papers. Therefore it is unfair to give me all the credit (or the blame) for this finding.

Our attempt to explain ulcer recurrences after cimetidine only on the basis of changes in the composition of gastric mucus³ may appear naïve 10 years later, yet in the case of cimetidine and carbenoxolone this relationship has been confirmed.¹⁰ Moreover, ulcer relapses in cimetidine healed patients were found to be more frequent than after ranitidine^{11,12} or after other anti-ulcer drugs¹³⁻¹⁶ which, according to our method, either exert no effect, or actually stimulate mucus secretion.²

Thus, despite 'the simplicity of these ideas', we were not so wrong.

M GUSLANDI

*Institute of Internal Medicine,
University of Milan, Italy.*

References

- 1 Ene MD, Clamp JR, Roberts CJC. Effects of cimetidine and carbenoxolone on gastric mucus. *Gut* 1988; **29**: 636-41.
- 2 Guslandi M. Evaluation of gastric mucus in man by means of the 'mucoprotective index'. A review of a five-year experience with this method. *Meth Find Exptl Clin Pharmacol* 1983; **5**: 735-9.
- 3 Guslandi M, Tittobello A, Evangelista A, Fesce E, Cambielli M. Cimetidine and protective effect of mucus in gastric ulcer. *Br Med J* 1978; **i**: 1486.
- 4 Guslandi M, Cambielli M, Bierti L, Tittobello A. Effect of carbenoxolone and cimetidine on gastric mucin. *Clin Ther* 1980; **3**: 40-2.
- 5 Watanabe Y, Kobayashi R, Yoshigoe F, *et al.* Effect of pirenzepine on gastric mucus secretion. In: *Gastrozepin/Bisvanil: new aspects in research and therapy*. Asia Pacific Congress Series No 40. Amsterdam: Excerpta Medica, 1985: 24-32.
- 6 Domschke W, Domschke S, Classen M, Demling L. Some properties of mucus in patients with gastric ulcer. Effect of treatment with carbenoxolone sodium. *Scand J Gastroenterol* 1972; **7**: 647-51.
- 7 Parke DV. Some recent advances in the pharmacology of carbenoxolone. In: Avery Jones F, Langman MJS, Mann RD, eds. *Peptic ulcer healing: recent studies on carbenoxolone*. Lancaster: MTP Press, 1978: 1-8.
- 8 Bickel M, Kauffman GL. Gastric gel mucus thickness: effect of distention, 16,16-dimethyl prostaglandin E₂ and carbenoxolone. *Gastroenterology* 1981; **80**: 770-5.
- 9 Green AP, Lander JE, Turner DH. The effect of stress and indomethacin, carbenoxolone, salbumatol, metiamide, zolimidine and CF19415 on rat gastric mucus. *J Pharm Pharmacol* 1981; **33**: 348-52.
- 10 Guslandi M, Cambielli M, Tittobello A. Carbenoxolone maintenance in cimetidine-healed patients. *Scand J Gastroenterol* 1980; **15**: 369-71.
- 11 Gough KR, Bardhan KD, Crowe JP *et al.* Ranitidine and cimetidine in prevention of duodenal ulcer relapse. A double-blind, randomised multicentre comparative trial. *Lancet* 1984; **ii**: 659-62.
- 12 Silvis SE. Final report on the United States multicenter trial comparing ranitidine to cimetidine as maintenance therapy following healing of duodenal ulcer. *J Clin Gastroenterol* 1985; **7**: 482-7.
- 13 Guslandi M. Importance of defensive factors in the prevention of peptic ulcer recurrence. *Acta Gastroenterol Belgica* 1983; **46**: 411-8.
- 14 McLean AJ, Byrne AJ, Harrison PM, McCarthy P, Ioannides-Demos L, Dudley FJ. The choice of ulcer healing agent influences duodenal ulcer relapse rate and long-term clinical outcome. *Aust NZ J Med* 1985; **15**: 367-74.
- 15 Miller JP, Faragher EB. Relapse of duodenal ulcer: does it matter which drug is used in the initial treatment? *Brit Med J* 1986; **293**: 1117-8.
- 16 Dobrilla G, Vallaperta P, Amplatz S. Influence of ulcer healing agents on ulcer relapse after discontinuation of acute treatment: a pooled estimate of controlled clinical trials. *Gut* 1988; **29**: 181-7.

Reply

SIR,—There is little in common between the paper by Ene *et al.*¹ and those by Guslandi and so our paper can hardly be called a reproduction of his work. Indeed there have been few biochemical studies of the type described by Ene *et al.*¹ on the effects of carbenoxolone and H₂ antagonists on gastric mucus.

The paper by Jerzy Glass² was a review of his pioneering work on gastric mucus carried out in the 1950s and early 1960s. He was too good a scientist to have resented the fact that the field had moved on in the intervening period. The use of Jerzy Glass' fractions is, however, not the point. The ratio of neutral to total 'mucoproteins' has been termed by Guslandi the 'Mucoprotective Index.' This concept was first introduced by Guslandi in an unrefereed letter in the *British Medical Journal*.³ I know of no paper which presents scientific evidence to justify the use of such an index.

J R CLAMP

*Department of Medicine,
University of Bristol,
Bristol Royal Infirmary,
Bristol
BS2 8HW.*

References

- 1 Ene MD, Clamp JR, Roberts CJC. Effects of cimetidine and carbenoxolone on gastric mucus. *Gut* 1988; **29**: 636-41.
- 2 Jerzy Glass GB. Current status of the glandular mucoprotein and mucoprotease fractions of the gastric mucin: a review of 15 years' progress in this area. *Ann NY Acad Sci* 1967; **140**: 804-34.
- 3 Guslandi M, Tittobello A, Evangelista A, Fesce E, Cambielli M. Cimetidine and protective effect of mucus in gastric ulcer. *Br Med J* 1978; **i**: 1486.