What the resource is, how it is used, & opportunities for future use

Gene Discovery

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"DNA sequencing-based gene discovery"

- Platform
  - Massively parallel sequencing (MPS)
  - HRM
  - Sanger sequencing
- Target
  - Whole-genome
  - Whole-exome
  - Specific targets/gene-centric

The *RINT1* example

CANCER DISCOVERY

Rare mutations in RINT1 predispose carriers to breast and Lynch Syndrome-spectrum cancers

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The *RINT1* example

- Highly selected pedigrees – whole-exomes
  - *FAVR* (*BMC Bioinformatics* 2013)
  - *AnnoKey* (*Source Code for Biology and Medicine* 2014)
- Targeted sequencing in multiple-case families (MPS)
  - Opportunistic - part of a much larger panel
- Targeted sequencing in breast cancer cases and controls (U40) using a population-based family design
  - Allows a range of analyses (e.g. OR, SIR, IRR)
  - HRM and Sanger!

PEDIGREE

Pathology, Epidemiology, DNA, Informatics and Genetics:
A Research Enabling Enterprise

Hi-Plex
Simple, accurate, cost-effective targeted MPS

- *BioTechniques* 2013
  - Proof of concept 60-plex format (PGM IonTorrent)
- *Analytical Biochemistry* 2013
  - Cross-platform compatibility (IonTorrent and TruSeq chemistries)
- *BMC Medical Genomics* 2013
  - High-throughput screening demonstration
- *Source Code for Biology and Medicine* 2014
  - ROVER variant-calling software
- *Journal of Something or Other* 2014
  - Hi-Plex/K-plex
- *Another Journal* 2014
  - Clinic-based *PALB2* screening
- and others…