Australian Genomics

Research Snapshot

June 2021

PanelApp Australia

PanelApp Australia is an open platform that allows Australian laboratories, clinicians and researchers to share structured gene-disease validity assessments; create and compare evidence-based virtual gene panels for genomic analysis; and contribute towards national and international efforts to establish consensus gene-disease relationships.

Background

Evidence that a gene is linked to a particular disease is a key component of genomic analysis and variant interpretation.

Focussing analysis on genes known to be causative for a particular clinical presentation, such as epileptic encephalopathy or primary immunodeficiency, increases diagnostic yields and efficiency. However, knowledge regarding gene-disease relationships is constantly evolving in light of new gene discoveries, making the creation and maintenance of knowledge databases a resource-intensive, largely manual process.

Many Australian laboratories, clinical services and research groups create and maintain their own lists of genes associated with particular conditions, which are then used as part of genomic data analysis and interpretation. Similar efforts are under way by many international groups including the Genomics England PanelApp, the ClinGen consortium, OMIM, Orphanet and the DDD study.

These gene-disease validity assessments are not in readily sharable format, leading to duplication of effort and inefficiency.

Sharing gene-disease curation effort on a national and international scale has the potential to promote evidence-based practice and to accelerate the development of robust, up-to-date resources meaning more patients will receive an accurate and timely diagnosis from genomic testing.

Project aims

The aim of the project is to provide an open platform for Australian laboratories, clinical and research groups to record and share structured gene-disease validity assessments.

The open nature of the platform allows the crowdsourcing of contributions from many experts, which will facilitate the timely identification of newly published evidence regarding gene-disease associations.

The platform can be used to create and manage virtual gene panels used in genomic analysis. The establishment of national consensus in specific disease areas such as renal genetics or cardiology will be supported by enabling rapid virtual panel comparison and discrepancy resolution.

Australian Genomics has worked in partnership with **Genomics England** to deploy a local instance of an open-source platform, PanelApp which was originally developed for the **100,000 Genomes Project.**

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Future co-development will aim to enable the sharing of notifications and reviews between the two instances, and potentially with other members of the Gene Curation Coalition such as ClinGen.

Key products

PanelApp Australia is an open platform designed to allow Australian laboratories, clinical services and research groups to:

- Record and share gene-disease validity assessments using a structured format that allows comparison and critical appraisal of evidence.
- Create and maintain virtual gene panels used in genomic analysis for specific indications such as epileptic encephalopathy or primary immunodeficiency, with full documentation and version control.
- Enable a large number of national and international experts to contribute towards creating the evidence base for gene-disease validity assessments, while final decision about the content of diagnostic panels remains with the diagnostic laboratories.
- Allow rapid comparison between panels from different providers with the aim of establishing national consensus and best practice.
- Link with international efforts in this area, in particular the Genomics England PanelApp, further accelerating the process of discordance resolution and rapid integration of new knowledge about gene-disease associations into diagnostic practice.

The consolidation of multiple disparate silos of gene-disease validity assessment activities into a single open national platform will reduce the gene curation burden on individual laboratory and clinical services, while improving diagnostic outcomes for Australian patients.

Potential impacts

PanelApp Australia aims to share information about clinically curated genes to:

- Combine siloed information and expertise for increased, faster and more robust diagnoses across Australian laboratories.
- Reduce the overall burden on individual laboratories in creating and maintaining virtual gene panels by reducing duplication of effort.
- Reduce the risk of missed diagnoses by sharing knowledge about new gene-disease associations in an open and readily accessible way.
- Standardise and improve practices around gene-disease validity assessments and virtual gene panel design across Australia, and align with emerging international best practice and terminology.
- Facilitate knowledge transfer between the Australian clinical genomics community and international data sources, benefiting patients in Australia and globally.

Conclusion

We anticipate that PanelApp Australia will contribute significantly towards more efficient and robust genomic diagnostic practices across Australia and internationally.

Go to panelapp.agha.umccr.org

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