

# Urine Test May Help Detect Ovarian Cancer Earlier

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SAN DIEGO — High levels of Bcl-2 in a woman's urine could be a marker for ovarian cancer.

The average amount of Bcl-2, an anti-apoptotic protein that promotes cell survival, in the urine of patients with ovarian cancer was up to 10 times greater than that for healthy controls in a study reported in a poster presentation at the annual

meeting of the American Association for Cancer Research.

"Measuring urinary Bcl-2 could provide a safe, specific, and economical way to detect ovarian cancer at an early, and therefore potentially curable, stage," Dr. Patricia Kruk, of the University of South Florida, Tampa, and her coauthors suggested.

The symptoms of ovarian cancer—gas, pelvic pain, abdominal bloating—are non-specific and are generally experienced by

virtually all women from time to time.

Because these signs are so vague, most women who have ovarian cancer are diagnosed with late-stage disease, and they have a very poor prognosis, with their 5-year survival no better than 37%, Dr. Kruk explained.

"Many people will refer to this as the disease that whispers because there are no symptoms," she said.

To validate data from an earlier pilot study that found high urinary levels of

Bcl-2 were associated with ovarian cancer, Dr. Kruk and her associates obtained additional urine samples from Dr. Robert Bast of the University of Texas M.D. Anderson Cancer Center in Houston. The samples had been collected from 58 normal, healthy volunteers, 122 patients with benign gynecologic disease, and 115 patients who had ovarian cancer.

The samples were measured for Bcl-2 by enzyme-linked immunosorbent assay (ELISA).

The results of the assay showed that the average amount of Bcl-2 in the urine of the patients who had ovarian cancer was found to be greater than 2 ng/mL and up to 10 times greater than that of

the healthy controls or of those patients who had benign disease.

With logistic regression, the investigators calculated that the predicted odds of cancer increased 27% with a 0.1-ng/mL increase in urinary Bcl-2 ( $P$  less than .001). Analysis of variance (ANOVA) analyses of clinical parameters indicated that the urinary levels of Bcl-2 were not significantly related to tumor size, grade, or stage.

Urinary Bcl-2 was more accurate in identifying ovarian cancer than was cancer antigen 125 (CA125), which is currently considered to be the accepted standard for ovarian cancer detection, Dr. Kruk said.

"The CA125 test is the best test we have, but it's not 100% accurate. Some people say that it ranges anywhere from 50% to 70% in accuracy and specificity, so there are a number of false positives and false negatives," she said.

However, "we found that our urinary Bcl-2 test performs at least as well as, and in some instances even better, than the CA125 test."

Dr. Kruk and her colleagues also reported that urinary levels of Bcl-2 decreased in ovarian cancer patients following initial debulking surgery and that it remained low while the women were receiving chemotherapy.

However, these levels increased significantly with recurrence of disease.

The urine test has been patented and has been licensed to GeoPharma Inc., she added.

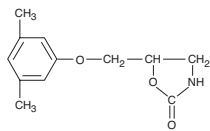
"The hope is that this test will be used as part of a woman's annual physical examination, right in her doctor's office. A urine test is very simple to do, and we would expect high patient compliance, and, used either alone or in conjunction with CA125, the test might provide a better way for us to diagnose ovarian cancer," she said.

In addition, being able to diagnose ovarian cancer at an earlier stage will save lives, Dr. Kruk said.

## SKELAXIN® (Metaxalone) Tablets

### DESCRIPTION

SKELAXIN® (metaxalone) is available as an 800 mg oval, scored pink tablet. Chemically, metaxalone is 5-[(3,5-dimethylphenoxy)methyl]-2-oxazolidinone. The empirical formula is  $C_{17}H_{25}NO_3$ , which corresponds to a molecular weight of 221.25. The structural formula is:



Metaxalone is a white to almost white, odorless crystalline powder freely soluble in chloroform, soluble in methanol and in 96% ethanol, but practically insoluble in ether or water.

Each tablet contains 800 mg metaxalone and the following inactive ingredients: alginate acid, ammonium calcium alginate, B-Rose Liquid, corn starch and magnesium stearate.

### CLINICAL PHARMACOLOGY

**Mechanism of Action:** The mechanism of action of metaxalone in humans has not been established, but may be due to general central nervous system depression. Metaxalone has no direct action on the contractile mechanism of striated muscle, the motor end plate or the nerve fiber.

### Pharmacokinetics:

The pharmacokinetics of metaxalone have been evaluated in healthy adult volunteers after single dose administration of SKELAXIN under fasted and fed conditions at doses ranging from 400 mg to 800 mg.

### Absorption

Peak plasma concentrations of metaxalone occur approximately 3 hours after a 400 mg oral dose under fasted conditions. Thereafter, metaxalone concentrations decline log-linearly with a terminal half-life of  $9.0 \pm 4.8$  hours. Doubling the dose of SKELAXIN from 400 mg to 800 mg results in a roughly proportional increase in metaxalone exposure as indicated by peak plasma concentrations ( $C_{max}$ ) and area under the curve (AUC).

Dose proportionality at doses above 800 mg has not been studied. The absolute bioavailability of metaxalone is not known.

The single-dose pharmacokinetic parameters of metaxalone in two groups of healthy volunteers are shown in Table 1.

| Dose (mg)        | $C_{max}$ (ng/mL) | $T_{max}$ (h) | $AUC_{0-4}$ (ng·h/mL) | $t_{1/2}$ (h) | CL/F (L/h) |
|------------------|-------------------|---------------|-----------------------|---------------|------------|
| 400 <sup>1</sup> | 983 (53)          | 3.3 (35)      | 7479 (51)             | 9.0 (53)      | 68 (50)    |
| 800 <sup>2</sup> | 1816 (43)         | 3.0 (39)      | 15044 (46)            | 8.0 (58)      | 66 (51)    |

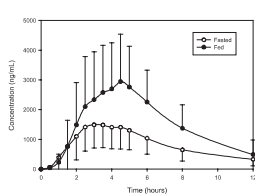
<sup>1</sup>Subjects received 1x400 mg tablet under fasted conditions (N=42)  
<sup>2</sup>Subjects received 2x400 mg tablets under fasted conditions (N=59)

### Food Effects

A randomized, two-way, crossover study was conducted in 42 healthy volunteers (31 males, 11 females) administered one 400 mg SKELAXIN tablet under fasted conditions and following a standard high-fat breakfast. Subjects ranged in age from 18 to 48 years (mean age =  $23.5 \pm 5.7$  years). Compared to fasted conditions, the presence of a high fat meal at the time of drug administration increased  $C_{max}$  by 177.5% and increased AUC ( $AUC_{0-4}$ ,  $AUC_{0-24}$ ) by 123.5% and 115.4%, respectively. Time-to-peak concentration ( $T_{max}$ ) was also delayed (4.3 h versus 3.3 h) and terminal half-life was decreased (2.4 h versus 9.0 h) under fed conditions compared to fasted.

In a second food effect study of similar design, two 400 mg SKELAXIN tablets (800 mg) were administered to healthy volunteers (N=59, 37 males, 22 females), ranging in age from 18-50 years (mean age =  $25.6 \pm 8.7$  years). Compared to fasted conditions, the presence of a high fat meal at the time of drug administration increased  $C_{max}$  by 193.6% and increased AUC ( $AUC_{0-4}$ ,  $AUC_{0-24}$ ) by 146.4% and 142.2%, respectively. Time-to-peak concentration ( $T_{max}$ ) was also delayed (4.9 h versus 3.0 h) and terminal half-life was decreased (4.2 h versus 8.0 h) under fed conditions compared to fasted conditions. Similar food effect results were observed in the above study when one SKELAXIN 800 mg tablet was administered in place of two SKELAXIN 400 mg tablets. The increase in metaxalone exposure coinciding with a reduction in half-life may be attributed to more complete absorption of metaxalone in the presence of a high fat meal (Figure 1).

Figure 1. Mean (SD) Concentrations of Metaxalone following an 800 mg Dose, under Fasted and Fed Conditions.



### Distribution, Metabolism, and Excretion

Although plasma protein binding and absolute bioavailability of metaxalone are not known, the apparent volume of distribution ( $V/F \sim 800$  L) and lipophilicity ( $\log P = 2.42$ ) of metaxalone suggest that the drug is extensively distributed in the tissues. Metaxalone is metabolized by the liver and excreted in the urine as unidentified metabolites.

### Pharmacokinetics in Special Populations

**Age:** The effects of age on the pharmacokinetics of metaxalone were determined following single administration of two 400 mg tablets (800 mg) under fasted and fed conditions. The results were analyzed separately, as well as in combination with the results from three other studies. Using the combined data, the results indicate that the pharmacokinetics of metaxalone are significantly more affected by age under fasted conditions than under fed conditions, with bioavailability under fasted conditions increasing with age.

The bioavailability of metaxalone under fasted and fed conditions in three groups of healthy volunteers of varying age is shown in Table 2.

| Age (years) | Younger Volunteers |             | Older Volunteers |           |
|-------------|--------------------|-------------|------------------|-----------|
|             | 25.6 ± 8.7         | 39.3 ± 10.8 | 71.5 ± 5.0       |           |
| N           | 59                 | 21          | 23               |           |
| Food        | Fasted             | Fasted      | Fasted           | Fed       |
|             | 1816 (43)          | 2719 (46)   | 2915 (55)        | 3168 (43) |

| $T_{max}$ (h)          | 3.0        | 4.9        | 3.0        | 8.7        | 2.6        | 6.5        |
|------------------------|------------|------------|------------|------------|------------|------------|
|                        | (39)       | (48)       | (40)       | (91)       | (30)       | (67)       |
| $AUC_{0-4}$ (ng·h/mL)  | 14531 (47) | 20683 (41) | 19836 (40) | 20482 (37) | 23797 (45) | 24340 (48) |
| $AUC_{0-24}$ (ng·h/mL) | 15045 (46) | 20833 (41) | 20490 (39) | 20815 (37) | 24194 (44) | 24704 (47) |

**Gender:** The effect of gender on the pharmacokinetics of metaxalone was assessed in an open label study, in which 48 healthy adult volunteers (24 males, 24 females) were administered two SKELAXIN 400 mg tablets (800 mg) under fasted conditions. The bioavailability of metaxalone was significantly higher in females compared to males as evidenced by  $C_{max}$  (2115 ng/mL versus 1335 ng/mL) and  $AUC_{0-24}$  (17884 ng·h/mL versus 10328 ng·h/mL). The mean half-life was 11.1 hours in females and 7.6 hours in males. The apparent volume of distribution of metaxalone was approximately 22% higher in males than in females, but not significantly different when adjusted for body weight. Similar findings were also seen when the previously described combined dataset was used in the analysis.

**Hepatic/Renal Insufficiency:** The impact of hepatic and renal disease on the pharmacokinetics of metaxalone has not been determined. In the absence of such information, SKELAXIN should be used with caution in patients with hepatic and/or renal impairment.

### INDICATIONS AND USAGE

SKELAXIN (metaxalone) is indicated as an adjunct to rest, physical therapy, and other measures for the relief of discomforts associated with acute, painful musculoskeletal conditions. The mode of action of this drug has not been clearly identified, but may be related to its sedative properties. Metaxalone does not directly relax tense skeletal muscles in man.

### CONTRAINDICATIONS

Known hypersensitivity to any components of this product. Known tendency to drug induced, hemolytic, or other anemias. Significantly impaired renal or hepatic function.

### WARNINGS

SKELAXIN may enhance the effects of alcohol and other CNS depressants.

### PRECAUTIONS

Metaxalone should be administered with great care to patients with pre-existing liver damage. Serial liver function studies should be performed in these patients.

False-positive Benedict's tests, due to an unknown reducing substance, have been noted. A glucose-specific test will differentiate findings.

Taking SKELAXIN with food may enhance general CNS depression; elderly patients may be especially susceptible to this CNS effect. (See CLINICAL PHARMACOLOGY: Pharmacokinetics and PRECAUTIONS: Information for Patients section).

### Information for Patients

SKELAXIN may impair mental and/or physical abilities required for performance of hazardous tasks, such as operating machinery or driving a motor vehicle, especially when used with alcohol or other CNS depressants.

### Drug Interactions

SKELAXIN may enhance the effects of alcohol, barbiturates and other CNS depressants.

### Carcinogenesis, Mutagenesis, Impairment of Fertility

The carcinogenic potential of metaxalone has not been determined.

### Pregnancy

Reproduction studies in rats have not revealed evidence of impaired fertility or harm to the fetus due to metaxalone. Post marketing experience has not revealed evidence of fetal injury, but such experience cannot exclude the possibility of infrequent or subtle damage to the human fetus. Safe use of metaxalone has not been established with regard to possible adverse effects upon fetal development. Therefore, metaxalone tablets should not be used in women who are or may become pregnant and particularly during early pregnancy unless in the judgement of the physician the potential benefits outweigh the possible hazards.

### Nursing Mothers

It is not known whether this drug is secreted in human milk. As a general rule, nursing should not be undertaken while a patient is on a drug since many drugs are excreted in human milk.

### Pediatric Use

Safety and effectiveness in children 12 years of age and below have not been established.

### ADVERSE REACTIONS

The most frequent reactions to metaxalone include: CNS: drowsiness, dizziness, headache, and nervousness or "irritability";

Digestive: nausea, vomiting, gastrointestinal upset.

Other adverse reactions are:

Immune System: hypersensitivity reaction, rash with or without pruritus;

Hematologic: leukopenia; hemolytic anemia;

Hepatobiliary: jaundice.

Though rare, anaphylactoid reactions have been reported with metaxalone.

### OVERDOSAGE

Deaths by deliberate or accidental overdose have occurred with metaxalone, particularly in combination with antidepressants, and have been reported with this class of drug in combination with alcohol.

When determining the  $LD_{50}$  in rats and mice, progressive sedation, hypnosis and finally respiratory failure were noted as the dosage increased. In dogs, no  $LD_{50}$  could be determined as the higher doses produced an emetic action in 15 to 30 minutes.

**Treatment:** Gastric lavage and supportive therapy. Consultation with a regional poison control center is recommended.

### DOSAGE AND ADMINISTRATION

The recommended dose for adults and children over 12 years of age is one 800 mg tablet three to four times a day.

### HOW SUPPLIED

SKELAXIN (metaxalone) is available as an 800 mg oval, scored pink tablet inscribed with 8667 on the scored side and "S" on the other. Available in bottles of 100 (NDC 60793-136-01) and in bottles of 500 (NDC 60793-136-05).

Store at Controlled Room Temperature, between 15°C and 30°C (59°F and 86°F).

### Rx Only

Prescribing Information as of April 2007.



King Pharmaceuticals

Distributed by: King Pharmaceuticals, Inc., Bristol, TN 37620  
Manufactured by: Mallinckrodt Inc., Hobart, NY 13788



www.kingpharm.com www.skelaxin.com

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