to glass emerged as a good way to identify "hypersensitive" people.^{5,6} These glass adhesive tests were difficult to perform, but the best test to separate patients with vascular disease from healthy subjects—the platelet electrophoretic response to low doses of adenosine diphosphate⁷⁻⁹—was even more tedious and, worse, was only semiquantitative. Experiments with this technique suggested that the platelets responded abnormally to adenosine diphosphate because of a factor present in the plasma, but the nature of this component was never elucidated fully. The technique that survived was measurement of platelet aggregation, which is relatively quick and easy to perform. Nevertheless, in clinical studies measurements of the release of platelet granules in response to aggregating agents and arachidonic acid, and measurements of platelet factors released into the circulating blood, are probably more useful than simple aggregation tests.^{10,11}

In round two of the platelet saga, in the 1970s, some of the many agents that had been found to modify platelet behaviour in vitro were tested in clinical trials to see whether they had an effect on thrombotic conditions. Aspirin, a potent inhibitor of the platelet release reaction and of the second phase of adenosine diphosphate induced aggregation, was the obvious drug to try, and early studies suggested that it might be beneficial for the secondary prevention of myocardial infarction.^{12,13} The results of the largest trial, however (aspirin myocardial infarction study; AMIS), showed no benefit,¹⁴ although there are doubts whether the dose of aspirin was appropriate.¹⁵

Twenty years ago dipyridamole (Persantin) was shown to inhibit various aspects of platelet function,¹⁶ and it is now widely used as an antithrombotic agent. The evidence of its efficacy is not convincing, although it is thought to inhibit the formation of thrombus in patients with artificial heart valves or dialysis shunts,^{17,18} and in combination with aspirin it may prevent a second myocardial infarction¹⁹ or the occlusion of a coronary vein graft.²⁰ Further trials are needed to confirm these effects.

The ED₅₀ method of assessing platelet aggregation does not seem to be affected by the recent use of aspirin, so clearly it is not measuring anything to do with platelet synthesis of thromboxane; thus it is not a complete test of platelet function and it should not be regarded as superior to simple aggregation measurements.

Our main problem in investigating the link between platelets and vascular disease is that we do not know which platelet function test, if any, is relevant to human thrombosis. Once a convincing clinical trial has shown that an agent that modifies platelet behaviour also inhibits thrombosis in man, we shall be able to look back to see which platelet test might have predicted the effect. Until we have such a trial there is no reason to suppose that any one test is superior to another or, indeed, that platelet function tests are of any importance at all in vascular disease.

J R HAMPTON

Professor of Cardiology,
University Hospital,
Queen's Medical Centre,
Nottingham NG7 2UH

- Duguid JB. Thrombosis as a factor in the pathogenesis of coronary atherosclerosis. *Journal of Pathology and Bacteriology* 1946;58:207-15.
- Born GVR. Aggregation of blood platelets by adenosine diphosphate and its reversal. *Nature* 1962;194:927-9.
- Heptinstall S, Mitchell JRA. Platelets and thrombosis. In: Biggs R, Rizza CR, eds. *Human blood coagulation haemostasis and thrombosis*. 3rd ed. Oxford: Blackwell Scientific Publications, 1984: 380-414.
- Emmons PR, Mitchell JRA. Post-operative changes in platelet-clumping activity. *Lancet* 1965;ii: 71-4.
- Wright HP. Changes in the adhesiveness of blood platelets following parturition and surgical operations. *Journal of Pathology and Bacteriology* 1942;54:461-8.
- Hellem AJ. The adhesiveness of human blood platelets in vitro. *Scand J Clin Lab Invest* 1960;12: suppl 51.

- Hampton JR, Mitchell JRA. Platelet electrophoresis: the present position. *Thrombosis et Diathesis Haemorrhagica* 1974;31:205-44.
- Hampton JR, Gorlin R. Platelet studies in patients with coronary artery disease and in their relatives. *Br Heart J* 1972;34:465-71.
- Turpie AGG, McNicol GP, Douglas AS. Platelet electrophoresis: effect of defibrination by anocrod (Arvin). *Cardiovasc Res* 1972;6:104-11.
- Heptinstall S, Mulley GP, Taylor PM, Mitchell JRA. Platelet release reaction in myocardial infarction. *Br Med J* 1980;280:80-1.
- Pumphrey CW, Dawes J. Plasma beta-thromboglobulin as a measure of platelet activity. Effects of risk factors and findings in ischemic heart disease and after acute myocardial infarction. *Am J Cardiol* 1982;50:1258-61.
- Elwood PC, Cochrane AL, Burr ML, et al. A randomized controlled trial of acetylsalicylic acid in the secondary prevention of mortality from myocardial infarction. *Br Med J* 1974;ii:436-40.
- Elwood PC, Sweetnam PM. Aspirin and secondary mortality after myocardial infarction. *Lancet* 1979;ii:1313-6.
- AMIS. A randomized, controlled trial of aspirin in persons recovered from myocardial infarction. *JAMA* 1980;243:661-9.
- Hanley SP, Bevan J, Cockbill SR, Heptinstall S. Differential inhibition by low dose aspirin of human venous prostacyclin synthesis and platelet thromboxane synthesis. *Lancet* 1981;ii:969-71.
- Emmons PR, Harrison MJG, Honour AJ, Mitchell JRA. Effect of dipyridamole on human platelet behaviour. *Lancet* 1965;ii:603-5.
- Sullivan JM, Harken DE, Gorlin MD. Pharmacologic control of thromboembolic complications of cardiac-valve replacement. *N Engl J Med* 1968;279:576-80.
- Jacques C, Druelle T, Nedellec O, et al. Les anomalies de l'hémostase chez les sujets en hémodialyse chronique, notamment compliquée de thromboses itératives des fistules artério-veineuses. Effets du dipyridamole [English Abstract]. *Pathol Biol (Paris)* 1976;24(suppl):27-32.
- PARIS. Persantine and aspirin in coronary heart disease. *Circulation* 1980;62:449-61.
- Chesebro JH, Clements IP, Fuster V, et al. A platelet-inhibitor-drug trial in coronary-artery bypass operations. Benefit of perioperative dipyridamole and aspirin therapy on early post-operative vein-graft patency. *N Engl J Med* 1982;307:73-8.

Cochlear implants

Help for those with loss of hearing has developed from the cupped hand and ear trumpet to the reconstruction of the ossicular chain by modern microsurgical techniques and the amplification of sound with tiny hearing aids. These techniques cannot, however, help everyone with impaired hearing, for patients with total neurosensory deafness have no appreciation of any sort of acoustic stimuli however well amplified. Furthermore, the size of this group appears to be getting bigger—possibly because of increased survival after meningitis, head injuries, and serious illness requiring treatment with ototoxic drugs.

Electrical charges play a part in neuronal transmission, and since 1957 workers have been trying to stimulate the auditory nerve directly with an electric current to obtain a sensation of sound.^{1,2} Despite encouraging responses the problems of placing an electrode on to the intrapetrous or intracranial portion of the auditory nerve were not resolved easily, so attention turned to the use of an electrode threaded into the cochlea.³ Such a system has been developed by House in Los Angeles and prostheses of this type are now on sale. The system is simple and has proved resistant to permeation by tissue fluids. It consists of an electrode implanted inside the cochlea that receives impulses through a coil transmitting across the skin behind the ear. The stimuli are derived from a box which transforms speech into electrical impulses. In appearance the prosthesis is similar to the old style hearing aid.

Experiments have shown that altering the rate of impulses gives a sensation of change in pitch, albeit within narrow limits for the range is adequate at very low frequencies only. Full perception of vowel sounds and consonants is not possible, and the higher frequencies remain elusive. These limitations led to attempts at inserting multiple electrodes into the cochlea in the hope that differential stimulation of the nerve endings, sometimes with different frequency bands for each electrode, might improve perception and result in contrasts in timbre which would improve the recognition of speech.^{4,6} Unfortunately, these techniques have not been as successful as expected, and the complex implanted electronics have been difficult to encapsulate adequately.

Furthermore, in many cases permeation of tissue fluid has limited the survival of the system.

In Britain work on cochlear implants has been carried out by the External Pattern Input Group, funded by the Medical Research Council. The group has taken a different approach from that of the Americans and has made three important contributions.⁷⁻⁹ Firstly, it showed that an electrode placed outside the cochlea could provide a range of hearing similar to the intracochlear device while avoiding some of its potential complications. This led to the development of extracochlear prostheses, which have proved popular in many countries because of the widespread concern at the prospect of invading the cochlea, especially in children.^{10 11} Secondly, the group showed that if the tympanic membrane is removed or stuck down into the inner wall of the middle ear the electrode system may be inserted and taken out in much the same way as a hearing aid mould. Some patients in Britain are already using an entirely external system successfully, though it has not proved widely popular; even so, it is so much cheaper than a permanently implanted device that it may prove to be the treatment of choice. The third, and probably the most important, contribution has yet to realise its full potential. It entails the extraction of appropriate patterns from the speech signal by a microcomputer before its transformation into simple electrical signals. Matching one stimulus pattern to a lower frequency has already proved advantageous and recent work suggests that some patterns may allow the perception of fricatives—the continuous consonants such as f and z.

Throughout the world hundreds of patients have been given cochlear implants of one sort or another with varying improvement in their perception of sound. What they hear,

however, is far from normal speech. They may recognise changes in tone well enough to distinguish questions from statement; they may learn to appreciate vowel sounds; they perceive the stress on each syllable and understand speech very much better than they would by lip reading alone. Nevertheless, these devices do not give the subtlety of normal hearing mechanisms, and more work must be done to enhance our understanding of the hearing mechanism and to design more advanced prostheses. Meanwhile, the present range of implants offer a measure of hope for the totally deaf and have excited much interest among the public. Those who fit the new prostheses will, we hope, choose to publish their first results in the scientific journals rather than in the daily press.

ELLIS DOUEK

Consultant Otolologist,
External Pattern Input Group,
Guy's Hospital,
London SE1 9RT

- 1 Djouma A, Ayries C. Prothese auditive par excitation electrique a distance du nerf sensoriel l'aide d'un bobinage inclus a demeure. *Presse Medicale* 1957;35:14-7.
- 2 Simmons FB. Electrical stimulation of the auditory nerve in man. *Arch Otolaryngol* 1966;84:24-76.
- 3 House WF, Urban J. Long term results of electrode implantation and electronic stimulation of the cochlea in man. *Ann Otol Rhinol Laryngol* 1973;82:504-18.
- 4 Michelson RP, Schindler RA. Surgical approach for insertion of multichannel electrodes into the scala tympani. *Ann NY Acad Sci* 1983;405:343-7.
- 5 Chouard CH, Fugain C, Meyer B, Lacombe H. Resultats cliniques de l'implant cochléaire a multiélectrodes. *Annales d'Otolaryngologie et de Chirurgie Cervico-faciale* 1982;99:154-88.
- 6 Clark GM, Tong YC, Dowell RC. Clinical results with a multichannel pseudobipolar system. *Ann NY Acad Sci* 1983;405:370-6.
- 7 Douek E, Fourcin AJ, Moore BCJ, Clarke GP. A new approach to the cochlear implant. *Proceedings of the Royal Society of Medicine* 1977;70:379-83.
- 8 Fourcin AJ, Douek E, Moore BCJ, et al. Speech perception with promontory stimulation. *Ann NY Acad Sci* 1983;405:280-94.
- 9 Moroe BCJ, Douek E, Fourcin AJ, et al. Extracochlear cochlear stimulation with speech pattern: experience of EPI Group (UK). *Advanced Audiology* 1984;2:148-62.
- 10 Burian K, Eisenwort B, Hochmair ES, Hochmair-Desoyer I. Clinical experiences with the 'Vienna cochlear implant.' *Advanced Audiology* 1984;2:19-29.
- 11 Banfai P, Hortmann G, Karczag A, Kubik S, Wustrow F. Results with eight-channel cochlear implants. *Advanced Audiology* 1984;2:1-18.

Media drug campaigns may be worse than a waste of money

The government is rightly concerned about the proliferation of the misuse of drugs, but in its anxiety to be seen to be doing something about the problem it may be about to make a mistake. In London the Department of Health and Social Security has set aside £2m for a prevention campaign¹ and will announce at the end of the month how exactly it will spend the money. In Edinburgh the Scottish Home and Health Department has already instructed the Scottish Health Education Group to mount a mass media campaign on drug misuse. To spend money in this way is to go against the advice of the government's experts that campaigns in the press and on television may be worse than useless: not only may they be a waste of much needed money but they may increase the prevalence of drug misuse.

Last year the Advisory Council on the Misuse of Drugs, which was set up more than 10 years ago to advise ministers, produced a report on preventing drug problems.² On page 17 it reports the Health Education Council's advice that "caution should be exercised in the use of widespread publicity . . . partly because of the risk that ill chosen educational methods attach disproportionate importance to drug misuse and arouse in some people an interest which they would not otherwise have felt." After weighing all the evidence the advisory council bluntly stated: "National campaigns aimed specifically at reducing the incidence of drug misuse should not be attempted."³

This recommendation is supported by many other studies. Dr Nick Dorn, of the Institute for the Study of Drug

Dependence in London, writes in an important review that "no known methods of drug education can be said to reduce drug use."³ Other large reviews from the United States have noted the ineffectiveness of most drug education campaigns while at the same time recognising the inadequacy of most studies of this matter.⁴⁻⁶ One review looked specifically at students and concluded: "Among student populations there is evidence to suggest that these programmes may exacerbate the use and sale of drugs."⁴

What ministers in London and Edinburgh should realise (and they have been told) is that unemployed youngsters on Merseyside do not react in the same way to exaggerated drug campaigns in the media as do their middle aged constituents in Rushcliffe and Argyle and Bute. Ministers should listen to the advice of their experts; it would be a great shame if the experts were left with the impression that ministers care more about what their constituents think of the campaigns than about what effect the publicity may have on potential young drug takers.

- 1 Clarke K. Parliamentary written answer. *House of Commons Official Report (Hansard)* 1984 December 13;299:cols 585-6. (No 53.)
- 2 Home Office. *Prevention: report of the Advisory Council on the Misuse of Drugs*. London: HMSO, 1984.
- 3 Dorn N. Social analyses of drugs in health education and the media. In: Busch C, Edwards SG, eds. *Drug problems in Britain*. London: Academic Press, 1981:281.
- 4 Kinder BN, Pape NE, Walfish S. Drug and alcohol education programs: a review of outcome studies. *Int J Addict* 1980;15:1035-54.
- 5 Schaps E, DiBartolo R, Moskowitz J, Palley CS, Churgin S. A review of 127 drug abuse prevention program evaluations. *Journal of Drug Issues* 1981;11:17-43.
- 6 Bandy P, President PA. Recent literature on drug abuse prevention and mass media: focusing on youth, parents, women, and the elderly. *Journal of Drug Education* 1983;13:255-71.