

Index

Terms shown in **bold** also appear in the glossary (page 79). Pages in *italics* refer to figures.

- ABO blood groups, 3, 71
 addition of base pair, 2
Agrobacterium tumefaciens, 49, 49
 amniocentesis, 62, 63, 63
 ampicillin resistance gene, 45
antibiotic resistance, 32, 35–7, 36, 54
 antifeedant, 50
Antirrhinum, 4, 13
 antisense gene, 50, 51
artificial insemination (AI), 22–3
 artificial selection, 16, 18, 35
- Bacillus thuringiensis*, 39, 50, 54
 baculovirus, 52–3
 background genes, 17, 34
 bacteria, 32, 35–7, 39, 43–4, 45, 47, 48, 49, 54
*Bam*HI, 43, 45, 45, 46
 Basta, 49, 53
- callus, 32
 cattle
 selective breeding in, 22, 24, 25, 34
 disease resistance in, 34
 cDNA, 42, 44
 centre of diversity, 29
 chi-squared (χ^2) test, 13–14
 chiasmata, 11
 chromosome banding, 59
chromosome mutation, 2
 chorionic villus sampling, 62, 63, 63
cloning, 24–5, 31–2
 codominance, 4
 compatibility, 70
 complementary genes, 9
 conjugation, 35, 35
continuous variation, 3–4, 3, 5–7
crossing over, 11–13, 12
 cross over value, 13
 cystic fibrosis (CF), 2, 58–9, 65, 67
- DDT, 38, 38
 degrees of freedom, 14
 deletion of base pair, 2
discontinuous variation, 3, 4–5
disease resistance
 in animals, 34–5
 in plants, 33–4
 DNA
 copy (cDNA), 42, 44
 recombinant, 44, 45
 viral, 44
 DNA ligase, 44
 DNA microinjection, 47, 47
 DNA polymerase, 42
 DNA probes, 67, 68–9
 DNA profiling *see* genetic finger-printing
 dominant allele, 4, 9
 double-blind trial, 65
 Down's syndrome, 2, 59–61, 60, 61
Drosophila melanogaster, 10–13, 10, 12, 14
 aristopedia antenna, 10–11, 10
 dihybrid cross, 11
- Eco*RI, 43
 electroporation, 47
 embryo cloning, 24, 25
 embryo donation, 23–4
 embryo freezing, 30, 31
embryo transplantation, 24–5
epistasis
 dominant, 8–9
 recessive, 9
 epistatic gene, 8
Escherichia coli, 36, 43, 45, 47, 52
 evolution,
 compared with selective breeding, 18
 of resistance, 35–40
 explant, 32
- F₁ generation, 6
 F₂ generation, 6
 field gene bank, 31, 31
- fitness, 27
 Flavr Savr tomato, 50–1, 51, 54
 Flor, H.H., 33
- gamete donation, 23
 gel electrophoresis, 68–9, 68, 69
gene bank, 28–31
 gene-for-gene concept, 33
 gene library, 47, 68
gene locus, 3, 5, 8, 9
gene mutation, 1–2
 gene pool, 27
 gene probe, 47, 63
gene therapy, 64–6, 66
 benefits and hazards of, 65–6
 general resistance, 33
genetic compatibility, 70–2
genetic counselling, 62–4
genetic disorders, 57–61
genetic engineering, 42–56
 benefits and hazards of, 52–4
 ethical implications of, 54–5
 in agriculture, 49–51
 of livestock, 51
 genetic erosion, 28
genetic fingerprinting, 66–70, 67, 69
genetic modification, 42–56
 genetic screening, 62
genome, 29, 68
genotype, 3
 germ cell therapy, 64, 64
- haplotype, 71
 herbicide tolerance, 49–50
heritability, 17–18
 heterosis *see* hybrid vigour
 horizontal resistance, 33, 33
 horizontal transmission, 35, 36
 human genetics, 57–72
 human leucocyte antigen system (HLA) *see* major histocompatibility complex
 Huntington's disease (chorea), 59
 hybrid vigour, 20, 28, 28, 34

82 Index

- hybridisation, 19–21
 hypostatic gene, 8
- in vitro* fertilisation (IVF)**, 23–4
inbreeding, 27–8
 inbreeding depression, 27
 insecticide resistance, 38–40, 38, 40
 insulin manufacture, 42, 47, 48
- kanamycin, 54
 karyotype, 59, 60
 kindred, 61
- lactoferrin, 51
 lectin, 50
linkage, 10–11
 liposome, 47
 Liposome–DNA complex, 65, 65
- maize
 cob length, 7–8
 hybrid vigour, 28, 28
 inbreeding depression, 27
 selective breeding, 20, 20
- major histocompatibility complex (MHC), 71–2
 male sterility genes, 19
 mass selection, 19, 19
 microinjection
 of DNA, 47
 of sperm, 23
 microprojectiles, 47
 MRSA *see* multiple resistance
 multi-locus probe, 69
 multiple alleles, 4
 multiple resistance, 37
mutation, 1–2
 chromosome, *see* chromosome mutation
 mutation
 gene, *see* gene mutation
- natural selection, 16, 35
 natural inbreeders, 18, 27
 natural outbreeders, 18, 20, 27
 neomycin, 54
 non-disjunction, 2, 60, 60
- orthodox seeds, 29
 outbreeding, 27
- paternity testing, 69, 69
 pBR322 plasmid, 45, 45
 pedigree analysis, 61
 pedigree selection, 19–20, 19
 phage, 35, 43, 45
phenotype, 3
 phenotypic variance, 7–8
 plasmid,
 pBR322, *see* pBR322 plasmid
 R (resistance), *see* resistance
 plasmid
 Ti *see* Ti plasmid
 polygenes, 4, 7, 32
 potato
 selective breeding in, 17
progeny testing, 21–2
- R plasmid, *see* resistance plasmid
 racehorse stud, 21
 rare breeds, 29
 recalcitrant seeds, 30
 recessive allele, 4
recombinant DNA, 44, 45
 replica plating, 45, 46
 resistance
 bacterial, 35–7
 to antibiotics, 35–7
 to insecticides, 38–40
 to scrapie, 34–5
 to warfarin, 5
 resistance plasmid, 36–7
restriction enzymes, 42–4, 44, 46
 reverse transcriptase, 42
Rhizobium, 53–4
- Salmonella*, 35
 scrapie, 34–5
seed bank, 29–31
 selection
 artificial, *see* artificial selection
 natural, *see* natural selection
selective breeding, 16–25
 aims of, 16–17
 animals, 21–2
 plants, 18–21
 severe combined immune deficiency (SCID), 64–5
 silent mutation, 2
 single cross hybrid, 20
- single-locus probe, 68–9
 single plant selection, 18, 18
 single seed descent, 19, 20
 snapdragon *see* *Antirrhinum*
 somatic cell therapy, 64, 64
 Southern blotting, 68
 specific resistance, 33, 33
sperm bank, 22, 31
Staphylococcus aureus, 37
 sticky ends, 43, 43
 substantial equivalence, 55
 substitution, 2
 supermouse, 55
 superovulation, 23
 surrogate mother, 24, 25
 SUZI, 23
- terminal transferase, 44
 test cross, 10–11
tetQ, 37
 tetracycline resistance gene *see* *tetQ*
 Ti plasmid, 49
 tissue culture, 31–2, 32
 tissue rejection, 70
 totipotent cells, 24
 transgenic organism, 42, 55
 translocation, 2, 59, 61, 61
 transplant surgery, 70–2
 trisomy, 2
- vancomycin, 37
 variable number tandem repeat (VNTR), 66–9
 variance, 3, 3, 7–8
 variation
 continuous, 3–4,
 discontinuous, 4–5, 5–7
 environmental (V_E), 7–8
 genetic (V_G), 7–8
 phenotypic (V_P), 7–8
 vector, 44–7, 64
 vertical resistance, 33, 33
 vertical transmission, 35, 36
 viral DNA, 44–5
- warfarin resistance, 5
 wild populations, 29
- yeast artificial chromosome (YAC), 45