Aims CYP2D6 and CYP2C19 are polymorphically expressed enzymes that show marked interindividual and interethnic variation. The aim of this study was to determine the frequency of the defective alleles in CYP2D6 and CYP2C19 in Africans and to test whether the genotype for CYP2C19 is better correlated with the proguanil/cylcoguanil ratio than the mephenytoin S/R ratio.

*Methods Two hundred and sixteen black Tanzanians were phenotyped for CYP2D6 with the use of sparteine, and for CYP2C19 with the use of mephenytoin and proguanil. Of these 196 subjects were also genotyped for CYP2D6 (including the CYP2D6*1, CYP2D6*3 and CYP2D6*4 alleles) and 195 were genotyped for CYP2C19 (including the CYP2C19*1, CYP2C19*2 and the CYP2C19*3 alleles). Furthermore 100 subjects were examined for the allele duplication in CYP2D6*, leading to ultrarapid metabolism, with long PCR.

*Results The sparteine metabolic ratio (MR) was statistically significantly higher in the Tanzanian group of homozygous, extensive metabolizers compared to a historical control group of white Danish extensive metabolizers. Only one poor metabolizer for CYP2D6 (MR=124 and genotype CYP2D6*1/CYP2D6*4) was found. The gene frequencies were 0.96 for the CYP2D6*1 allele and 0.04 for the CYP2D6*4 allele. No CYP2D6*3 alleles were found. Nine subjects had an allele duplication in CYP2D6 (9%). For CYP2C19 there were seven subjects (3.6%) who were phenotyped as poor metabolizers, but only three subjects (1.5%) had a genotype (CYP2C19*2/CYP2C19*2) indicative of poor metabolism. The gene frequencies were 0.90 for the CYP2C19*1 allele and 0.10 for the CYP2C19*2 allele. No CYP2C19*3* alleles were found. The mephenytoin S/R ratios were not bimodally distributed.

Conclusions Both the genotyping and phenotyping results show that there is a substantial difference between an African black population and a Caucasian population in the capacity to metabolize drugs via CYP2D6 and CYP2C19.