IgA level; △, hemagglutinating titre with antigen from *E. coli* 083.

The present study concerns coproantibody production following artificial colonization of 5 new-born infants with an *E. coli* type 083.  $5 \times 10^8$  organisms/ml were given orally immediately after birth and then 3 times a week for 3 weeks. Blood and stool samples were taken before the colonization and in 1, 2 and then every 2 weeks after colonization for a 25-week time period.

Antibodies were measured in stool filtrates and in the serum specimens by using the passive haemagglutination<sup>13</sup>. Immunoglobulins were assayed by radial immunodiffusion in agar gel<sup>14</sup>. A micromodification of the Ouchterlony method was used for demonstration of IgA and IgM in stool filtrates.

The first immunoglobulin which was found in our stool samples was IgA and sometimes also IgM. No IgG presence could be shown in the stool but usual levels were present in the serum. The IgA production was ascertained sometimes sooner in the stool filtrates than in the serum. A typical example of our result is shown in Figures 1 and 2.

Haemagglutinating antibodies against the *E. coli* 083 antigen were present in the stool and in the serum as well in titers from 1:2 to 1:128 (Figure 1). A random infection with *Proteus* was followed by appearance of haemagglutinating antibody against the O antigen of the *E. coli* 083 in stool filtrates of 2 infants.

From our results one can conclude that the presence of antigen leads to a local production of antibodies sooner than a measurable answer in the serum can be demonstrated. The immunoglobulin which appears in the stool is IgA. It remains a question whether the artificial colonization which leads to an earlier local IgA production could also mean a better protection against some intestinal infections in the first period of life. Work on this topic is still in progress.

**Zusammenfassung.** Bei peroraler Infektion von Säuglingen mit dem nicht pathogenen *E. coli* Stamm 083 zeigen sich die Antikörper im Stuhl vor denjenigen im Blut.

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