

Question 38 (Answer: C)

- Penicillin blocks an enzyme needed to cross-link the peptidoglycan cell wall.
- The weakened wall cannot resist the osmotic pressure, so the bacterium bursts.
- Human cells have no cell wall, which is why the antibiotic is selective.

Question 37 (Answer: C)

- Compare how many colonies survived each antibiotic.
- Many surviving colonies means the bacterium is resistant to that antibiotic.
- Few or none surviving means it is sensitive, so that antibiotic would be the effective treatment.

4(a)	<i>any three from:</i> <i>similarities, both have</i> phospholipids ; channel / transport, protein ; A intrinsic / integral / transmembrane, protein R carrier / pump, protein a bilayer / two layers ; <i>differences</i> <i>do not need to have 'outer membrane' 'bacterial' if context is clear</i> (bacterial outer membrane) has lipopolysaccharides ; ora (cell surface membrane / eukaryote) has, phospholipid bilayer / both layers with phospholipids ; ora <i>if ora also given (bacterial) only has outer layer of (outer) membrane with phospholipids, can also award mp1</i> AVP ;; e.g. cell surface membrane has, glycocalyx / glycolipids / glycoproteins cell surface membrane has cholesterol outer membrane does not have extrinsic proteins	<i>max 2 for similarities, max 2 for differences</i>
4(b)(i)	<i>any one from:</i> <i>formation of O-IMV</i> involves a more complex process ; e.g. greater variety of, contents / cell structures R organelles <i>ref. to needing to make a vesicle with two 'membranes' / AW</i> A 'layers' peptidoglycan, chains / layer / bonds, need to be broken ; A peptidoglycan wall needs to be broken causes, (temporary) weakness in cell wall / risk of lysis ; <i>idea that</i> more resources required to form vesicle or too great a loss of important cell, components / structures <i>ref. to</i> take more time to produce ; uses (more) energy to, break wall / repair wall / make the vesicle ; I <i>ref. to</i> organelles AVP ; e.g. suggestion that periplasmic proteins need to be released in greater numbers so more OMVs formed	
4(b)(ii)	<i>any one suggestion that:</i> function of O-IMVs require, energy / ATP ; A suggested function e.g. DNA transcription / metabolic reactions / for active transport I cell processes O-IMV (formation) has cytoplasm, which contains ATP ; OMVs formed only from periplasm, which has no ATP ; A no ATP in outer membrane space AVP ; e.g. no / few, ATP transporters / transport proteins, for exit of ATP into periplasm (in area where OMV forms)	<i>must be in context of a fully formed O-IMV</i>
4(b)(iii)	<i>ref. to</i> DNA in O-IMVs being passed on to other bacteria ; e.g. O-IMVs may, fuse with / be taken up by / AW, plasmids / DNA, in (degraded) O-IMVs may enter other bacteria qualified <i>ref. to</i> O-IMV DNA and antibiotic resistance ; e.g. O-IMVs have, alleles / genes / plasmid, that, give / confer / AW, antibiotic resistance DNA may mutate to give (a, gene / allele, for) antibiotic resistance DNA, codes for / expresses / AW, a protein involved in antibiotic resistance example of gene conferring resistance e.g. enzyme to breakdown antibiotic change to ribosome structure (to prevent antibiotic attachment) efflux pump for / membrane protein to pump out, antibiotic	

5(a)	any two from: 1 bacteria, have <u>70S</u> ribosomes and humans have <u>80S</u> ribosomes / <u>only</u> have 70S ribosomes ; 2 antibiotic, cannot bind to 80S / human ribosomes or can only bind to 70S / bacterial ribosomes ; 3 antibiotic, binding site / target site, not present on 80S ribosomes / only present on 70S ribosomes ; A ref. to complementary / specific – alternative to second part of the MP 4 antibiotic cannot enter mitochondria to reach 70S ribosomes (in humans) ; 5 AVP ; different combinations of proteins in ribosomes / different rRNAs in ribosomes
5(b)	any one from: 1 penicillin acts on cell walls <u>and</u> human cells have no, peptidoglycans / cell walls / enzyme(s) that make cell walls; A murein <i>penicillin</i> 2 prevents formation of peptide / cross, bridges / linkages, (between peptidoglycans) in (bacterial) cell wall ; 3 prevents repair of, gaps / holes / AW, in (bacterial) cell walls caused by autolysins ; I ref. to penicillinase
5(c)	any one from: <i>rifampicin</i> 1 blocks / fits into / binds to / competes for, the active site of, RNA polymerase / enzyme ; 2 binds, to allosteric site / site away from active site, to, change shape of active site / prevent it forming phosphodiester bonds ; 3 attaches to DNA template blocking RNA polymerase moving along it ; 4 can be incorporated into RNA but no nucleotide can be added to it ; 5 AVP ; e.g. attaches to the promoter to stop RNA polymerase, binding to DNA / moving along DNA / AW