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## Ursodeoxycholic acid

Ursodeoxycholic acid is an epimer of chenodeoxycholic acid (DB06777). It is a mammalian bile acid found first in the bear and is apparently either a precursor or a product of chenodeoxycholate. Its administration changes the composition of bile and may dissolve gallstones. It is used as a cholagogue and choloretic. [PubChem]

### Indication:

The drug reduces cholesterol absorption and is used to dissolve (cholesterol) gallstones in patients who want an alternative to surgery.

### Categories:

Cholagogues and Choloretics

### Mechanism of Action:

Ursodeoxycholic acid reduces elevated liver enzyme levels by facilitating bile flow through the liver and protecting liver cells. The main mechanism is anticholelithic. Although the exact process of ursodiol's anticholelithic action is not completely understood, it is thought that the drug is concentrated in bile and decreases biliary cholesterol by suppressing hepatic synthesis and secretion of cholesterol and by inhibiting its intestinal absorption. The reduced cholesterol saturation permits the gradual solubilization of cholesterol from gallstones, resulting in their eventual dissolution.

### Pharmacology:

Ursodiol (also known as ursodeoxycholic acid) is one of the secondary bile acids, which are metabolic byproducts of intestinal bacteria. Primary bile acids are produced by the liver and stored in the gall bladder. When secreted into the colon, primary bile acids can be metabolized into secondary bile acids by intestinal bacteria. Primary and secondary bile acids help the body digest fats. Ursodeoxycholic acid helps regulate cholesterol by reducing the rate at which the intestine absorbs cholesterol molecules while breaking up micelles containing cholesterol. Because of this property, ursodeoxycholic acid is used to treat gall stones non-surgically.

### Route of Elimination:

Only small quantities of ursodiol appear in the systemic circulation and very small amounts are excreted into urine. Eighty percent of lithocholic acid formed in the small bowel is excreted in the feces, but the 20% that is absorbed is sulfated at the 3-hydroxyl group in the liver to relatively insoluble lithocholyl conjugates which are excreted into bile and lost in feces.

### Drug interactions:

#### Cholestyramine [1]

The resin decreases the effect of ursodiol

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#### Clofibrate [2]

The fibric acid derivative decreases the effect of ursodiol

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Clomifene [3]

Estrogens decreases the effect of ursodiol

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Colesevelam [4]

Bile Acid Sequestrants may decrease the serum concentration of Ursodiol. Consider administration of ursodiol 5 hours or more after bile acid sequestrants to minimize ursodiol adsorption in the gastrointestinal tract. Monitor for decreased therapeutic effects of ursodiol in patients receiving bile acid sequestrants.

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Colestipol [5]

The resin decreases the effect of ursodiol

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Conjugated Estrogens [6]

Estrogens decreases the effect of ursodiol

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Cyclosporine [7]

Ursodiol increases the levels of cyclosporine

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Diethylstilbestrol [8]

Estrogens decreases the effect of ursodiol

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Estradiol [9]

Estrogens decreases the effect of ursodiol

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Ethinyl Estradiol [10]

Estrogens decreases the effect of ursodiol

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Fenofibrate [11]

The fibric acid derivative decreases the effect of ursodiol

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Gemfibrozil [12]

The fibric acid derivative decreases the effect of ursodiol

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**Toxicity:**

Neither accidental nor intentional overdosing with ursodeoxycholic acid has been reported. Doses of ursodeoxycholic acid in the range of 16-20 mg/kg/day have been tolerated for 6-37 months without symptoms by 7 patients. The LD50 for ursodeoxycholic acid in rats is over 5000 mg/kg given over 7-10 days and over 7500 mg/kg for mice. The most likely manifestation of severe overdose with ursodeoxycholic acid would probably be diarrhea, which should be treated symptomatically.

**Affected organisms:**

Humans and other mammals [13]

**Type:**

small molecule [14]

**Group:**

Approved [15]

**Experimental properties:**

Water Solubility:  
20 mg/L (at 20 °C)

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Melting Point:  
203 °C

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logP:  
3.00

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**Manufacturers:**

Watson pharmaceuticals inc [16]

Corepharma llc [17]

Epic pharma llc [18]

Lannett holdings inc [19]

Mylan pharmaceuticals inc [20]

Teva pharmaceuticals usa [21]

Axcan pharma us inc [22]

**Brands:**

Actigall [23],

Antigall [24],

Arsacol [25],

Cholit-ursan [26],

Delursan [27],

Destolit [28],

Deursil [29],

Dom-ursodiol c [30],

Litursol [31],

Lyeton [32],

Peptarom [33],

PHL-ursodiol c [34],

PMS-ursodiol c [35],

Solutrat [36],

Ursacol [37],

Urso [38],

Urso 250 [39],

Urso DS [40],

Urso forte [41],

Ursobilin [42],

Ursochol [43],

Ursodamor [44],

Ursofalk [45],

Ursolvan [46]

**General References:**

# Akare S, Jean-Louis S, Chen W, Wood DJ, Powell AA, Martinez JD: Ursodeoxycholic acid

modulates histone acetylation and induces differentiation and senescence. Int J Cancer. 2006 Dec 15;119(12):2958-69. "Pubmed":<http://www.ncbi.nlm.nih.gov/pubmed/17019713> # Smith T, Befeler AS: High-dose ursodeoxycholic acid for the treatment of primary sclerosing cholangitis. Curr Gastroenterol Rep. 2007 Mar;9(1):54-9.

"Pubmed":<http://www.ncbi.nlm.nih.gov/pubmed/17335678> # Jackson H, Solaymani-Dodaran M, Card TR, Aithal GP, Logan R, West J: Influence of ursodeoxycholic acid on the mortality and malignancy associated with primary biliary cirrhosis: A population-based cohort study. Hepatology. 2007 Aug 8;46(4):1131-1137.

"Pubmed":<http://www.ncbi.nlm.nih.gov/pubmed/17685473>

#### **Packagers:**

Amerisource Health Services Corp. [47]

Axcan Pharma Inc. [48]

Cardinal Health [49]

Corepharma LLC [50]

DispenseXpress Inc.

Giuliani SPA [51]

Heartland Repack Services LLC

Lannett Co. Inc. [52]

Mckesson Corp. [53]

Murfreesboro Pharmaceutical Nursing Supply [54]

Mylan [55]

Novartis AG [56]

Patheon Inc. [57]

Pharmaceutical Utilization Management Program VA Inc.

Physicians Total Care Inc. [58]

Prasco Labs [59]

Qualitest [60]

Resource Optimization and Innovation LLC

Rising Pharmaceuticals [61]

Schering Corp. [62]

Southwood Pharmaceuticals [63]

Summit Pharmaceuticals [64]

Teva Pharmaceutical Industries Ltd. [65]

UDL Laboratories [66]

Watson Pharmaceuticals [67]

#### **Prices:**

Urso 250 mg Tablet

tablet

\$1.42

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Pms-Ursodiol C 500 mg Tablet

tablet

\$1.75

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Ursodiol 250 mg tablet

tablet

\$2.68

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Urso Ds 500 mg Tablet  
tablet  
\$2.69

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Urso 250 250 mg tablet  
tablet  
\$3.55

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Urso 250 mg tablet  
tablet  
\$4.41

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Ursodiol 500 mg tablet  
tablet  
\$4.75

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Actigall 300 mg capsule  
capsule  
\$5.52

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Urso forte 500 mg tablet  
tablet  
\$6.30

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Pms-Ursodiol C 250 mg Tablet  
tablet  
\$0.92

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**Cas Number:**

128-13-2

**Substructure:**

[Bile Acids](#) <sup>[68]</sup>

[Steroids and Steroid Derivatives](#) <sup>[69]</sup>

[Hydroxy Compounds](#) <sup>[70]</sup>

[Acetates](#) <sup>[71]</sup>

[Sterols](#) <sup>[72]</sup>

[Carboxylic Acids and Derivatives](#) <sup>[73]</sup>

[Bicyclohexanes](#) <sup>[74]</sup>

[Alcohols and Polyols](#) <sup>[75]</sup>

**External links:**

[Wikipedia](#) <sup>[76]</sup>

**External identifiers:**

ChEBI:  
9907

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PubChem Compound:  
31401

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PubChem Substance:  
46508795

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Drugs Product Database (DPD):  
2238984

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KEGG Compound:  
C07880

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KEGG Drug:  
D00734

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ChemSpider:  
29131

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National Drug Code Directory:  
0527-1326-01

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PharmGKB:  
PA451837

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PDB:  
IU5

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- [3] <http://alldrugs.info/clomifene>
- [4] <http://alldrugs.info/colesevelam>
- [5] <http://alldrugs.info/colestipol>
- [6] <http://alldrugs.info/conjugated-estrogens>
- [7] <http://alldrugs.info/cyclosporine>

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