# UGT2B10 Variant Effects on Dexmedetomidine Metabolism Using Nicotine Studies

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**Background:**

Dexmedetomidine is a procedural sedative primarily metabolized by the *UDP-glucuronosyltransferase (UGT) 2B10*. UGT2B10 also contributes to nicotine metabolism. Most research on the effect of gene variants on *UGT2B10's* glucuronidation efficacy has focused on nicotine. This study outlines current data on the relationship between *UGT2B10* pharmacogenomics, nicotine pharmacokinetics, and race, then extrapolates that information to dexmedetomidine.

**Methods:**

A literature review was conducted on *UGT2B10* variants and dexmedetomidine or nicotine in PubMed. Due to lack of studies on dexmedetomidine glucuronidation, studies using nicotine were used to classify variants as poor, intermediate, or extensive metabolizers; characterize their expression in African/African Americans (AA) and Europeans (C), and establish their respective activity based on nicotine metabolite percentages.

**Results:**

*UGT2B10* accounts for about 20% of nicotine metabolism. The *UGT2B10* variants rs61750900 (AA= 37.62%; C=0.18%) and rs2942857 (AA=4.42%; C=9.28%) are nonfunctional. Poor metabolizers (PM) are homozygous for one of these variants and see a 97% decrease in *UGT2B10* metabolites. Intermediate metabolizers (IM) have one variant allele and one wild-type allele, with a 32% decrease in *UGT2B10* metabolites. Extensive metabolizers (EM), have two wild-type alleles. Metabolites from other pathways increase as *UGT2B10* metabolites decrease. These results were superimposed onto dexmedetomidine metabolism to predict metabolite percentages in *UGT2B10* IM and PM. In PM, only 1.02% of dexmedetomidine metabolites were predicted to be from *UGT2B10.*

**Conclusion:**

Nicotine metabolism data suggests variants of *UGT2B10* significantly impact dexmedetomidine metabolism. PMs have 97% decreased nicotine *UGT2B10* metabolism and a compensatory increase in nicotine's other metabolites. *UGT2B10* accounts for the largest portion of dexmedetomidine metabolism. Thus, *UGT2B10* PMs may have decreased glucuronide metabolites, with increased proportion of other pathways.

Giving the same dose of dexmedetomidine to PM or ultrarapid metabolizers (UM) may result in toxicity or undersedation, respectively. More research needs to be done on *UGT2B10* variants to optimize patient care.