Clinical Genetics – Finding the Needle in a Haystack

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(if it’s even there!)

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Hereditary Cancer Syndromes
Distribution of Cancer

- **Hereditary**
  - Gene mutation is inherited in family
  - Significantly increased cancer risk

- **Familial**
  - Multiple genes & environmental factors may be involved
  - Some increase in cancer risk

- **Sporadic**
  - Cancer occurs by chance or related to environmental factors
  - General population cancer risk
**Cancer Syndromes by Primary Cancer Site**

**Breast Cancer**
- Hereditary Breast-Ovarian Cancer
- Cowden syndrome
- Li-Fraumeni syndrome
- Peutz-Jeghers syndrome

**Ovarian Cancer**
- Hereditary Breast-Ovarian Cancer
- Hereditary Nonpolyposis Colon Cancer/Lynch syndrome
- Cowden syndrome
- Multiple Endocrine Neoplasia, Type I

**Thyroid Cancer**
- Cowden syndrome
- Multiple Endocrine Neoplasia, Type 1
- Multiple Endocrine Neoplasia, Type 2
- Peutz-Jeghers syndrome
- Familial Adenomatous Polyposis

**Colon Cancer**
- Hereditary Nonpolyposis Colon Cancer/Lynch syndrome
- Familial Adenomatous Polyposis
- MUTYH-associated Polyposis
- Cowden syndrome

**Uterine Cancer**
- Hereditary Nonpolyposis Colon Cancer/Lynch syndrome
- Cowden syndrome
- Li-Fraumeni syndrome
- Peutz-Jeghers syndrome

Pharmacogenomics
Mutation vs. Polymorphism
Central Dogma of Biology

Mutation

Genetic Condition

DNA -> Transcription -> RNA -> Transport to cytoplasm for protein synthesis -> Translation -> Protein
Polymorphism

Central Dogma of Biology

DNA → Transcription → RNA → Transport to cytoplasm for protein synthesis → Translation → Protein

?Genetic Predisposition?
• Proper patient
• Proper test
• Proper circumstances
• Proper consent

Uncertainty!
Who,
What,
When,
Where,
Why,
How...?
Thank you for your attention