

安徽师范大学

2014 年招收硕士研究生考题

科目名称: 遗传学 科目代码: 939

考生请注意: 答案必须写在答题纸上, 写在本考题纸上的无效!

一、名词解释 (共 12 题, 每题 5 分, 共 60 分)

1. 基因组
2. 测交
3. 内含子
4. 启动子
5. 数量性状位点 (QTL)
6. 配子体不育
7. 等位基因
8. 非同义突变
9. 伴性遗传
10. 转座子
11. 杂种优势
12. 同源异型基因

二、简答题 (30 分, 每题 10 分)

1. 简述染色体结构变异的类型及其遗传学效应。
2. 简述“中心法则”的主要内容。
3. 同一物种不同基因型 (如 AA、Aa、aa) 差异的本质是什么? 试从分子水平上解释什么是纯合基因型、杂合基因型、显性基因、隐性基因。

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三、问答题（30分）

1. 试说明遗传学三大定律的内容、其细胞学基础和各自的适用范围。

四、英译汉（30分）

Although most DNA is packaged in chromosomes within the nucleus, **mitochondria** (线粒体) also have a small amount of their own DNA. This genetic material is known as mitochondrial DNA or mtDNA.

Mitochondria produce energy through a process called **oxidative phosphorylation** (氧化磷酸化). This process uses oxygen and simple sugars to create adenosine triphosphate (ATP), the cell's main energy source. A set of enzyme complexes, designated as complexes I-V, carry out oxidative phosphorylation within mitochondria.

In addition to energy production, mitochondria play a role in several other cellular activities. For example, mitochondria help regulate the self-destruction of cells (apoptosis). They are also necessary for the production of substances such as **cholesterol** (胆固醇) and **heme** (血红素) (a component of hemoglobin, the molecule that carries oxygen in the blood).

Mitochondrial DNA contains 37 genes, all of which are essential for normal mitochondrial function. Thirteen of these genes provide instructions for making enzymes involved in oxidative phosphorylation. The remaining genes provide instructions for making molecules called transfer RNAs (tRNAs) and ribosomal RNAs (rRNAs), which are chemical cousins of DNA. These types of RNA help assemble protein building blocks (amino acids) into functioning proteins.