

編號： 437 系所：生物化學暨分子生物學研究所乙組 科目：分子生物學

本試題是否可以使用計算機：可使用，不可使用（請命題老師勾選）

※請依題號順序於答案卷上作答，未依題號順序作答者不予計分。

1. Please define the concept of a gene and its biological function, as well as describe the possible gene number in human genome according to the defined concept. (20%)
2. Please design and construct an inducible RNA interference (RNAi) based on RNase P RNA H1 (H1) or small nuclear RNA U6 (U6) promoter for conditional gene silencing in mammalian cells. (20%)
3. Please design experiments to demonstrate the cap-, internal ribosome entry site (IRES)-dependent or both cap- and IRES-dependent translation mechanisms. (20%)
4. Please describe the biogenesis of microRNA (miRNA) and its biological function involved in either tumorigenesis or tumor suppression. (20%)
5. Please design experiments to analyze the mitochondrial targeting signal (MTS), MALLTAAARLLGTKNASCLVLAARHAS, in mitochondrial protein-X and also conduct experiments to identify the possible mitochondrial import receptors, TOM20, TOM22 and TOM70, required for mitochondrial targeting protein-X. (20%)