

AN ALPHA₂-GLOBULIN COMPONENT PRESENT IN SWEAT, SALIVA, TEARS, HUMAN MILK, COLOSTRUM AND CERUMEN

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By double-diffusion and immunoelectrophoresis, using rabbit anti-sweat protein immune serum, an alpha₂-globulin component of glycoprotein character was found in sweat, saliva, tears, human milk, colostrum and cerumen.

In 1957 we reported the presence of mucoproteins in human sweat [1]. By immunochemical methods using rabbit anti-sweat protein immune serum we found sweat proteins contained non-serum as well as serum components; one of the chief non-serum protein components in sweat was an alpha₂-globulin [2,3]. Further reports dealing with the character of macromolecular substances in human sweat have been presented [4-10].

Using immunochemical techniques we investigated the presence of this alpha₂-globulin in other biological fluids. Apart from sweat we found the alpha₂-globulin in whole (mixed) saliva, tears, human milk, colostrum and cerumen (fig. 1a and 1b).

On immunoelectrophoresis of concentrated samples the alpha₂-globulin component gave a long precipitin arc (in some instances doubled) indicating electrophoretic heterogeneity (fig. 2); its anodal mobility seemed fastest in colostrum (human milk) and slowest in saliva, and this may be due to differences in sialic acid content. Thus the alpha₂-globulin precipitin line was weakly PAS positive in concentrated sweat and its anodal mobility was decreased when the sample of sweat was exposed to the action of neuraminidase from *Vibrio cholerae* (fig. 3).

The concentration of the alpha₂-globulin seems lower in sweat than in other secretions. We have not yet studied the presence of this component in different salivary secretions (parotid, submaxillary and sublingual). Its presence in gastric and duodenal juice

is probably attributable to swallowed saliva. Sputum which is usually contaminated by saliva also gives positive results. Its presence in tracheobronchial secretion* has not been established. In urine (concentrated at least fourhundred fold) traces were found but it was not detected in cerebrospinal fluid.

The presence of an alpha₂-globulin in sweat which is immunochemically identical or similar to that of saliva, tears, human milk, colostrum and cerumen may result from a common morphogenetic origin of the corresponding secretory glands. At present we are studying the possible polymorphism of this protein component.

* This material was collected under bronchoscopic control in 3 and 14 yr old boys suspected of obstructive emphysema.

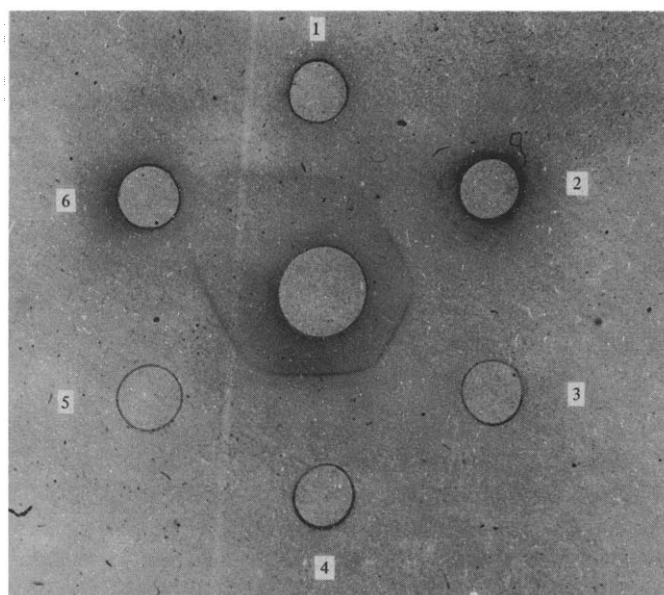


Fig. 1a. Precipitation reactions using a double-diffusion technique. 1, human milk; 2, colostrum; 3, tears; 4, concentrated thermal sweat; 5, mixed saliva; 6, pooled normal serum. In the center well rabbit immune serum against sweat proteins absorbed with normal serum.

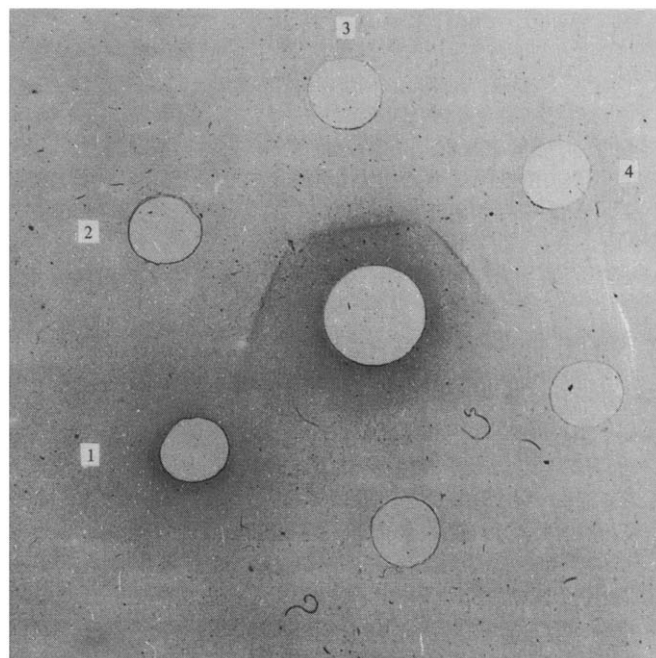


Fig. 1b. Precipitation reactions using a double-diffusion technique. 1, pooled normal serum; 2, mixed saliva; 3, concentrated thermal sweat; 4, cerumen (dissolved in saline). In the center well rabbit immune serum against sweat proteins absorbed with normal serum.

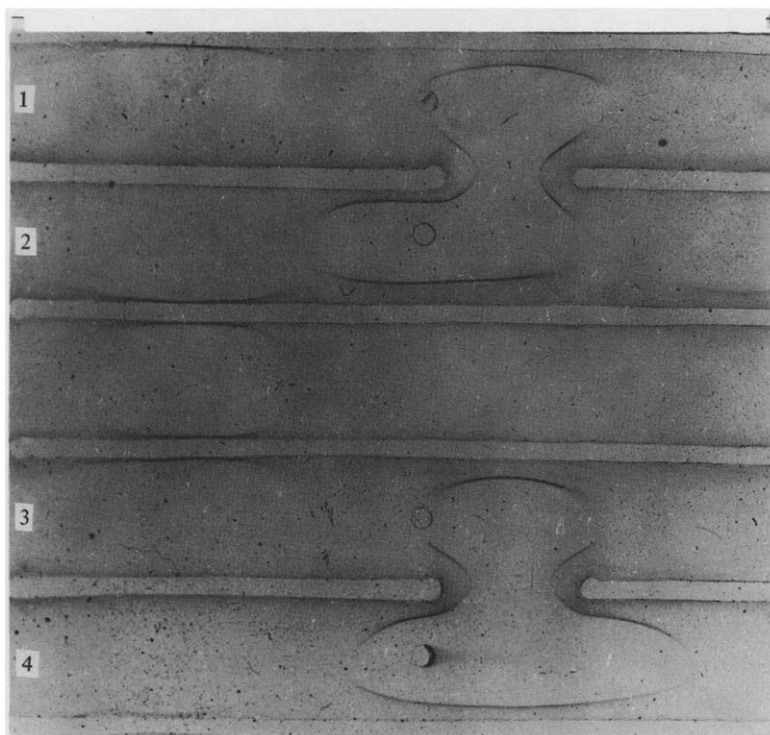


Fig. 2. Immunoelectrophoretic pattern of sweat (induced by pilocarpine [11], concentrated ten fold) – 1,3; whole saliva (concentrated five fold) – 2; tears (concentrated five fold) – 4; using a long and an interrupted basin. In long basins rabbit immune serum against sweat proteins, in the interrupted ones the same immune serum absorbed with normal serum.

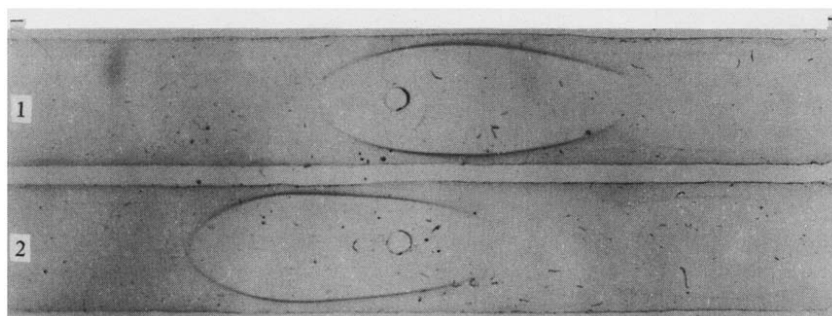


Fig. 3. Immunoelectrophoretic pattern of sweat (induced by pilocarpine, concentrated ten fold) – 1; same sample after treatment with neuraminidase from *Vibrio cholerae* – 2. In longitudinal basins rabbit immune serum against sweat proteins absorbed with normal serum.

References

- [1] M.Jirka and J.Kotas, *Clin. Chim. Acta* 2 (1957) 292.
- [2] M.Jirka and J.Masopust, *Biochim. Biophys. Acta* 71 (1963) 217.
- [3] J.Houšťek and M.Jirka, *Modern Problems in Pediatrics*, Vol. 10, Proc. 4th Intern. Conf. on Cystic Fibrosis of the pancreas (Mucoviscidosis), Part I (S.Karger, Basel/New York, 1967) p. 247.
- [4] J.C.Pallavicini, O.Gabriel, P.A.di Sant'Agnese and E.R. Buskirk, *Ann. N.Y. Acad. Sci.* 106 (1963) 330.
- [5] J.F.Cier, Y.Manuel and J.R.Lacour, *C.R. Soc. Biol.* 157 (1963) 1623.
- [6] L.Berrens and E.Young, *Dermatologica* 128 (1964) 287.
- [7] E.Seutter and J.W.H.Mali, *Clin. Chim. Acta* 12 (1965) 17.
- [8] J.S.Remington and C.O'Neal Page, *Clin. Res.* 13 (1965) 126.
- [9] C.O'Neal Page and J.S.Remington, *J. Lab. Clin. Med.* 69 (1967) 634.
- [10] J.Vanfraechem and J.R.Poortmans, personal communication.
- [11] M.Jirka, *Clin. Chim. Acta* 11 (1965) 78.