**PART IV ADAPTATIONS AND DEVELOPMENTAL PLASTICITY**

Chapter 7

1. Which statement offers the best description of habituation?
2. Gradual genetic change so that organisms become adapted to their environment
3. A type of operant conditioning such that behaviours become habitual
4. Developmental plasticity such that a child develops in response to environmental cues that allow it to optimise fitness in adult life.
5. A gradual reduction in a response to a stimuli as the organism learns the response is of little value
6. Reversible changes in the phenotype that occur to allow the phenotype to better cope with its environment.
7. Which statement best describes acclimatization
8. Changes in an organism in response to environmental stresses. The changes are often reversible and enable the organism to better cope with the changed environment.
9. The development in utero of future life history strategies to better cope with anticipated conditions in the future
10. A change to the proteins surrounding DNA switching on or off genes as appropriate.
11. The learning response of an organism to a rapidly changing climate – favouring complex cognitive learning and reasoning
12. The state reached when a stimulus ceases to have any effect.
13. Which statement best describes the concept of a thrifty genotype?
14. Genes that only switch on when absolutely necessary – thereby saving energy.
15. Genes that were selected to enable population to cope with famine by causing the body to put on fat during times when food is plentiful
16. Genes that dispose people towards hypoinsulinaemia – reducing the uptake of sugar in a thrifty way.
17. A genotype that causes the embryo to grow in ways sensitive to environmental conditions to adapt to anticipated future environments
18. A highly homogenous genotype with relatively low genetic diversity
19. Which statement best describes the concept of a “thrifty phenotype”?
20. A phenotype of reduced stature that develops in environments that are resource poor.
21. A phenotype that has a low risk of type II diabetes and obesity
22. A phenotype that results when thrifty genotype genes are present
23. A phenotype that is highly efficient in converting metabolic energy to growth and survival
24. A phenotype that shows developmental plasticity, responding to information in early life to develop later in compensatory ways
25. Which statement best describes the phenomenon of sex-specific genetic imprinting
26. Where newly born offspring imprint on one sex (usually the mother) and follow it around.
27. Where some genes are not passed onto offspring at all through genetic slicing.
28. Where some genes in the maternal or paternal line are silenced from being operational.
29. Where genes have different and antagonistic effects depending if they are passed through the male or female line
30. Where some gens on either the X or Y chromosomes are turned off in either boys or girls.
31. What statement best describes the emerging science of epigenetics?
32. The study of how the expression of inherited genes can be modified by surface proteins and other influences such as methylation that can switch on or off the gene
33. The study of how single genes turn out to have many different functions
34. The study of how early influences on a neonate can condition its adult response to such stimuli as food availability
35. The study of how two genes can interact to act synergistically and give rise to greatly enhanced effects
36. The study of how mutations can accumulate on non-coding regions of DNA that are not protected by methylation.
37. Which statement best describes “transgenerational epigenetic inheritance”?
38. A mode of inheritance which lies outside of genetic influences and is really the inheritance of cultural norms and values
39. Where the epigenetic modification of genes in one generation is passed on to the next generation
40. Where a functioning gene suffers fatal mutation between one generation and the next
41. Where a gene can been seen to be inherited unchanged through more than two generations
42. A rare mode of inheritance where environmental influences actually alters the base sequence of DNA which is then inherited through two or more generations
43. Which sentence best describes the causes of Bergmann’s rule?
44. As limbs get longer and slimmer for the same volume so the surface area decreases.
45. As body size increases linearly then surface area increases faster than body volume allowing a greater cooling effect
46. As body size increases linearly so surface are increases more slowly than volume meaning a better conservation of metabolic heat energy
47. Northern latitude will favour lighter skin tones due to the lower levels of light there compare to equatorial regions
48. Skin reflectance decreases as latitude decreases.
49. Which sentence best describes the causes of Allen’s rule?
50. As limbs get longer and slimmer for the same volume so the surface area increases allowing a faster loss of metabolic heat energy
51. As body size increases linearly then surface area increases slower than body volume allowing a reduced cooling effect
52. As body size increases linearly so surface are increases more slowly than volume meaning a better conservation of metabolic heat energy
53. Northern latitude will favour lighter skin tones due to the lower levels of light there compare to equatorial regions
54. Skin reflectance decreases as latitude decreases.
55. Which is the best potential explanation for why the Ammassalimiut –Eskimo people of Greenland have darker skin that other populations living at this northerly latitude?

a) Sunlight reflects strongly from snow causing skin tanning, the tanning reduced expose to harmful UV radiation which is also more intense in these regions.

b) These people reached Greenland from Southern Asia about 15,000 years ago, these people had dark skin and natural selection has had relatively little time to modify this.

c) Their diet is rich in carotenoids meaning a darker skin tone

d) These people have evolved to conserve energy and darker skin conserves energy better than a lighter skin since it radiates less heat.

e) Light skin is an adaptation in northern regions to enable the skin to produce Vitamin D, since the Inuit people have plentiful Vitamin D in their diet they do not need to evolve light skin.

1. Which statement best describes the phenomenon of “frequency dependent balancing selection”?
2. It is a form of selection whereby natural selection and sexual selection eventually reach a balance
3. It is where two or more genetically based strategies can co-exist at specific frequencies where any increase or decrease in frequency would lower overall fitness.
4. It is where successful genes can only reach a certain penetration in the gene pool since higher frequencies would reduce fitness due to the homozygosis brought about by inbreeding
5. It is where the rate of new mutation occurring exactly balances the rate of their removal by natural selection
6. It is where different optima exist for gene types depending on the environment – as populations move around this leads to several different phenotypes co-exiting some of which may no longer be optimal for their current environment.
7. Many personality traits have high heritabilities. What is the best answer to the significance of this in evolutionary psychology (EP)?
8. It is just what is predicted: characteristics are genetically determined as EP would argue
9. It is irrelevant since EP is concerned with human universals and not differences between people. EP can ignore this and concentrate on more cross –cultural differences between people
10. High heritabilities mean that the environment is similar for most people today and so these differences are trivial
11. High heritability suggests genetic differences between people which is a problem for theories that look for the natural selection of human universals since significant genetic differences should be minimal.
12. High heritability means that characteristics are moulded by the environment and are of no concern to EP which is concerned with genetic similarities.

Chapter 8

1. Which statement best describes the difference between K selection and r selection in groups and species involved in the process of producing offspring?
2. K selected groups produce lots of small inexpensive offspring with low mortality; r selected groups produce a few large offspring but with high mortality
3. r selected groups produce lots of small inexpensive offspring with high mortality; K selected groups produce a few large offspring with low mortality
4. r selected groups produce short lived offspring in environments that are stable and subject to little change
5. K selected groups produce long lived offspring in environments that are subject to rapid change
6. Life history theory suggests that K selected groups produce offspring that mature earlier than r selected groups.
7. Life History Theory suggests that decisions have to be made by an organism concerning the allocation of resources to survival and reproduction. Which statement provides the most plausible account of the potential role of testosterone in this allocation process?
8. Testosterone increases muscle mass and the immune response so helps an organism to better survive, switching energy away from reproduction towards maintenance.
9. Testosterone stimulates the uptake of overall metabolic energy for both processes of survival and reproduction
10. Testosterone delays the onset of menarche but subsequently increases the inter birth interval in females.
11. Testosterone switches energy between survival and reproduction; high levels of testosterone promote reproductive activities at the expense of survival and maintenance activities.
12. Testosterone incrases in males once they have found a sexual partner and have produced offpsing; this then directs the efforts of males towards parenting.
13. Here are some statements about the menopause
14. The menopause is part of a general decline in the efficiency of physiological functions (such as cardiac fitness and lung capacity) that occurs at about 45 years of age.
15. The menopause is a rapid shutdown in fertile followed by an long infertile phase in life shared with chimpanzees and gorillas
16. The menopause is a puzzle since women experience about 1/3 of their lives after the menopause whereas this is typically 1/10 for most mammals.
17. One plausible explanation for the menopause is that it reduces the risks of death in childbirth impacting negatively on the health of pre-existing children
18. The fact that women typically live 20 years after the menopause is evidence that this period of life must serve some fitness enhancing function
19. The grandmother hypothesis supposes that women live for many years after the menopause since they receive help and support from their grandchildren.

Which set of statements is most likely to be correct?

1. (i), (ii) and (vi)
2. (i) and (iii)
3. (i) and (vi)
4. (vi) only
5. (iii), (iv) and (v)
6. Which sentence best describes the relevance of antagonistic pleiotropy to the problem of senescence and death?
7. Genes would be favoured if they has a positive effect on fertility in youth whilst causing ageing and death in later life
8. Pleiotropy suggest that some genes in their heterozygous state could enhance longevity whilst in the homozygous state they reduce it
9. Pleiotropic genes shift resources from fertility to survival and maintenance suggesting an antagonism with reproductive output
10. Antagonistic pleitropy is the gradual accumulation of multiple mutations in genes causing ageing and death of cells
11. Antagonistic pleiotropic genes are those which bring about genetic disorders and death, the more genes of this type than an individual has the shorter the lifespan.
12. Here are some statements about the demographic transition
13. The demographic transition is characterised by low birth rate, low death rate, and long birth intervals.
14. The demographic transition is when humans moved from a Hunter-gathering to a Neolithic lifestyle
15. The demographic transition is associated with increases in fertility due to high survival rates
16. The demographic transition is a problem for Human Behavioural ecology since it is hard to explain low fertility rates.
17. The demographic transition is a problem for Evolutionary psychology since it is hard to explain why humans should willingly use contraceptive methods
18. The demographic transition is when fertility exceeds death rate and population can begin to increase.

Which set of statements is most correct?

1. (ii), (iii) and (vi)
2. (iii) and (vi)
3. (iv) and (v)
4. (i) and (iv)
5. (i) and (iv) and (v)
6. The timing of menarche has been the subject of much discussion and theorising. Which statement best accords with the life history theory approach?
7. Late menarche implies females are shifting their reproduction towards r type strategies
8. Early menarche is an adaptive and compensatory consequence of the demographic transition and a falling death rate allowing females to produce more offspring over a lifespan
9. Early menarche may be an adaptive response to stressful environments, low attachment parenting and the expectation of a relatively short lifespan
10. Late menarche occurs when plentiful help from grandparents is at hand
11. Early menarche is often associated with polygynous mating groups as an adaptive means of ensuring a female sharing a male partner does become pregnant.