



A Nutrient Mixture Attenuates Acetaminophen Hepatic and Renal Toxicity in ICR Mice

M.W. Roomi, V. Ivanov, A. Niedzwiecki, M. Rath
Dr. Rath Research Institute, 1260 Memorex Drive, Santa Clara, CA 95050

Presented at: Society of Toxicology, San Diego, CA, March 5-9, 2006

Published in: The Toxicologists (suppl Toxicological Sciences) 90 (1), Abstract 1398, pg 285, 2006.

Abstract

Introduction:

Drugs based on acetaminophen, such as Tylenol, are available without prescription and commonly used to fight fever and pain. A large overdose of acetaminophen (APAP) is often fatal, leading to fulminant hepatic and renal tubular necrosis in humans and animals. A unique nutrient formulation consisting of lysine, proline, ascorbic acid and green tea extract (NM) has previously been demonstrated to exhibit a broad spectrum of pharmacological, therapeutic, cardio vascular and chemoprotective properties.

Objective:

This study was undertaken to determine whether NM is useful in treatment of APAP-induced hepatic and renal damage.

Materials and Methods:

Six-week-old male ICR mice were divided into four groups (A-D) of five animals each: Group A (control) received corn oil, group B received APAP (600 mg/kg, ip), group C was fed NM (0.5%) for two weeks, and group D was dosed with APAP after feeding with NM (0.5%) for two weeks. All animals were sacrificed after 24 hrs, serum was collected for liver and kidney functions, and liver and kidney were excised for histology.

Results:

APAP treatment (groups B and D) resulted in a marked increase in liver and kidney weights. Serum AST and ALT in groups A and C were comparable, increased markedly in group B and significantly reduced in group D. APAP caused significant centrilobular necrosis in group B animals, while NM prevented these alterations in group D. Serum markers of kidney: BUN, creatinine and BUN/creatinine ratio were markedly increased in group B in contrast to groups A and C. The NM fed group D exhibited biochemical parameters similar to control group A. The kidney of APAP intoxicated mice (B) showed severe acute damage to the glomerulus and proximal tubule in contrast to the kidneys of mice fed with NM (D), which demonstrated a nearly normal histological pattern.

Conclusions:

The results indicate that NM has potential to protect against APAP-induced liver and kidney damage.

Comment:
 Overdosing with acetaminophen, a common over-the-counter analgesic, is often fatal, causing severe liver and kidney damage in humans and animals. We tested the protective effect of a nutrient supplemented diet (0.5% NM) in mice injected ip with acetaminophen (600 mg/kg) using a nutrient mixture that has previously demonstrated therapeutic and chemoprotective properties. The nutrient supplemented mice were protected against acetaminophen-induced liver and kidney damage, while the unsupplemented mice exhibited liver and kidney pathology and associated serum enzyme abnormality. Thus, the nutrient mixture provides protection against acetaminophen-induced hepatic and renal damage.

