**ST MARY’S UNIVERSITY**

**TWICKENHAM, LONDON**

MSc Degree Examination students registered for

Level **SEVEN**

Title**: Nutrient-Gene Interactions**

Code: **NGE7003**

Semester: **ONE**

Date: **January 17th 2019**

Time: **9:30AM – 12:30** **PM**

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. Which of the following is correct for candidate gene studies?
2. They are exploratory
3. They explore a large number of variants
4. They are mostly confirmatory
5. They are hypothesis-free
6. Selective breeding is a form of genetic modification:
7. That does not involve the addition of foreign genetic material
8. That involves the addition of foreign genetic material
9. That involves the addition of foreign DNA
10. Both b and c are correct
11. Heritability is usually explored in:
12. Pairs of monozygotic and dizygotic twins
13. Pairs of identical and fraternal twins
14. Both a and b are correct
15. Pairs of unrelated individuals
16. Which of the following statement is correct?
17. When a mouse’s agouti gene is completely methylated, its coat is yellow and it is obese and prone to diabetes and cancer
18. When a mouse’s agouti gene is completely acetylated, its coat is yellow and it is obese and prone to diabetes and cancer
19. When a mouse’s agouti gene is completely un-methylated, its coat is yellow and it is obese and prone to diabetes and cancer
20. None of the above
21. Universal methyl donor involved in DNA methylation is:
22. 5-methyltetrahydrofolate
23. S-adenosylmethionine
24. Vitamin B12
25. Choline
26. Sulforaphane in broccoli is associated with:
27. Increased histone acetylation and turning on anti-cancer genes
28. Increased histone acetylation and turning off anti-cancer genes
29. Increased histone deacetylation and turning on anti-cancer genes
30. Increased histone acetylation and turning on oncogenes
31. Hunger Winter Family studies revealed that:
32. The risk of metabolic syndrome is increased if mother is exposed to malnutrition in the last trimester of pregnancy
33. The risk of metabolic syndrome is increased if mother is exposed to malnutrition in the first trimester of pregnancy
34. The risk of metabolic syndrome does not depend on whether a mother is exposed to malnutrition during pregnancy
35. The risk of metabolic syndrome depends on father’s diet during adolescence
36. According to the DASH trial
37. Individuals on the DASH diet, with the highest level of salt intake, had the lowest blood pressure
38. Individuals with normal or mildly elevated blood pressure did not demonstrate a clear dose–response relationship when salt intake was decreased from 8 to 6 to 4 g/day
39. The fall in blood pressure was similar at all levels of sodium intake
40. None of the above
41. Which of the following statements is incorrect?
42. miRNA are part of siRNA
43. siRNA are part of miRNA
44. snRNA is part of ncRNA
45. ncRNA is part of RNA
46. Familial hypercholesterolaemia occurs when:
47. A large section of the lipoprotein lipase gene is missing
48. A large section of the lipoprotein lipase gene is added
49. A large section of the low density lipoprotein receptor gene is missing
50. A large section of the low density lipoprotein receptor gene is added
51. In Europe, APOE4 frequency is:
52. Higher in north compared to south
53. Higher in south compared to north
54. There are no differences between northern and southern Europe
55. None of the above
56. In healthy individuals, renin-angiotensin aldosterone system is:
57. Supressed when sodium intake is increased
58. Activated when sodium intake is increased
59. Activated when sodium intake is decreased
60. Both a and c are correct
61. Salt sensitivity may develop due to genetic variations in:
62. ACE gene
63. Genes coding for sodium transporters in kidneys
64. Nitric oxide synthase gene
65. All of the above
66. Which of the following genes has been shown to interact with protein intake and moderate the percentage of body fat?
67. FTO
68. MC4R
69. CD36
70. All of the above
71. The association between red meat intake and colorectal neoplasia appears to be stronger in:
72. Carriers of the “rapid” NAT2 alleles
73. Carriers of the “slow” NAT2 alleles
74. Carriers of the “medium” NAT2 alleles
75. None of the above

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

1. Describe the role of ApoE in development and progression of cardiovascular disease (10 marks) and critically discuss the interactions between the ApoE genotype and dietary fat in blood lipid response (25 marks).
2. Critically discuss gene-diet interactions and the risk for colorectal cancer. (35 marks).
3. Critically discuss the available evidence that links salt intake with hypertension (20 marks). Emphasise potential gene – diet interactions in salt sensitivity of blood pressure (15 marks).

**END OF EXAMINATION**