

Markscheme

① TAC|GGT|CAG|GCC|ACC|CTC|GAA|TTA|AGA|TTC|ATT

AUG CCA GUC CGG UGG GAG CUU AAU UCU AAG UAA mRNA

met - pro - val - arg - trp - glu - leu - asn - ser - lys polypeptide

② TAC|GGC|TCA|GGC|CAC|CCT|CGA|ATT|AAG|ATT|CATT

AUG CCG AGU CCG GUG GGA GCU UAA UUC UAA GUA A mRNA

met - pro - ser - pro - val - gly - ala polypeptide

polypeptide is both composed of different amino acids and is shorter. Protein is either going to be different and/or non-functional

③ Skin cells are somatic cells (body cells) and these are not used in fertilization and thus cannot be passed onto offspring.

The only mutations that can be passed onto offspring would need to occur in gametes (sperm/ova) and these would need to be used in fertilization to produce zygote and ultimately offspring

* typically changes/mutations acquired in your lifetime are not passed on as most occur in somatic cells

④ Mutagens, like those found in cigarettes and vapes increase the likelihood/rate of mutations but this is not a guarantee.

Mutations are random events, so we cannot say with certainty these chemicals will cause a mutation that leads to cancer but we can say they significantly increase the risk and chance of developing cancer.

⑤ If mutations occur in non-coding sections of DNA, there will likely not be an impact on phenotype as protein synthesis not directly affected.

∴ as phenotype is unaltered, many mutations may accumulate without negative (or positive) effects

If mutations occur in coding genes these can have a direct impact on phenotype and if negative, these will likely not be passed on often

* more on this in next lesson on evolution

⑥ Monozygotic (identical) twins are born with identical DNA, as they are genetic clones.

∴ if each twin was separated and raised under different environments/conditions we could examine which characteristics remain the same and which are altered.

→ the more a characteristic changes, the more of an impact the environment has / less genetic

→ the more a characteristic remains the same, the more of an impact genetics have / less environmental

⑦ ideally graphing programs are used like excel