

中山 大 学

二 00 六 年攻读硕士学位研究生入学考试试题

科目代码: 494

科目名称: 微生物药物学

考试时间: 1 月 15 日下午

考 生 须 知

全部答案一律写在答题纸上,
答在试题纸上的不得分! 请用
蓝、黑色墨水笔或圆珠笔作答。
答题要写清题号, 不必抄题。

[注: 本试题适用于生物技术 (071021) 学科、专业方向包括: 03 微生物药物及制药工程; 及其他指定的学科专业方向]

一、基本知识判断题 (80 分)

(对以下描述认为正确的打 \checkmark , 不正确的打 \times 。只记正确分, 答错不扣分。在答题纸上只写题号即可。每小题 1 分)

(一)、微生物药物的微生物学

1、微生物药物可以来源于

- (1) 微生物整体或部分实体
- (2) 微生物初级代谢产物
- (3) 微生物次级代谢产物

2、抗生素按化学结构分类可以包括

- (4) β -内酰胺类
- (5) 氨基糖苷类
- (6) 大环内酯类
- (7) 四环素类
- (8) 氯霉素类
- (9) 肽类
- (10) 核苷类
- (11) 安莎类
- (12) 多烯大环内酯类
- (13) 聚醚类

3、抗生素按作用机制分类包括

- (14) 抑制或干扰细胞壁合成
- (15) 抑制或干扰蛋白质合成
- (16) 抑制或干扰 DNA、RNA 合成
- (17) 抑制或干扰细胞膜功能
- (18) 作用于能量代谢系统

4、生理活性物质包括

- (19) 作用于关键酶的物质
- (20) 生物应答调节剂
- (21) 作用于受体的物质

5、作用于酶的生理活性物质包括

- (22) 酶抑制剂
- (23) 酶激活剂

6、微生物药物研究一般流程的关键环节包括

- (24) 微生物药物产生菌分离
- (25) 有效菌株筛选
- (26) 产生菌保藏
- (27) 产生菌遗传改良选育
- (28) 发酵培养
- (29) 活性成分分离纯化
- (30) 化学鉴别与结构测定
- (31) 药理和临床评价
- (32) 工业化工艺研究
- 7、微生物药物的应用领域包括
 - (33) 临床医学
 - (34) 农业
 - (35) 畜牧业
 - (36) 食品保藏
 - (37) 工业
 - (38) 科学研究
- 8、抗生素的早期鉴别包括
 - (39) 抗菌谱
 - (40) 细菌的耐药性和赖药性
 - (41) 纸层析和纸电泳
 - (42) 颜色反应
 - (43) 紫外线吸收光谱
- 9、微生物药物的生物合成途径的层次包括
 - (44) 初级代谢合成
 - (45) 次级代谢合成
- (二)、微生物药物的化学
- 10、从培养物中提取微生物药物的方法包括
 - (46) 溶剂提取法
 - (47) 吸附法
 - (48) 离子交换法
 - (49) 沉淀法
- 11、微生物药物的精制技术包括
 - (50) 吸附色谱
 - (51) 分配色谱
 - (52) 离子交换色谱
 - (53) 离子排斥色谱
 - (54) 凝胶排阻色谱
 - (55) 高压液相色谱
 - (56) 重结晶
- 12、 β -内酰胺类抗生素的化学结构包括
 - (57) 单环 β -内酰胺类
 - (58) 青霉烷
 - (59) 氧青霉烷
 - (60) 碳青霉烷
 - (61) 青霉稀
 - (62) 氧青霉稀
 - (63) 碳青霉稀
 - (64) 头孢稀

(65) 氧头孢稀

(66) 碳头孢稀

13、氨基糖苷类抗生素的化学结构包括

(67) 1, 3-二氨基环醇衍生物

(68) 1, 4-二氨基环醇衍生物

14、肽类抗生素的化学结构主要特征包括

(69) 线状肽/环状肽/线状-环状肽

(70) 酯肽/糖肽/磷酸肽/核苷肽

(三)、微生物药物的作用机制与耐药机制

15、作用机制

(71) 抑制细胞壁合成的抗生素包括 β -内酰胺类和糖肽类

(72) 作用于细胞膜的抗生素包括多肽类、多稀类和离子载体类

(73) 抑制蛋白质合成的抗生素包括氨基糖苷类、四环素类、氯霉素、大环内酯类、林可霉素类

(74) 抑制核苷和核酸合成的抗生素包括安莎类

(75) 灰黄霉素抑制真菌的有丝分裂

(76) 寡霉素抑制真菌的能量代谢系统

16、耐药性的生化机制

(77) 产生分解酶或钝化酶

(78) 改变原始作用位点

(79) 细胞膜通透性变化

(80) 外膜微孔蛋白缺失

二、综合素质考察 (40 分) (考生根据微生物学/药学/化学背景专长任选 1 题作答即可)

1、表述新抗生素筛选的研究方法与一般过程 (40 分)

2、表述微生物药物的化学鉴别和结构鉴定 (40 分)

三、学科前沿与专业英语 (30 分) (考生根据背景专长任选 1 题将下划线处翻译成中文)

1、J Antibiot (Tokyo). 2005 Jun; 58(6):390-6. **Heptemerones A-G, seven novel diterpenoids from *Coprinus heptemerus*: producing organism, fermentation, isolation and biological activities.** Seven novel diterpenoids, named heptemerones A-G, were isolated from the broth of submerged cultures of *Coprinus heptemerus*, a basidiomycete which previously had not been known to produce secondary metabolites. The compounds were purified by solid phase extraction and silica gel chromatography followed by preparative HPLC. Among the biological activities the inhibition of fungal germination was the most potent, and depended highly on the composition of the assay medium. In water, inhibition occurred at 5 - 10 fold lower concentrations as compared to complex media. Heptemerone G was the most active compound with MICs starting at 1 microg/ml. Four of the antifungal compounds exhibited plant protective activity in a leaf segment assay using *Magnaporthe grisea* as the pathogen. Growth of yeasts and bacteria was hardly affected. Cytotoxic activities were moderate and only heptemerone D was phytotoxic.

2、J Antibiot (Tokyo). 2005 Apr; 58(4):260-7. **Antibiotics GE23077, novel inhibitors of bacterial RNA polymerase. II. Structure elucidation.** During the screening program for new antibacterial agents produced by actinomycetes, GE23077 was isolated from fermentation broths of an *Actinomadura* sp. strain as a complex of factors A1, A2, B1, B2. NMR, MS and GC/MS analysis carried out on the isolated components led to the conclusion that GE23077 is a novel cyclic heptapeptide consisting of common and unusual amino acids. The chemical structures of the complex components were elucidated. Components A and B differ in the structure of the acyl group connected to a 2,3-diaminopropanoic acid moiety. A α -amino-malonic acid residue in the peptidic sequence is the origin of an isomerization process between A1 and A2 as well as B1 and B2. The chirality of the α -amino-malonic acid residue can be inverted easily via keto-enol tautomerism. Factors A2 and B2 should be considered as epimers of A1 and B1 respectively. By degradation studies the absolute configuration of some amino acids were determined. Chiral GC-MS and Micellar Electrokinetic Capillary Chromatography (MEKC) were used to define the absolute stereochemistries of five out of ten chiral centers.