**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

MSc Degree Examination students registered for

Level **SEVEN**

Title**: Nutrient-Gene Interactions**

Code: **NGE7003**

Semester: **Resit**

Date: **04 July 2019**

Time: **9:30-12:30am**

TIME ALLOWED: **THREE** HOURS

Section A: Answer all questions in this section. There is one correct answer for each question (2 marks each). Please provide your answers as a list in the booklet, not on this exam paper.

1. Allergenicity of genetically modified (GM) foods arises from:
2. The possibility that a new gene may create a new allergen
3. The possibility that a new protein may create a new gene
4. The possibility that a new gene may create a new protein
5. Both a and c are correct
6. Heritability is:
7. The proportion of phenotypic variance attributable to genetic variance
8. The proportion of genotypic variance attributable to variance in phenotype
9. The proportion of genotypic variance attributable to variance in environment
10. None of the above
11. Which micronutrient is a co-factor for methylenetetrahydrofolate reductase (MTHFR)?
12. B12
13. B2
14. B6
15. Folate
16. Resveratrol in red wine:
17. Removes acetyl groups from histones
18. Is involved in deacetylation of histones
19. Is responsible for turning off gene expression
20. All of the above
21. Overkalix studies revealed that:
22. Increased food supply during slow-growth period in grandparents affects grandchild’s longevity
23. Paternal grandfather’s food supply affects granddaughter’s mortality risk
24. Paternal grandmother’s food supply affects grandson’s mortality risk
25. There is no correlation between grandparent’s food supply and mortality risk in grandchildren
26. X-chromosome inactivation refers to:
27. The process of removing one of the two X chromosomes in females
28. The process of substituting one of the two X chromosomes for a Y chromosome in males
29. The process of inactivating one of the two X-chromosomes in females
30. None of the above
31. Which of the statements is correct for phenyl butyrate in royal jelly?
32. It is involved in histone acetylation
33. It is involved in DNA methylation
34. Both and a and b are correct
35. It is involved in histone deacetylation
36. Familial hypercholesterolaemia occurs when:
37. No functional low density lipoprotein receptor is produced
38. No functional lipoprotein lipase is produced
39. Low density lipoprotein receptor gene is over expressed
40. Lipoprotein lipase gene is over expressed
41. Which amino acids does APOE4 have at position 112 and 158?
42. Cysteine and arginine
43. Arginine and arginine
44. Cysteine and arginine
45. Arginine and alanine
46. Aldosterone primarily acts on:
47. Epithelial sodium channel and promotes sodium reabsorption
48. Epithelial sodium channel and promotes natriuresis
49. Angiotensin converting enzyme and promotes sodium reabsorption
50. Angiotensin converting enzyme and promotes natriuresis
51. Normotensive salt-sensitive individuals:
52. Have cumulative mortality rates similar to salt-sensitive hypertensive individuals
53. Have cumulative mortality rates similar to salt-resistant hypertensive individuals
54. Have lower cumulative mortality rate than salt-resistant normotensive individuals
55. Both a and b are correct
56. Which of the following genes has been shown to interact with physical activity levels and moderate the risk obesity?
57. FTO
58. MC4R
59. CD36
60. All of the above
61. Which of the following is correct for genome-wide association studies?
62. They are mostly confirmatory
63. They explore a small number of variants
64. They are hypothesis generating
65. The variants are selected *a priori*
66. The strongest evidence to support the reduction of sodium intake in prevention of high blood pressure comes from:
67. Cross-sectional studies such as Intersalt
68. Randomised controlled trials such as DASH-sodium trial
69. Meta-analyses of randomised controlled trials
70. Prospective cohort studies
71. Nutrient-gene interactions are explored for the following reason(s):
72. To obtain a better estimate of the population-attributable risk for genetic and environmental factors by accounting for their joint interaction
73. To offer tailored preventive advice that is based on the knowledge that an individual carries susceptibility or resistance alleles
74. To determine which specific compounds in the complex mixture of compounds that humans are exposed to cause disease
75. All of the above

Section B: Answer **TWO** questions from this section (35 marks each)

1. Provide a comprehensive overview of epigenetics processes and how they may affect gene expression (20 marks). Discuss the evidence supporting the role of diet in epigenetics and disease development (15 marks).
2. Critically discuss available evidence on gene-environment interactions in obesity (35 marks).
3. Describe the mechanisms through which NFkB can affect gene expression (15 marks) and critically discuss the potential role of diet in regulating NFkB to promote health or disease (20 marks).

**END OF EXAMINATION**