CENTER FOR PRECISION ANIMAL MODELING

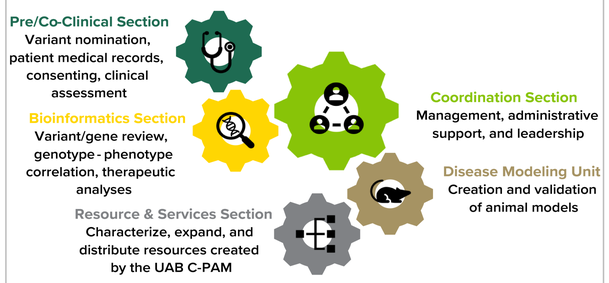
UAB MEDICINE
The University of Alabama at Birmingham

Directors: Drs. Bradley Yoder, Matthew Might, and Elizabeth Worthey
Section Directors/Co-Leads: Drs. Matthew Alexander, Bob Kesterson, Bruce Korf, Brittany Lasseigne, John Parant, Deeann Wallis

Overview

The UAB Center for Precision Animal Modeling (CPAM) is dedicated to **advancing the understanding of human genetic disorders through the generation, analysis, and distribution of precision models**.

Our mission is to serve as a **national resource**, facilitating the pursuit of disease mechanisms, the development of diagnostic evidence, and the identification of potential therapeutics.



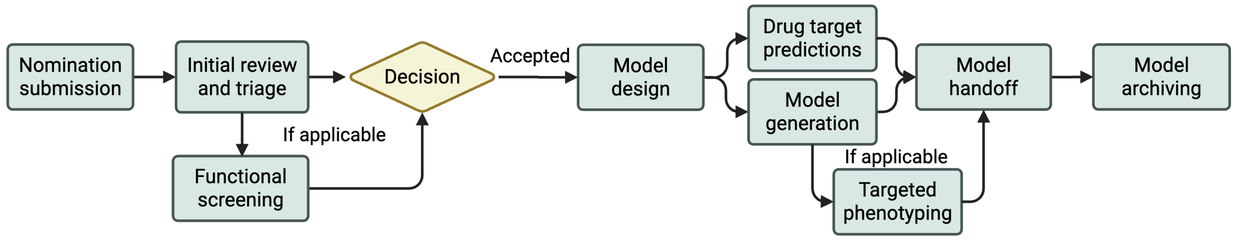
Cores within CPAM, led by CPAM Directors (CS), Drs. Bruce Korf & Matt Might (PCS), Drs. Liz Worthey and Brittany Lasseigne (BIS), Dr. John Parant (DMU), and Drs. Deeann Wallis and Matt Alexander (RSS).

Impact

- **169**+ variant nominations submitted by patient foundations, clinicians, and researchers worldwide.
- **134**+ precision models generated (or in production) across human cell (iPSCs), *Xenopus* (for rapid functional screening), zebrafish, mouse, rat, and *C.elegans* systems.
- Innovative tools developed, including **Rosalution** (open-source collaborative variant analysis) and **CoSIA** (cross-species transcriptomic comparison platform).
- Advanced understanding of rare disease mechanisms.
- Enabled therapeutic discovery, including antisense oligonucleotide and nonsense-suppression strategies.

Current CPAM Collaborators

Workflow



CPAM Workflow: From Nomination to Model. Nominations undergo structured review and triage, with optional functional screening to inform prioritization and decision-making. In silico drug target prediction occurs in parallel with model generation to guide downstream experimental planning. Approved projects progress through model design, generation, targeted phenotyping (if applicable), model handoff, and repository submission.

Models Available

Functional Screening
- Overexpression in *Xenopus laevis* embryos
- Zebrafish F0 crispants

Cell Lines
- Engineered human iPSCs
- Edited immortalized cell lines

Zebrafish
- *Danio rerio*
- CRISPR-edited knock-ins (or knock-outs)

Mouse
- *C57BL/6J* background
- CRISPR-edited knock-ins (or knock-outs)

Rat
- *Sprague Dawley* background
- CRISPR-edited knock-ins (or knock-outs)

Services & Deliverables

Type	Included Deliverable/Service Description	Additional Services (for fee)
Resource (Model)	**Validated Disease Model** - the genetically engineered model (iPSC, cell, zebrafish, mouse, or rat) carrying the patient's variant. **Model Archiving** – deposition of model in national repositories.	**Model distribution/shipping to external (outside UAB) investigators.** **Generation of models above core capacity** (e.g., additional rat/mouse lines). **Customized genetic backgrounds**
Technical	**Disease Pathway and Functional Assay Report** - report documenting the specific molecular pathways affected by the variant and outlines the assays developed to confirm function. **Final Variant Analysis, Screening, and Model Pathology Report** - comprehensive report integrating all data gathered throughout the pipeline, including variant analysis, model generation details, and the pathology report.	**Advanced phenotyping** (e.g., specialized behavioral testing or molecular and cellular analyses.) **Generation and analysis of advanced omics data** (e.g., RNA-Seq) for custom projects.
Therapeutic Guidance	**Therapeutic Analysis Report** - report identifying and prioritizing novel drug targets and repurposing candidates based on AI/ML and network analysis of gene-drug interactions.	**Preclinical drug screening** and efficacy testing in animal or iPSC models. **Custom drug-gene network analysis**
Clinical Insights	**Phenotype Validation & Clinical Curation Report** - if applicable, a report detailing the clinical review of all generated data, evaluating model relevance, updating ACMG classifications, etc.	

Nominations

Who can submit a nomination?

Collaborators, clinicians, genetic counselors, researchers, patient foundations, and patient/family advocates.

What is CPAM looking for in a nomination?

- **Scientific Rationale & Feasibility**
  - Clear biological hypothesis or mechanistic rationale.
  - Strong gene–disease association *or* compelling reason to study a gene of uncertain significance.
  - Disease-relevant readouts (molecular, developmental, behavioral, structural).
  - Evidence the biology is model-able (gene conservation, pathway relevance).
  - No suitable existing model **or** clear need for an improved model.
  - Feasible in CPAM species.
- **Translational & Research Impact**
  - Defined downstream purpose (functional assays, mechanistic studies, therapeutic testing).
  - Committed research partner ready to use the model once generated (or an identified path to collaboration).
  - Addresses an unmet need (rare disease, understudied gene, unclear mechanism).

Interested?

Website: sites.uab.edu/cpam/ or QR code below

Nomination form can be found under the "Variant Submission" tab, or by clicking "Begin Variant Submission" button on the main page.

Email:
cpam@uab.edu

QR code to CPAM Website