Caffeine phenotyping in patients with familial adenomatous polyposis may shed light on sporadic colon cancer and acetylator status

Editor,—The age at which patients with familial adenomatous polyposis (FAP) develop colorectal cancer (CRC) is variable, as is the development of extracolonic tumours in the syndrome. This could be due to the effect of different mutations in the responsible gene, environmental factors or the influence of risk modifier genes. Enzymes that metabolise dietary carcinogens such as N-acetylation transferase 2 (NAT2) and cytochrome P450 CYP1A2 are potential modifier genes and fast metabolisers for NAT2 and CYP1A2 in FAP patients have been found to contain higher concentrations of carcinogens than those who are slow.

Therefore, Spigelman et al (Gut 1995; 36: 251–4) have examined the frequency of phenotypes for NAT2 and CYP1A2 in FAP patients and also examined the influence of colecotyly on the caffeine metabolism ratios used for phenotyping. They believe that a re-examination of their data questions the use of the terms ‘fast’ and ‘slow’ for NAT2 in patients and may help to explain the excess risk for fast acetylators seen in phenotyping studies of colorectal cancer.

NAT2 has a well characterised polymorphism and patients can be classified as fast or slow acetylators either by means of phenotyping, using a probe drug such as caffeine, or by genotyping using a simple PCR based assay for the four common alleles. In healthy young subjects, these methods are well correlated. In their paper Spigelman et al state that there is no significant difference in the value of the metabolic ratio for NAT2 phenotype in a group of six patients before and after surgery. However, if we re-examine the data from Fig 2 and look at the apparent phenotype in each subject rather than the metabolic ratio it would seem that one subject had changed from a slow to a fast acetylator after colecoty, one has done the reverse, and another who seems very close to the cut off point of 0.48 before surgery is now clearly a fast acetylator. Thus possibly as many as 50% of subjects seem to have changed their phenotype in this small group of subjects. If this finding were repeated in a larger sample it would invalidate the conclusion that there are more slow acetylators in the FAP group.

While fast acetylator status has been associated with greater risk for sporadic CRC in a number of phenotyping studies in white subjects, two genotyping studies in Japanese subjects found no increased risk. It may be that this is due to different risk factors or the high (90%) prevalence of fast acetylators in Japan but clearly it could also result from a disease effect on the phenotyping procedure causing misclassification of patients in the phenotyping studies in white subjects. We believe that phenotyping may be inaccurate in people with concurrent diseases and that the study by Spigelman et al gives some support to this theory. In contrast, genotyping offers a quick and simple means of assessing acetylator status, which is unaffected by concurrent illness or drugs. Until further studies have validated phenotyping in patients with FAP or CRC we believe that genotyping is the method of choice for NAT2 analysis and a genotyping study is required to establish whether fast acetylator status is truly a risk factor for this disease in white subjects.

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Reply

Editor,—We thank Dr Welfare and colleagues for their valued remarks. We entirely agree that genotyping studies are required to evaluate further the role of pharmacogenetic polymorphisms in carcinogenesis, and said as much in our paper. Moreover, the context in which we made this point shows just why we did not genotyping in our study—we had no phenotype, which are now ‘quick and simple’, were not available at the time our work was conceived and executed. We have since, however, been able to use genotyping to investigate this question, and have found, for example, that the GST Mu polymorphism (GST Mu being a carcinogen detoxifying enzyme system) is unequally distributed between patients with familial adenomatous polyposis (FAP) and others. FAP patients express the null phenotype significantly more often than do controls (70% versus 40%, p<0.0003). This supports the suggestion that carcinogen metabolising genes act as modifiers of phenotypic expression in FAP patients, as is the case in the animal model for FAP. If this is indeed so in humans, then the concept of FAP as a single gene disorder must be questioned.

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Urinary excretion of TNF receptors

Editor,—We would like to comment on the paper by Dr Hadziselimovic and colleagues (Gut 1995; 37: 260–3) investigating urinary excretion of TNF receptors in children with inflammatory bowel disease (IBD). Their findings of increased urinary concentrations of p17 and p75 soluble receptors in patients with active disease is in agreement with studies showing increased systemic concentrations of these receptors in adult patients with Crohn’s disease and ulcerative colitis.1-3

Soluble TNF receptors are released in Gram negative sepsis and experimentally as response to endotoxin, formulated oligopeptide, and TNF.4 It is unclear whether the soluble TNF receptors act as inhibitors of TNF activity or as carrier molecules for TNF.4 The biological implication of increased circulating and urinary TNF receptors in patients with IBD is equally uncertain. In a recent study, administration of the anti-TNF antibody cA2 to 10 patients with Crohn’s disease was associated with a normalisation of Crohn’s disease activity index scores in eight patients, but no change in the serum concentrations of the soluble TNF receptors p55 and p75.5

Irrespective of the exact role that soluble TNF receptors may have in IBD, measurement of urinary or circulating concentrations of these receptors may prove useful in predicting those patients likely to relapse.

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