

## **Mock ECMGG exam 2/2:**

1. A 7-day-old girl has anal atresia, auricular tags, coloboma, and duplicated thumbs.

### **Investigations:**

Chromosome microarray (CMA) identified a copy number variant.

### **What is the most likely CMA finding?**

- A Mosaic tetrasomy 12p
- B Partial tetrasomy 22q
- C Terminal deletion 4p
- D Trisomy 18
- E Trisomy 21

2. A 2-year-old boy has developmental delay and febrile seizures.

### **Investigations:**

Chromosome microarray of the boy:

arr[GRCh37] 8p23.3p23.1(191530\_6644251)x1, 8q24.3(142840194\_146280020)x3

Karyotype of the mother:

46,XX

### **What is the most likely karyotype of the father?**

- A 46,XY
- B 46,XY,del(8)(p23.3p23.1)
- C 46,XY,ins(8)(q24.3p23.1p23.3)
- D 46,XY,inv(8)(p23.1q24.3)
- E 46,XY,r(8)(p23.1q24.3)

3. A 2-year-old boy has a provisional diagnosis of Fanconi anemia.

### **Investigations:**

Homozygous for variant of uncertain significance *FANCA*: p.Val1394Met

### **Which cytogenetic test could be used to provide further evidence of pathogenicity of this variant?**

- A Chromosome breakage following culture in diepoxybutane (DEB)
- B Chromosome breakage following irradiation
- C Increased sister chromatid exchange
- D Increased spontaneous chromosome breakage
- E Mosaic chromosomal aneuploidy on prolonged culture

4. A 6-year-old girl has poor growth, rickets, and photophobia.

**Investigations:**

Urine analysis: glycosuria, proteinuria and microhematuria.

Exome sequencing: Compound heterozygous pathogenic variants in *CTNS*, associated with cystinosis.

**Which renal manifestation is most likely to be present in this patient?**

- A Focal segmental glomerulonephropathy
- B IgA nephropathy
- C Medullary nephrocalcinosis
- D Polycystic kidney disease
- E Renal tubular Fanconi syndrome

5. A 30-year-old woman has episodic hypertension and vertigo.

**Investigations:**

Abdominal ultrasound: Renal and pancreatic cysts.

Biochemical studies: Increased urinary catecholamines over 24 hours.

**Which is the most likely diagnosis?**

- A Adult onset polycystic kidney disease
- B Multiple endocrine neoplasia type 1
- C Neurofibromatosis type 1
- D Tuberous sclerosis complex
- E von Hippel-Lindau syndrome

6. A 30-year-old woman has an osteosarcoma. Her sister developed breast cancer aged 32 years and her brother had an adrenocortical carcinoma.

**Which gene is most likely to contain a pathogenic variant?**

- A *BRCA1*
- B *CDH1*
- C *MLH1*
- D *MUTYH*
- E *TP53*

7. A 20-year-old man has bilateral congenital hypertrophy of the retinal pigment epithelium (CHRPEs).

**Which clinical investigation is likely to be abnormal?**

- A Colonoscopy
- B Echocardiography
- C Holter analysis
- D Spinal X-ray
- E 24h urine sample

8. A 30-year-old man, and his mother, have non-syndromic dilated cardiomyopathy.

**A pathogenic variant in which gene is most likely to cause the phenotype in this family?**

- A *DMD* (dystrophin)
- B *FBN1* (fibrillin 1)
- C *GAA* (alpha-glucosidase)
- D *HFE* (homeostatic iron regulator)
- E *TTN* (titin)

9. A man has an inherited cardiac condition and is prescribed Mavacamten.

**What is the specific inherited cardiac condition for which this drug is approved?**

- A Aortic dilatation
- B Arrhythmogenic right ventricular cardiomyopathy
- C Brugada syndrome
- D Hypertrophic cardiomyopathy
- E Long QT syndrome

10. A 40-year-old man has cerebellar dysplastic gangliocytoma (Lhermitte-Duclos disease) on a brain MRI scan.

**Which other feature is most likely?**

- A Cutaneous neurofibromas
- B Fibrofolliculomas
- C Hemihypertrophy
- D Macrocephaly
- E Renal cell carcinoma

11. A 60-year-old woman has a hormone sensitive breast cancer. She had a previous contralateral triple negative breast cancer at age 37. Her family history is unremarkable.

**Investigations:**

*BRCA1* and *BRCA2* analysis: No pathogenic variant identified.

**Which of these genes is most likely to have an associated pathogenic variant?**

- A *APC*
- B *BAP1*
- C *BRIP1*
- D *MSH6*
- E *PALB2*

12. A 7-year-old girl has mild developmental delay, self-injurious behavior, hypotonia, and obesity. A heterozygous deletion of 17p11.2 confirms Smith-Magenis syndrome.

**Which is the most characteristic other feature of the patient's condition?**

- A Absence seizures
- B Ataxic gait
- C Fasciculations
- D Immune deficiency
- E Sleep disturbance

13. A 5-year-old boy has developmental delay, ventricular septal defect, choanal atresia, external ear malformation, hearing loss, facial nerve palsy, and genital hypoplasia. His height and weight are less than the 3<sup>rd</sup> percentile.

**What is the most likely diagnosis?**

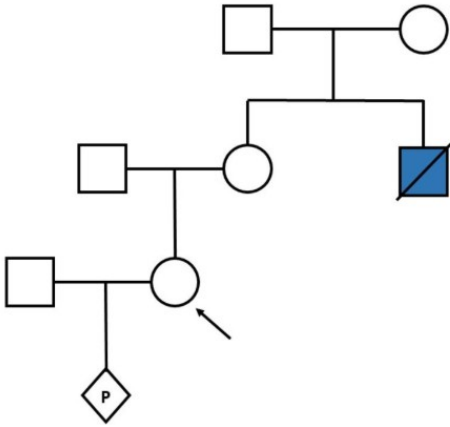
- A 22q11.2 deletion syndrome
- B BOR syndrome
- C CHARGE syndrome
- D Möbius syndrome
- E VATER association

14. A 52-year-old man has pulmonary fibrosis and anaemia. His hair turned grey at age 35 years. He has brittle nails.

**Which abnormal finding concerning chromosomes would you expect?**

- A Centromeric instability
- B Disturbed methylation pattern
- C Increased radiation-induced chromosome breakage
- D Increased sister chromatid exchange
- E Telomere shortening

15. A 28-year-old woman is pregnant. Her maternal uncle had classical Duchenne Muscular Dystrophy (DMD). There is no other family history of muscle disease.



**What is the approximate risk that the fetus is affected with DMD?**

- A 1%
- B 4%
- C 12%
- D 16%
- E 25%

Question	Correct answer
1	B
2	D
3	A
4	E
5	E
6	E
7	A
8	E
9	D
10	D
11	E
12	E
13	C
14	E
15	B