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The Students' Awareness about Practical Training in a Hospital Pharmacy.

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All senior students at our university experienced 2 weeks of practical training at one of 22 hospitals. We investigated the students' awareness regarding this practical training at a hospital before and after the training. After practical hospital training, many of the students became aware of the importance of seeing and experiencing the pharmacist's daily practice. The students often expressed that they wanted to know how to talk to patients, how to teach patients about taking medicine and how to express concern or associate with other hospital staffs, none of which are addressed in the university. Other comments indicated that students wanted to think about the future of pharmacists based on their role and function, or that students wanted to refer to these experiences in deciding which course to follow. The answer to another question regarding the image of a hospital pharmacist indicated that students who felt that pharmacists were positively tackling complex affairs were more interested in actual training in the hospital.

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Carbapenem-induced Endotoxin Release in Gram-negative Bacterial Sepsis Rat Models.

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The carbapenem-induced endotoxin release was evaluated using experimental models of Gram-negative bacterial sepsis in Wistar rats. Infections with *Escherichia coli*, *Serratia marcescens*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Proteus vulgaris* and *Proteus mirabilis* resulted in an increase of the plasma endotoxin concentration after treatment with ceftazidime and carbapenems including imipenem, panipenem, meropenem and biapenem. Except for *P. aeruginosa*, the plasma endotoxin concentrations after carbapenem treatment were significantly lower than those after ceftazidime treatment. It is noteworthy that treatment of *P. aeruginosa* sepsis with meropenem or biapenem induced significantly more endotoxin release than other carbapenems and the endotoxin concentrations induced by these carbapenems reached those of ceftazidime treatment. The plasma endotoxin concentrations appeared to correlate with the reduction of platelet counts and the elevation of both glutamic oxaloacetic transaminase and glitamic pyruvic transaminase values.

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Granulocyte Colony-Stimulating Factor Enhances Endotoxin-Induced Decrease in Biliary Excretion of the Antibiotic Cefoperazone in Rats.

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The present study investigated the effect of human recombinant granulocyte colony-stimulating factor (G-CSF), which is reported to be beneficial in experimental models of inflammation, on endotoxin (LPS)-induced changes in pharmacokinetics and bilialy excretion of the β-lactam antibiotic cefoperazone (CPZ) in rats. G-CSF was injected subcutaneously for 3 days and was administered intravenously at a final dose 1 h before LPS (250 μg/kg) injection. LPS decreased the systemic and biliary clearances of CPZ. Pretreatment with G-CSF enhanced these decreases induced by LPS. The total leukocyte numbers were increased in G-CSF-pretreated rats compared to the numbers in the controls. Pretreatment with G-CSF produces a deleterious effect against the LPS-induced decrease in biliary secretion of CPZ, and leukocytes play an important role in that mechanism.

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Time-dependent Effects of *Klebsiella pneumoniae* Endotoxin on Hepatic Drug-metabolizing Enzyme Activity in Rats.

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The effects of *Klebsiella pneumoniae* endotoxin (LPS) on hepatic P450-dependent drug-metabolizing capacity and on the pharmacokinetics of antipyrine (AP) have been determined in rats. The role of tumour necrosis factor α (TNFα) to the LPS-induced changes was also examined in rats pretreated with granulocyte colony-stimulating factor (G-CSF). The systemic clearance (CLsys) of AP and the activity of drug-metabolizing enzymes were reduced 24h after LPS injection, but had returned to control levels by 96h. The CLsys of AP correlated significantly with P450 content and aminopyrine *N*-demethylase activity. Pretreratment of G-CSF did not eliminate the LPS-induced changes in the CLsys of AP. These results indicate that LPS induces time-dependent changes in drug-metabolizing enzymes and that TNFα is not the sole component responsible for the reduction of drug-metabolizing enzyme activity.