

Mark schemes

Q1.

- (a) (Insulin stimulates release of osteocalcin – no mark)
1. Osteocalcin causes **more** (release of) insulin;
 2. (**More**) insulin causes **more** (inactive) osteocalcin (release);
 1. and 2. *Idea of more required but other words can be used*
 1. and 2. *Ignore ref. to further*
 1. and 2. *Ignore ref. to more B cells / osteoblasts stimulated*
- 2
- (b) 1. (Change in pH) changes / breaks ionic / hydrogen bonds;
Ignore ref. to peptide or sulfur-sulfur bonds
Accept polar bonds
2. Changes tertiary structure;
Ignore changes to primary structure
Reject ref. to active site / enzyme
Accept forms binding site
Ignore 3D
Accept 3°
- 2
- (c) 1. (Insulin) leads to more transport proteins / channel (proteins) / carrier (proteins) for glucose;
Ignore references to opening channels
Accept co-transport / GLUT 1 or 4 protein
2. More glucose (for respiration / glycolysis) enters cell;
*Idea of more required **once** to cover both mark points*
Ignore references to glycogen formation / fat metabolism / enzyme activation
- 2

[6]**Q2.**

- (a) 1. Binding (of interferon gamma) changes shape/tertiary structure of receptor (protein);
2. This activates/switches on the enzyme;
 3. Use of ATP (to phosphorylate STAT1);
 1. *Accept reference to second messenger mechanism/process*
 3. *Context is important*

2 max

- (b) 1. Phosphorylated STAT1;
2. IRF (protein);
Accept in either order
1. Must be phosphorylated but accept STAT1P
2. Ignore references to phosphorylated

2

- (c) 1. Causes more helper T cells to form;
2. (So) more interferon (gamma) production (by helper T cells);
1. and 2. require idea of more

2