高职高专制药技术类专业规划教材

制药专业英语

刘书志　乔德阳　主编

化学工业出版社

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·北京·

本书选文反映了制药专业英语的特点和表达方式，在保持了原版外文的风格和习惯的同时，注意难度适中，循序渐进。贴近制药科研和生产实际，突出实用性和实践性。内容涵盖药剂学、药理学、药品生产、制药设备操作、中医药、药事管理、化学合成和发酵知识、知识产权、设备操作和维护以及药品标签等。每部分均由课文、注释、单词列表、翻译练习和阅读材料构成。书后还附有参考译文。

本书可作为高职高专制药类专业英语教材，也可供制药工程技术人员、科研人员，外资制药企业的操作、管理和销售人员参考使用。

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前　言

随着中国药品生产和经营企业对外合作和交流的增多，以及国外知名制药企业大举进入中国市场，社会对既懂药品生产技术，又掌握本专业英语的科技和高技能人才的需求大量增加。因此，各校制药专业基本都开设了制药专业英语课程。专业英语不同于公共英语，有自己的词汇、表达方式、规律和特点，在制药专业领域更是如此。因此，一本好的教材对学好专业英语非常重要。本书就是专门为制药专业编写的教材，适合制药专业的学生、技术人员、操作人员和管理人员使用。本书有以下特点。

1. 内容涵盖制药专业领域的大部分知识：从药剂学、药理学、药品生产、制药设备操作、中医药、药事管理、化学合成和发酵知识，到知识产权、设备操作和维护以及药品标签等。

2. 本书课文全部选自英文原版资料，试图真实反映制药专业英语的特点和表达方式，循序渐进，由易到难，使读者能够逐步过渡到顺畅地阅读原版技术资料的水平。

3. 本书内容偏重药品生产过程。涵盖操作和实践技能方面的知识——比如设备的操作和维护、设备和药品说明书等——是本书的特色之一。除此之外，还介绍了专利、商标等知识产权方面的内容。这些知识在制药专业学生毕业后实际工作中非常有用。因此，学习本书，不仅可以提高专业英语水平，而且能够提高技能，增长见识。

4. 提供参考译文是本书的另一个特色，也是编写专业外语教材的一次尝试。译文尽可能做到准确和专业，在解释一些专业词汇时还配有图片。但由于水平所限，不当之处在所难免，希望能给读者提供一些帮助。

此外，考虑到专业外语学习特点以及教材的篇幅，也为了给教师和学生提供更大的灵活性，适当地简化了作业内容。教师可根据实际情况自行安排作业。

本书第一、第二、第三、第五、第十～第十三单元及译文由石家庄职业技术学院卜欣立编写；第四、第十四、第十五单元及译文由石家庄职业技术学院刘书志编写；第十六单元由徐州工业职业技术学院乔德阳编写；第六、第七、第九单元及译文由河北医药职业技术学院张静编写；第八单元由天津渤海职业技术学院孙津清编写。本书由刘书志、乔德阳主编，由刘书志统稿。

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Part One Introduction to Drugs

Unit One What Is a Drug

1. Text

What is a drug

A drug is any natural or synthetic substance that alters the physiological state of a living organism. Drugs can be divided into two groups:

1. Medicinal drugs are substances used for the treatment, prevention, and diagnosis of disease.
2. Non-medicinal drugs, or social drugs, are substances used for recreational purposes. Non-medicinal drugs include illegal mood-altering substances such as cannabis, heroin, and cocaine as well as everyday substances such as caffeine, nicotine, and alcohol.

Although drugs are intended to have a selective action, this is rarely achieved. There is always a risk of adverse effects associated with the use of any drug. No drug is without side effects, although the severity and frequency of these will vary from drug to drug and from person to person. Those who are more prone to the adverse effects of drugs include[1]:

1. Pregnant women, who must be careful about taking drugs as certain drugs cause fetal malformations.
2. Breast-feeding women, who must also be careful about which drugs they take, as many drugs can be passed on[2] in the breast milk and consumed by the developing infant.
3. Patients with liver or kidney disease. These illnesses will result in decreased metabolism and excretion of the drug and will produce the side effects of an increased dose of the same drug.
4. The elderly, who tend to take a large number of drugs, greatly increasing the risk of drug interactions and the associated side effects. In addition, elderly patients have a reduced renal clearance, and a nervous system that is more sensitive to drugs. The dose of drug initially given is usually 50% of the adult dose, and certain drugs are contraindicated.

Drug names and classification

A single drug can have a variety of names and belong to many classes. Factors used for classifying drugs include their pharmacotherapeutic actions, pharmacological actions, molecular actions, and chemical nature. The generic name[3] of a drug is that which appears in official national pharmacopoeias. All drugs available on prescription or sold over the counter have a generic name that may vary from country to country. Newly patented drugs usually have one generic name and one brand name. However, once the patent expires, the marketing of the drug is open to any number of manufacturers and, although the generic name is retained, the variety of brand names inevitably increases.

How do drugs work?

A drug causes a change of physiological function by interacting with the organism at the chemical level.

Certain drugs work by means of their physicochemical properties and are said to have a non-specific mechanism of action. For this reason, these drugs must be given in much higher doses (mg-g) than the more specific drugs.

Most drugs produce their effects by targeting specific cellular macromolecules. This may involve modification of DNA or RNA function, inhibition of transport system or enzymes or, more commonly, action on receptors [4].

注释

[1] prone to 词组，等于 tending to，易于……的；有……倾向的。

[2] pass on 词组，这里相当于 transfer，传递。

[3] generic name 指药典中指定的药物名称，有人翻译成“通用名”、“学名”、“正式名称”等，编者认为“正式名称”较合适。

[4] receptor 受体，药物的作用目标之一。

2. Vocabulary

synthetic [sin'θetic] *adj.* 合成的，人造的，综合的
alter ['ɔ:ltə] *v.* 改变
physiological [ˌfiziə'lɔdʒikəl] *adj.* 生理学的，生理学上的
organism ['ɔ:gənizəm] *n.* 生物体，有机体
diagnosis [ˌdaiəg'nəusis] *n.* 诊断
recreational [ˌrekri'eiʃənəl, -kri:-] *adj.* 休养的，娱乐的
cannabis ['kænəbis] *n.* (=hemp) 大麻，大麻雌花顶部
heroin ['herəuin] *n.* 海洛因，吗啡
cocaine [kə'kein] *n.* 古柯碱，可卡因

caffeine ['kæfi:n] *n.* 咖啡因，茶精（兴奋剂）
nicotine ['nikəti:n, -tin] *n.* 烟碱
alcohol ['ælkəhɔl] *n.* 酒精，酒
pregnant ['pregnənt] *adj.* 怀孕的，重要的，富有意义的，孕育的
fetal ['fi:tl] *adj.* 胎儿的，胎的
malformation [ˌmælfɔ:'meiʃən] *n.* 难看，畸形
kidney ['kidni] *n.* 肾，（动物可食用的）腰子，个性，性格
metabolism [me'tæbəlizəm] *n.* 新陈代谢，变形
excretion [eks'kri:ʃən] *n.* （动植物的）排泄，排泄物
renal ['ri:nl] *adj.* 肾脏的，肾的
clearance ['kliərəns] *n.* 清除
sensitive ['sensitiv] *adj.* 敏感的，灵敏的
contraindicate [kɔntrə'indikeit] *v.* [医学] 禁忌（某种疗法等）
pharmacological [ˌfɑ:məkə'lɔdʒikəl] *adj.* 药理学的
molecular [məu'lekjulə] *adj.* [化] 分子的，由分子组成的
generic [dʒi'nerik] *adj.* [生物] 属的，类的，一般的，普通的，非特殊的
pharmacopoeia [ˌfɑ:məkə'pi:ə] *n.* 药典
prescription [pri'skripʃən] *n.* 处方，药方
patent ['peitənt, 'pætənt] *n.* 专利权，执照，专利品；*adj.* 特许的，专利的；*vt.* 取得……的专利权，请准专利
expire [iks'paiə, eks-] *v.* 期满，终止，届满
retain [ri'tein] *vt.* 保持，保留
inevitably [in'ivaitəbli] *adv.* 不可避免地
cellular ['seljulə] *adj.* 细胞的
macromolecule [ˌmækrəu'mɔlikju:l] *n.* 巨大分子，高分子
modification [ˌmɔdifi'keiʃən] *n.* 更改，修改，修正
inhibition [ˌinhi'biʃən] *n.* 禁止，阻止，禁制，压抑
enzyme ['enzaim] *n.* [生化] 酶
receptor [ri'septə] *n.* 接受器，受体

3. Self-assessment

(1) Put the following into Chinese

natural substance; medicinal drugs; non-medicinal drugs; mood-altering substances; the nervous system; side effects; the breast milk; developing infant; pharmacopoeia.

(2) Put the following into English

药物可分为两类；合成物质；容易受毒副作用伤害的人群；哺乳期妇女；肝、肾病患

者；老年病人；成年剂量；服用很多药物；药物剂量；有些药物禁止服用；正式名称；商品名称；处方药物；非处方药物；一旦专利过期；物化性质；作用于受体。

4. Reading materials

(1) Text

Routes of drug Administration

Drug may be administered by a variety of dosage forms and routes of administration. One of the fundamental considerations in dosage form design is whether the drug is intended for local or systemic effects. Local effects are achieved from direct application of the drug to the desired site of action, such as the eye, nose, or skin. Systemic effects result from the entrance of the drug into the circulatory system and its subsequent transport to the cellular site of its action. For systemic effects, a drug may be placed directly into the blood stream via intravenous injection or absorbed into the venous circulation following oral or other routes of administration.

An individual drug substance may be formulated into multiple dosage forms which result in different drug absorption rates and times of onset, peak, and duration of action.

The difference in drug absorption between dosage forms is a function of [1] the formulation and the route of administration. For example, a problem associated with the oral administration of a drug is that once absorbed through the lumen of the gastrointestinal tract into the portal vein, the drug may pass directly to the liver and undergo the *first-pass effect*.[2] In essence a portion or all of the drug may be metabolized by the liver. Consequently, as the drug is extracted by the liver, its bioavailability to the body is decreased. Thus, the bio-available fraction is determined by fraction of drug that is absorbed from the gastrointestinal tract and the fraction that escapes metabolism during its first pass through the liver. The bio-available fraction (f) is the product of these two fractions[3] as follow:

f=Fraction of drug absorbed×Fraction escaping first-pass metabolism

The bio-availability is lowest, then, for those drugs that undergo a significant first-pass effect. For these drugs, a hepatic extraction ratio, or the fraction of drug metabolized, E, is calculated. The fraction of drug that enters the system circulation and is ultimately available to exert its effect then is equal to the quantity $(1-E)$.

To compensate for this marked effect, the drug manufacturer may consider other routes of drug administration, e. g. , intravenous, intramuscular, sublingual, that avoid the first-pass effect. With these routes there will be a corresponding decrease in the dosage required when compared with oral administration.

Another consideration centers around[4] the metabolites themselves, and whether they are pharmacologically active or inactive. If they are inactive, a large oral dose will be required to attain the desired therapeutic effect when compared to a lower dosage in a non-first-pass effect route. The classic example of drug that exhibits this effect is propranolol. If, on the other hand, the metabolites are the active species, the oral dosage must be carefully tailored to the desired therapeutic effect. First-pass metabolism in this case will result in a quicker therapeutic response than that achieved by a non-first-pass effect route.

One must remember also that the flow of blood through the liver can be decreased under certain conditions. Consequently, the bio-availability of those drugs that undergo a first-pass effect then would be expected to increase. For example, during cirrhosis the blood flow to the kidney is dramatically decreased and efficient hepatic extraction by enzymes responsible for a drug's metabolism also falls off[5]. Consequently, in cirrhotic patients the dosage of drug that undergoes a first-pass effect from oral administration will have to be reduced to avoid toxicity.

注释

[1] to be a function of... 是……的函数。

[2] first pass effect 首关效应，或首过效应，这里指药物经过肝脏时经历的代谢或降解。

[3] to be the product of ... and ... 是……和……的乘积。

[4] center around 等于 center on，意思是以……为中心。

[5] fall off 这里等于 decrease，降低。

(2) Vocabulary

administer [əd'ministə] *v.* 管理，用药
dosage ['dəusidʒ] *n.* 剂量，配药，用量
administration [ədminis'treiʃən] *n.* 给药，投药
fundamental [ˌfʌndə'mentl] *adj.* 基础的，基本的；*n.* 基本原则
circulatory [sə:kju'leitəri; (*US*)'sə:kjələtɔ:ri] *adj.* 循环的
intravenous [ˌintrə'vi:nəs] *adj.* 静脉内的
injection [in'dʒekʃən] *n.* 注射，注射剂
venous ['vi:nəs] *adj.* 静脉的
oral ['ɔ:rəl] *adj.* 口头的，经口的，口的
multiple ['mʌltipl] *adj.* 多样的，多重的；*n.* 倍数，若干；*v.* 成倍增加
lumen ['lju:min] *n.* [解] 内腔
first-pass effect 首关效应
portal ['pɔ:təl] *n.* 入口
vein [vein] *n.* 血管，静脉；portal vein 门静脉
extract [iks'trækt] *n.* 萃出物；*vt.* 清除，萃取
bioavailability [ˌbaiəueˌveilə'biliti] *n.* (药物或营养素的) 生物利用度

gastrointestinal [ˌgæstrəuinˈtestənl] *adj.* [解] 胃与肠的；gastrointestinal tract 胃肠道
ultimately [ˈʌltimətli] *adv.* 最后，终于
compensate [ˈkɔmpənseit] *v.* 偿还，补偿
intramuscular [ˌintrəˈmʌskjulə] *adj.* 肌内的
sublingual [sʌbˈliŋgwəl] *adj.* 舌下的，舌下腺的
metabolite [miˈtæbəlait] *n.* 代谢物
therapeutic [θerəˈpju:tik] *adj.* 治疗的，治疗学的；*n.* 治疗剂，治疗学家
propranolol [prəuˈprænələl] *n.* [药] 心得安（一种 β-受体阻滞剂，用于治疗心律不齐、心绞痛等）
cirrhosis [siˈrəusis] *n.* [医] 肝硬化
hepatic [hiˈpætik] *adj.* 肝的
extraction [iksˈtrækʃən] *n.* 提取，取出，[化] 提取（法），萃取法
cirrhotic [siˈrɔtik] *adj.* [医] 肝脏硬化症的；cirrhotic patient 肝硬化病人
toxicity [tɔkˈsisiti] *n.* 毒性

Unit Two Fate of Drug after Absorption

1. Text

Fate of Drug after Absorption

After absorption into the general circulation from any route of administration, a drug may become bound to blood proteins and delayed in its passage into the surrounding tissues. Many drug substances may be highly bound to blood protein and others little-bound. For instance, when in the blood stream, naproxen is 99% bound to plasma proteins, penicillin G is 60% bound, amoxicillin only 20% bound, and minoxidil is unbound.

The degree of drug binding to plasma proteins is usually expressed as a percentage or as a fraction (termed *alpha*, or α) of the bound concentration (C_b) to the total concentration (C_t), bound plus unbound (C_u) drug[1]:

$$\alpha = C_b/(C_u + C_b) = C_b/C_t$$

Thus, if one knows two of the three terms in the equation, the third may be calculated. Drugs having an alpha value of greater than 0.9 are considered highly bound (90% or above); those drugs with an alpha value of less than 0.2 are considered to be little (20% or less) protein bound.

Bound drug is neither exposed to the body's detoxification (metabolism) processes nor is it filtered through the renal glomeruli. Bound drug is therefore referred to as the *inactive* portion in the blood, and unbound drug, with its ability to penetrate cells, is termed the *active* blood portion. The bound portion of drug serves as a drug reservoir or a depot, from which the drug is released as the free form when the level of free drug in the blood no longer is adequate to ensure protein saturation. The free drug may be only slowly released, thereby increasing the duration of the drug's stay in the body. For this reason a drug that is highly protein bound may remain in the body for longer periods of time and require less frequent dosage administration than another drug that may be only slightly protein bound and may remain in the body for only a short period of time. Evidence suggests that the concentration of serum albumin decreases about 20% in the elderly. This may be clinically significant for drugs that bind strongly to albumin, e.g., phenytoin, because if there is less albumin available to bind the drug there will be a corresponding increase of the free drug in the body. Without a downward dosage adjustment in an elderly patient, there could be an increased incidence of adverse effects.

A drug's binding to blood proteins may be affected by the simultaneous presence of a second (or more) drug(s). The additional drug(s) may result in drug effects or durations of drug action quite dissimilar to that found when each is administered alone. Salicylates, for instance, have the effect of decreasing the binding capacity of thyroxin, the thyroid hormone, to proteins[2]. Phenylbutazone is an example of a drug that competitively displaces several other drugs from serum binding sites, including other anti-inflammatory drugs, oral anti-coagulants, oral anti-diabetics, and sulfonamides. Through this action, the displaced drugs become less protein bound and their activity (and toxicity) may be increases. The intensity of a drug's pharmacologic response is related to the ratio of the bound drug *versus* free, active drug, and the therapeutic index of the drug[3]. Warfarin, an anticoagulant, is 97% bound to plasma protein leaving 3% in free form to exert its effect. If a second drug, such as naproxen, which is strongly bound to plasma proteins is administered and results in only 90% of the warfarin being bound, this means that 10% of warfarin is now in the free form. Thus, the blood level of free warfarin (3% to 10%) has tripled and could result in serious toxicity. The displacement of drugs from plasma protein sites is typical in the elderly who normally are maintained on numerous medicines. Coupled with the aforementioned decrease in serum protein through the aging process the addition of a highly protein-bound drug to an elderly patient's existing treatment regimen could pose significant problems if the patient is not monitored carefully for signs of toxicity.

In the same manner as they are bound to blood proteins, drugs may become bound to specific components of certain cells. Thus drugs are not distributed uniformly among all cells of the body, but rather tend to pass from the blood into the fluid bathing the tissues and may accumulate in certain cells according to their permeability capabilities and chemical and physical affinities. This affinity for certain body sites influences their action, for they may be brought into contact with reactive tissues (their *receptor sites*) or deposited in places where they may be inactive. Many drugs, because of their affinity for and solubility in lipids, are found to be deposited in fatty body tissue, thereby creating a storage place or drug reservoir from which they are slowly released to other tissues.

注释

[1] bound plus unbound (C_u) 为 total concentration 的同位语。

[2] the thyroid hormone 为插入语，进一步解释 thyroxin。如果没有插入语应该是 "the binding capacity of thyroxin to proteins"，即甲状腺素结合到蛋白质上的能力。

[3] the ratio of ... and ... ……和……之比。

2. Vocabulary

fate [feit] *n.* 天数，命运，运气；*vt.* 注定，送命

absorption [əb'sɔ:pʃən] *n.* 吸收
bound [baund] *adj.* 结合的，被束缚的；*v.* 结合，限制
protein ['prəuti:n] *n.* [生化] 蛋白质；*adj.* 蛋白质的
naproxen [nə'prɔksin] *n.* [药] 甲氧萘丙酸，萘普生（抗炎、解热、镇痛药）
plasma ['plæzmə] *n.* [解] 血浆，乳浆，[物] 等离子体，等离子区
penicillin [ˌpeni'silin] *n.* [微] 青霉素
amoxicillin [əˌmɔksə'silin] *n.* [药] 羟氨苄青霉素，阿莫西林
minoxidil [mi'nɔksidil] *n.* [药] 长压定
concentration [ˌkɔnsen'treiʃən] *n.* 浓缩，浓度
filter ['filtə] *n.* 过滤器，筛选；*vt.* 过滤，渗透，用过滤法除去；*vi.* 滤过，渗入
glomeruli [gləˌmerju'li] *n.* [医] 肾小球
penetrate ['penitreit] *vt.* 穿透，渗透；*vi.* 看穿，渗透，弥漫
reservoir ['rezəvwɑ:] *n.* 水库，蓄水池
depot ['depəu; 'di:-] *n.* 库房，仓库，补给站
saturation [ˌsætʃə'reiʃən] *n.* 饱和（状态）；饱和度
serum ['siərəm] *n.* 血清，免疫血清
albumin [æl'bjumin] *n.* [生化] 清蛋白，白蛋白
phenytoin ['fenitɔin] *n.* [药] 苯妥英
simultaneous [ˌsiməl'teinjəs] *adj.* 同时的，同时发生的
salicylate [sæ'lisileit] *n.* [化] 水杨酸盐
thyroxin [θai'rɔksin] *n.* [生化] 甲状腺素，甲状腺氨酸
thyroid ['θairɔid] *n.* 甲状腺，甲状软骨
hormone ['hɔ:məun] *n.* 荷尔蒙，激素
phenylbutazone [fenəl'bju:təzəun] *n.* [药] 苯基丁氮酮（即保泰松）
displace [dis'pleis] *vt.* 取代，置换；*v.* 转移
anti- ['ænti] [前缀] 表示“反对，抵抗”之义
inflammatory [in'flæmətəri] *adj.* 发炎的，炎症的
coagulant [kəu'ægjulənt] *n.* 凝结剂，凝血剂
diabetic [ˌdaiə'betik, -'bi:tik] *adj.* [医] 糖尿病的；*n.* 糖尿病患者
sulfonamide [ˌsʌlfəu'næmid, sʌl'fɔnəmaid] *n.* [药] 磺胺药物
intensity [in'tensiti] *n.* 强烈，剧烈，强度；亮度
warfarin ['wɔ:fərin] n. [药] 华法林
triple ['tripl] *n.* 三倍数；*adj.* 三倍的；*vt.* 三倍于；*vi.* 增至三倍
aforementioned [ə'fɔ:ˌmenʃənd] *adj.* 上述的，前述的
regimen ['redʒimen] *n.* [医] 治疗方案，政权，政体
monitor ['mɔnitə] *n.* 班长，监视器，监控器；*vt.* 监控；*v.* 监控
component [kəm'pəunənt] *n.* 成分；*adj.* 组成的，构成的
accumulate [ə'kju:mjuleit] *v.* 积聚，堆积

permeability [ˌpəːmiəˈbiliti] *n.* 渗透性
capability [ˌkeipəˈbiliti] *n.* (实际) 能力，性能，容量，接受力
affinity [əˈfiniti] *n.* 亲和力
solubility in lipids 脂溶性

3. Self-assessment

(1) Put the following into Chinese

the general circulation; routes of administration; plasma proteins; the total concentration; unbound drug; renal glomeruli; an elderly patient; increased incidence of adverse effects; simultaneous presence of a second drug; duration of drug action; pharmacologic response; affinity for and solubility in lipids; treatment regimen; fatty body tissue.

(2) Put the following into English

药物与血蛋白的结合度；结合浓度和总浓度的百分比；公式中三项中的两项；穿透细胞的能力；药物在体内的停留时间；有证据表明……；降低大约 20%；这意味着……；带来严重问题；平均分布在身体细胞之间；药物缓慢释放到其他组织中。

4. Reading Materials

(1) Text

Excretion of Drugs

The excretion of drugs and their metabolites terminates their activity and presence in the body. They may be eliminated by various routes, with the kidney playing the dominant role by eliminating drugs via the urine. Drug excretion with the feces is also important, especially for drugs that are poorly absorbed and remain in the gastrointestinal tract after oral administration. Exit through the bile is significant only when the drug's reabsorption from the gastrointestinal tract is minimal. The lungs provide the exit for many volatile drugs through the expired breath. The sweat glands, saliva, and milk play only minor roles in drug elimination. However, it should be recognized that if a drug gains access to the milk of a mother during lactation, it could easily exert its drug effects in the nursing infant. Example of drugs that do enter breast milk and may be passed on to nursing infants include theophylline, penicillin, reserpine, codeine, meperidine, barbiturates, diltiazem, and thiazide diuretics. It is generally good practice for the mother to abstain from taking medication during the period of time she is nursing her infant. If she must take medication, she should abide by a dosage regimen and nursing schedule that

permit her own therapy yet ensure the safety of her child. Not all drugs gain entrance into the milk; nevertheless, caution is advisable. Manufacturers' package insert[1] contain product-specific information (usually in the "Precautions" section) on drug migration into breast milk.

The unnecessary use of medications during the early stages of pregnancy is likewise restricted by physicians, because certain drugs are known to have the ability to cross the placental barrier and gain entrance to the tissues and blood of the fetus. Among the many drugs known to do so after administration to an expectant mother are all of the anesthetic gases, many barbiturates, sulfonamides, salicylates, and a number of other potent agents like quinine, meperidine, and morphine, the latter two drugs being narcotic analgesics with great addiction liabilities. In fact, it is not unusual for a newborn infant to be born an addict due to the narcotic addiction of its mother and passage of the narcotic drugs across the placental barrier.

The kidney, as the main organ for the elimination of drugs from the body, must be functioning adequately if drugs are to be efficiently eliminated. For instance, elimination of digoxin occurs largely through the kidney according to first-order kinetics; that is, the quantity of digoxin eliminated at any time is proportional to the total body content. Renal excretion of digoxin is proportional to the glomerular filtration rate which when normal[2] results in a digoxin half-life that may range from 1.5 to 2.0 days. When the glomerular filtration rate becomes impaired or disrupted, however, as in an anuric patient, the elimination rate decreases. Consequently, the half-life of digoxin may be between 4 to 6 days. Because of this prolongation of digoxin's half-life, the dosage of the drug must be decreased or the dosage interval prolonged. Otherwise, the patient will experience digoxin toxicity. The degree of impairment can be estimated by measurements of glomerular filtration rates, most often by creatinine clearance determination[3]. Usually, however, this is not feasible and the patient's serum creatinine value is used within appropriate pharmacokinetic equations to help determine a drug's dosage regimen.

Some drugs may be reabsorbed from the renal tubule even after having been sent there for excretion. Because the rate of reabsorption is proportional to the concentration of drug in unionized form, it is possible to modify this rate by adjusting the pH of the urine. By acidifying the urine, as with the oral administration of ammonium chloride, or by alkalinizing it, as with the administration of sodium and thereby alter its prospect of being reabsorbed. Alkalinization of the urine has been shown to enhance the urinary excretion of weak acids such as salicylates, sulfonamides, and phenobarbital. The opposite effect can be achieved by acidifying the urine. Thus, the duration of a drug's stay within the body may be markedly altered by changing the pH of the urine. Some foods, such as cranberry juice, can also serve to acidify the urine and may alter drug excretion rates.

The urinary excretion of drugs may also be retarded by the concurrent administration