

PharmGKB Update:

I. Genetic Variants of the Organic Cation Transporter 2 (OCT2, SLC22A2)

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Supported by Grant GM 61390.
First published on June 13, 2003

Category: genotype

PharmGKB Submission Number: PS202784
<http://www.pharmgkb.org/do/serve?objId=PA331&objCls=Gene>

Project: Pharmacogenetics of Membrane Transporters

HGNC Symbol: SLC22A2

HGNC Name: solute carrier family 22 (organic cation transporter), member 2

Synonyms: OCT2

Gene Ontology Terms: GO:0005624 membrane fraction, GO:0005887 integral to plasma membrane, GO:0007589 fluid secretion, GO:0015101 organic cation transporter activity, GO:0015695 organic cation transport

Locus ID: 6582

GenBank Accession: X98333

Pharmacogenetic Significance: Genetic variation in SLC22A2 may result in variation in renal elimination and/or toxicities of its substrates.

Pharmacological Significance: SLC22A2 is predominantly expressed in the kidney and appears to play a role in renal elimination of hydrophilic organic cations of diverse chemical structure including many drugs such as metformin and cimetidine as well as the neurotoxin MPP⁺ (1-methyl-4-phenylpyridinium).

Potential Drug Interactions: cimetidine, ranitidine, metformin, phenformin, pindolol, procainamide

Functional Characteristics: SLC22A2 is a facilitated transporter found on the basolateral membrane of renal proximal tubules. The protein mediates the transport of small molecular weight hydrophilic organic cations from the extracellular fluids into the proximal tubule cell.

Summary of Data Submitted:

Size of sample set: 247 (494 chromosomes)

Number of gene regions assayed: 11

Total bases assayed: 3502

Coding bases: 1668

Noncoding bases: 1834

Number of variant sites: 27

PCR primers reported: 22

Publications:

Leabman MK, Huang CC, DeYoung J, Carlson EJ, Taylor TR, DeLaCruz M, Johns SJ, Stryke D, Kawamoto M, Urban TJ, Kroetz DL, Ferrin TE, Clark AG, Risch N, Herskowitz I, and Giacomini KM (2003) Natural variation in human membrane transporter genes reveals evolutionary and functional constraints. *Proc Natl Acad Sci (USA)* **100**:5896-5901.

Leabman MD, Huang CC, Kawamoto M, Johns SJ, Stryke D, Ferrin TE, DeYoung J, Taylor T, Clark AG, Herskowitz I, and Giacomini KM (2002) Polymorphisms in a human kidney xenobiotic transporter, OCT2, exhibit altered function. *Pharmacogenetics* **12**: 395-405.

Available online at <http://pharmrev.aspetjournals.org/>
DOI: 10.1124/pr.55.3.6.