The Knockout Mouse Project, and Image Informatics: <u>The Information is in the Image</u>

James Denegre The Jackson Laboratory











Leading the search for tomorrow's cures

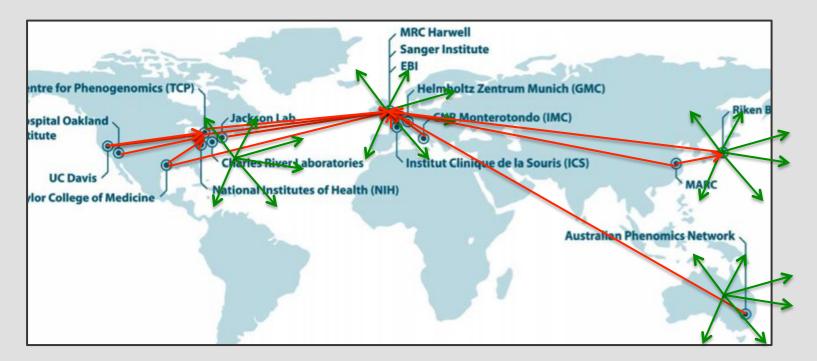
The Knockout Mouse Project (KOMP) is an international collaborative effort to make, and phenotype, a knockout mouse line for every gene in the genome.

🔒 https://www.mousephenotype.org/data/genes/MGI:103226 🗸 C 🔍 Search						
Jax	8 Google 😣 PubMed	🎼 MGI 💠 IMPC 💠 Phe	enoDCC 🗌 LIMS 🥑 Ens	mbl 📋 OMERO 💠 micro	CT 💿 Eurexpress 🔁 O	PT 🧲 EMAP 🗍 NDP.serv
	▲ Gene Phenotype Associations Heatmap Expression Impc Images Order Mouse and ES Cells					
	✓ Zygosity phenodeviance 🛛 🖉 No zygosity phenodeviance 🦞 Sexual dimorphism detected 🖓 No sexual dimorphism detected					
	Significant Insignificant Include baseline 🕑 Download all 🖲 Download significant (?) Help					
	Show gradient p-value threshold: 0.0001					
		Adipose tissue	Behavior / neurological	Cardiovascular system	Craniofacial	Embryogenesis
	Cox7c	Het P	Het 🖤	Het	Het O	
		Growth / size / body	Hearing / vestibular / ear	Hematopoietic system	Homeostasis / metabolism	Immune system
	Cox7c	Het P	Het 💭	Het O	Het 🧐	Het O
		Integument	Limbs / digits / tail	Liver / biliary system	Mortality / aging	Mouse anatomical entity
	Cox7c	Het	Het 📮		Hom @	
		Muscle	Nervous system	Other	Pigmentation	Renal / urinary system
	Cox7c		Het 💇	Het	Het 👰	

Data for Cox7c adult heterozygotes



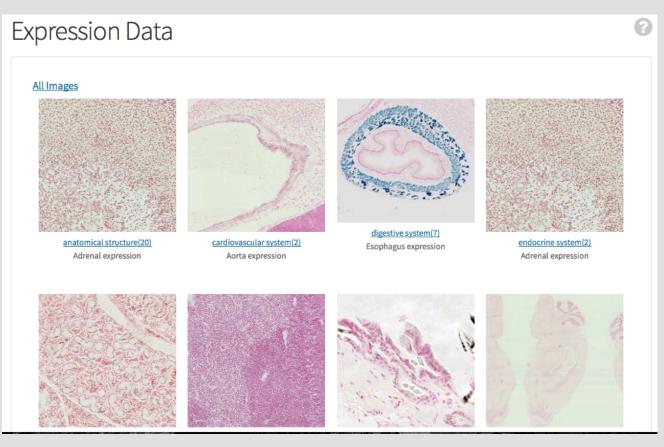
Much of the data are images, and this is an enormous amount of image data to transfer from each Center to the Data Coordination Center (DCC).



Are there advantages to hosting image data locally, or semi-locally, under the organizational umbrella of the DCC? The JAX is working with the DCC to pilot a "federated" OMERO server for JAX image data.



Annotation of images is currently manual.



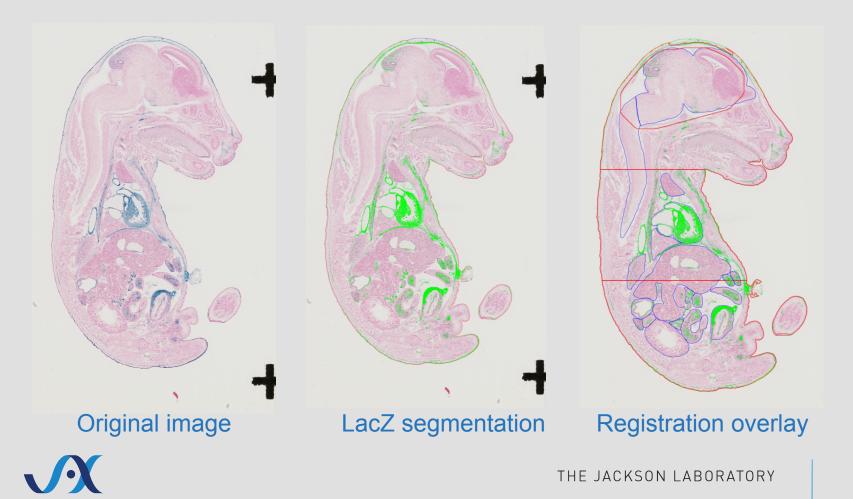
LacZ Image data, with thumbnails linking directly to complete digital slide on JAX server. Annotations of expression are manual. We are in the process of moving all these data to our OMERO server



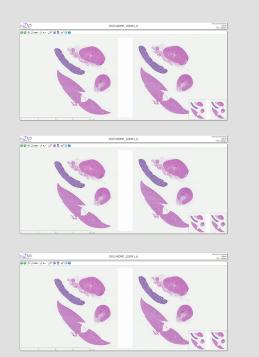
Information Resides in the Image

We want to read the information from the image directly, onboard in OMERO

Automated LacZ Detection and Quantification; algorithm by ImageIQ



Perhaps we can read more challenging features, through feature recognition software.



WT data, read as a baseline

Algorithm will read 20,000 KO samples, and identify those which are "different".



