30. Lukacher, A. E., Braciale, V. L. and Braciale, T. J., *J. Exp. Med.*, 1984, **160**, 814.
31. Townsend, A. R. M., McMichael, A. J., Carter, N. P., Huddleston, J. A. and Brownless, G. G., *Cell*, 1984, **39**, 13.
32. Yewdell, J. W., Bennink, J. R., Smith, G. L. and Moss, B., *Proc. Natl. Acad. Sci.* (USA), 1985, **82**, 1785.
33. Townsend, A. R. M., Gotch, F. M. and Davey, J., *Cell*, 1985, **42**, 457.
34. McMichael, A. J., Michie, C. A., Gotch, F. M., Smith, G. L. and Moss, B., *J. Gen. Virol.*, 1986, **67**, 719.
35. Wraith, D. C. and Askonas, B. A., *J. Gen. Virol.*, 1985, **66**, 1327.
36. Taylor, P. M. and Askonas, B. A., *Immunology*, 1986, **58**, 417.
37. Townsend, A. R. M., Rothbard, J., Gotch, F. M., Bahadur, G., Wraith, D. and McMichael, A. J., *Cell*, 1986, **44**, 959.
38. Hosaka, Y. *et al.*, *Proc. VII Int. Congr. Virol.*, Edmonton, Canada, 9–14 August, 1987.
39. Morrison, L. A., Lukacher, A. E., Braciale, V. L., Fan, D. P. and Braciale, T. J., *J. Exp. Med.*, 1986, **163**, 903.

NEWS

HEPARIN STOPS THE CLOTS

When blood comes into contact with an alien surface, it rapidly forms a clot. This is why so much effort has been devoted to finding inert or biocompatible plastics for 'spare-part' surgery, and it is a major problem with dialysis and heart-lung machines where the patient's blood contacts metal surfaces. To prevent potentially fatal thromboses while on one of these machines, the patient must be given anticoagulants — but these can lead to equally dangerous haemorrhages.

Now a Scandinavian team has made a breakthrough that could get round the problem by making the machine's surface blood-compatible. The normal aim is to make the surfaces as inert as possible, but Professor Per Olsson of the Karolinska Hospital in Stockholm looked at it another way — what keeps blood flowing in normal arteries and veins? The answer is heparin, a polysaccharide found in the walls of blood vessels, which acts as an immobilised anticoagulant. It is a well-known compound and it has long been used as an anticoagulant drug for post-operative patients.

Olle Larm, the carbohydrate chemist in Professor Olsson's team, found a way to bind heparin to surfaces without altering its effectiveness. The result is a biocompatible metal or plastic. Carmeda, part of the Norwegian Norsk Hydro group, holds the patent on the process.

Heparin-coated materials could be used in a wide range of blood-contacting medical devices such as sensors, catheters, pumps, oxygenators and artificial organs. The Karolinska Hospital already has a heparin-coated heart-lung machine that has saved the lives of two lung-damaged patients, and the St. Goran Hospital is developing a smaller machine specifically to help new-born babies with underdeveloped lungs. Olsson believes that heparin-coated equipment will be common place in major surgery in the 1990s. (*Chemistry in Britain*, March 1988, p. 203, Published by the Royal Society of Chemistry, Burlington House, London WC1B OBW).