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Regulation of the Defense Mechanism with Food

- Relationship between Tumor Dormant Therapy and Food Function -

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Liver Supporting Effects against Drugs and Mode of Action

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This study examined the effects in rats of MGN-3 on the development of various forms of experimental liver damage. The types of damage included liver damage due to D-galactosamine, whose histopathology is similar to that of human acute viral hepatitis, liver damage due to acetaminophen, which is drug-induced liver damage seen in humans, and liver damage due to α-naphthylisothiocyanate (ANIT), in which choleretic disturbance causes jaundice.

All rats used were Wistar-strain male rats, and serum AST (aspartate aminotransferase) and ALT (alanine aminotransferase) activity was measured as an indicator of liver damage. For ANIT liver damage, serum bilirubin levels were also measured as a damage indicator.

1. Effects of MGN-3 on the development of D-galactosamine liver damage: Intraperitoneal administration of D-galactosamine (400 mg/kg) produced acute liver damage and markedly high levels of serum AST and ALT activity after 24 hours, but intraperitoneal administration of MGN-3 (20-80 mg/kg) one hour before dosing of D-galactosamine significantly inhibited the increase in serum AST and ALT activity. Similar inhibitory effects were noted when MGN-3 (120 mg/kg) was orally administered. However, liver damage was not inhibited when D-galactosamine 300 mg/kg and lipopolysaccharide 20 μg/kg were simultaneously given intraperitoneally. Addition of 1% of MGN-3 to feed and ingestion for 14 days before dosing of D-galactosamine increased serum AST and ALT activity compared to controls.

2. Effects on acetaminophen liver damage: Intraperitoneal administration of acetaminophen (700 mg/kg) after 18 hours of fasting increased serum AST and ALT activity after 24 hours and produced liver damage, but intraperitoneal (40 mg/kg) or oral (120 mg/kg) administration of MGN-3 one hour before dosing of acetaminophen inhibited the development of liver damage. Similar inhibitory effects were noted when MGN-3 hydrolyzed with HCl was used as in D-galactosamine. However, addition of 1% of MGN-3 to feed and ingestion for 14 days before dosing of acetaminophen did not affect the development of liver damage.

3. Effects on ANIT liver damage: Oral administration of ANIT (150 mg/kg) dissolved in olive oil through a gastric tube increased serum AST and ALT activity and serum bilirubin levels after 48 hours and produced liver damage. Intraperitoneal administration of MGN-3 (40 mg/kg) one hour before dosing of ANIT did not affect serum AST or ALT activity or direct bilirubin levels, but inhibited the increase in indirect bilirubin levels. However, these effects were not noted in oral administration (120 mg/kg).