Colostrum as a source of togavirus inhibitors

Sir,

Human colostrum and milk are rich sources of antimicrobial substances. These afford increased resistance to bacterial and viral infections of the neonatal/infant gastrointestinal and respiratory tracts (Grulee *et al.*, 1935; Goldman and Smith, 1973; Gerrard, 1974) and this must be considered an advantage of breast feeding over the use of substitutes.

My interest in this subject concerns the antiviral behaviour of human colostrum. This stems from the study of nonantibody nonspecific virus inhibitors (NSIs) which occur naturally in serum independent of antigenic stimuli. Colostral NSIs secreted at high level around parturition have been found for representative respiratory viruses, namely influenza, parainfluenza, and adenoviruses (Shortridge, 1970; Shortridge *et al.*, 1974). Detailed study suggested that the influenza virus NSI might be derived from circulating plasma α_2-macroglobulin. Falkler *et al.* (1975) in Hawaii recently reported the presence of a lipid-type inhibitor in human colostrum active against dengue virus, an arbovirus.

In continuing studies in Hong Kong, lipoprotein NSIs have been observed in serum (Shortridge and Ho, 1974, 1976) and colostrum for a number of togaviruses including rubella virus and arboviruses such as Aura, Pixuna, Sindbis, Y62-33 (group A); Japanese encephalitis (JE), Ntaya, and Wesselsbron (group B). Colostrum samples from 55 individual Chinese or Caucasian donors ranging from 12 days' preparturition to 3 days' post- were examined and all contained NSI activity for these togaviruses. Strong virus infectivity neutralizing activity was observed using JE virus as a representative virus and there was no evidence that this activity was associated with specific antibody or interferon.

Rubella does not seen to be clinically as important in the Far East as in Western countries (Kono *et al.*, 1969). It is not clear whether the prevalent strains of virus are different or whether there are ethnic differences in susceptibility or response to infection. There is no firm information to hand as to whether the incidence of arbovirus infections such as JE in the Far East, or rubella in Hong Kong, is less frequent in breast-fed babies. However, as part of a broader study in this field, the serological status of local infants and children for rubella will be evaluated.

A recent report from the World Health Organization has shown very clearly that the rise in infant mortality in rural Chile coincided with a decline in the prevalence of breast feeding (Plank and Milanesi, 1973). While the phylogenetic significance and protective capability of naturally occurring inhibitory substances for arboviruses in particular are unclear, there is continuing evidence of the antiviral behaviour of human colostrum and milk. Such information should not be overlooked in view of the modern trend away from breast feeding in many parts of the world, a trend also evident in Hong Kong.

Some of the colostrum samples used in this study were provided by Dr. R. Wong, Department of Obstetrics and Gynaecology, University of Hong Kong.

K. F. SHORTRIDGE
Department of Microbiology,
University of Hong Kong,
Pathology Building,
Queen Mary Hospital Compound,
Hong Kong.

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Long-term effects of undernutrition in infancy

Sir,

The recent article (*Archives*, 1976, **51**, 327) by Stoch and Smythe on the ultimate consequences of infantile malnutrition is undoubtedly a valuable one, notwithstanding criticisms which have been levelled at this study previously. I am concerned however that the statistical handling and interpretation of their growth data are not made clear in the published paper. Unfortunately Table I shows what I presume are the mean values for the three variables measured, and there is no indication of the range or distribution of findings among their populations. As a consequence we have the surprising finding that a difference in mean height of 5·6 cm between index and