Resources and Emerging Technologies

The annual Xenopus "PI" meeting was held at the International Xenopus Conference on September 1, 2016. Since the community would like all levels of researcher involvement, the meeting will henceforth be called the "Resources and Emerging Technologies" Meeting.

- In odd years (e.g., 2017) it will be held at the National Xenopus Resource at the Marine Biology Laboratory in Woods Hole, MA, USA (see below).
- In even years (e.g., 2018), it will be held during the International Conference.

Xenopus Resources and Emerging Technologies Meeting (previously known as PI meeting): August 26th – 29th, 2017, http://www.mbl.edu/xenopus/pi-meeting-2

September 1, 2016 meeting agenda

- "Refining the laboratory husbandry of the African clawed frog, Xenopus laevis", Lottie Hosie (Univ. Chester)
- Xenbase: Aaron Zorn (Cincinnati Children's)
- Training Courses: Marko Horb (NXR)
- Resource Centers: Matt Guille (Univ. Portsmouth)
- Reagent Pipelines –
  ORFeome: Todd Stukenberg (Univ. Virginia)
  Proteomics: Leon Peshkin (Harvard Univ.)
- International Xenopus Board: Sally Moody (George Washington Univ)
- 2016 Xenopus White Paper: Amy Sater (Univ. Houston)
- Open Discussion

University of Chester

National Centre for the Replacement Refinement & Reduction of Animals in Research

Amphibian Behaviour & Endocrinology Group
Department of Biological Sciences, University of Chester

NC3Rs funded project:

"Refining the laboratory husbandry of the African clawed frog, *Xenopus laevis*"

Goal – to develop a non-invasive corticosterone assay combined with behaviour measures to identify where and how to improve welfare with underpinning science.

Key findings so far:

- **Dark tank background reduces physiological & behavioural stress measures (Holmes, Emmans, Jones, Coleman, Smith & Hosie (2016) Appl Anim Behav Sci -avail online)**
- **Transport elevates physiological & behavioural stress measures , recovery takes many days** (MS submitted)
- **Enrichment reduces physiological measures (behaviour data pending)** (MSS in prep)
- **Males and females respond differently to some stressors**
- **Any feedback and discussion very welcome!**

Team: Charlotte Hosie (PI) (l.hosie@chester.ac.uk) Tessa Smith (Co-PI) (tessa.smith@chester.ac.uk) Andrew Holmes (Postdoc) (a.holmes4@liverpool.ac.uk) Chris Emmans (Research Tech)

Xenbase

- Xenbase.org 4.0 update: new infrastructure, ongoing integration of new genomes and new support for RNA-seq & ChIP-seq data
- Xenbase is coordinating gene model annotation with Genome consortium, NCBI and the community (contact: Joshua.Fortriede@cchmc.org)
- Coming soon – phenotype annotation and enhanced support for human disease modeling
- Please cite Xenbase: Karpinka JB, Fortriede JD, Burns KA, James-Zorn C, Ponferrada VG, Lee J, Karimi K, Zorn AM, Vize PD (2014) Xenbase, the Xenopus model organism database; new virtualized system, data types and genomes. Nucleic Acids Research 43:D756-763 (PMC4384024)
- Xenbase and model organism databases are in danger of being dissolved. To ensure that Xenbase continues to exist, please send a letter to the NIH (NIH_Repository_Metrics_RFI@mail.nih.gov) explaining the value of Xenbase to your research by September 30. Read the full requests on the NIH Website NOT-OD-16-133.
- Please take the Xenbase-Stock Center Survey now

Questions? Email xenbase@ucalgary.ca

Xenbase is supported by NICHD P41 HD064556

2017 Training Courses at the NXR

Imaging Workshop

1) A primer on microscopes and optics with a focus on practical considerations.
2) Imaging immunostained Xenopus embryos in whole-mount.
3) Live imaging of cells and tissues in intact Xenopus using fluorescent fusion proteins.
4) Live imaging of cells and tissues in explants.
5) Computational post-processing of images for presentation/display.
6) Development of custom imaging assays for students.

August 20th – 26th, 2017

http://www.mbl.edu/xenopus/workshops/imaging-workshop

Xenopus Genome Editing Workshop

Theoretical and practical aspects of CRISPR/Cas9 and TALENs
Methods for genotyping (DSP, HRMA, T7E1, and others)
Maximizing target site choice and sgRNA design
Applications for the maternal host transfer technique combined with genome editing
Gene targeting and homology-directed repair
Circumventing lethal phenotypes
Xenopus genetics and husbandry issues arising in the creation of mutant lines
Both laevis and tropicalis will be used

August 28th – September 3rd, 2017

http://www.mbl.edu/xenopus/workshops/genomeediting-workshop

Resource Centers

Centre de Ressources Biologiques :
http://xenopus.univ-rennes1.fr/fr/vente/

National Xenopus Resource: http://www.mbl.edu/xenopus/

European Xenopus Resource Center (EXRC) :
https://xenopusresource.org

Xenopus laevis Resource for Immunobiology:
https://www.urmc.rochester.edu/microbiology-immunology/xenopus-laevis.aspx

National BioResource Project of Japan/Institute for Amphibian Biology:
http://www.nbrp.jp/report/reportProject.jsp?project=xenopus

EXRC@xenopus resource.org

Extended housing to provide clean *X. tropicalis* (now) and *X. laevis* (2017) animals.
>125 transgenic lines available and can be made to order.
Oocytes and egg extracts provided (extracts from tg frogs labeling sub-cellular structures being tested)
In situ/expression plasmid collection available
X. laevis BAC clones and ORFeome clones now available
Distribution of males as frozen sperm under test

New website with a search box that will show all of the resources we have associated with a gene – but this does **not** recognise pseudonyms!


Maya Piccinni – molecular resources


Ania Noble – animal resources

http://www.urmc.rochester.edu/smd/mbi/xenopus

Funded By NIAID

Director: Jacques Robert, *Department of Microbiology and Immunology. University of Rochester Medical Center, Rochester NY*

The *Xenopus laevis* Research Resource for Immunology (***XLRRI***) is home to the world's most comprehensive resource specializing in the use of *X. laevis* for immunological research. The *XLRRI* maintains and distributes animals and reagents not commercially available including:

- Genetically-defined (MHC homozygous) inbred strains (J & F) and clones (Isogenetic *laevis/ gilli hybrids)* as well as immunologically-relevant transgenic lines and clones
- Cell lines: J, F & LG fibroblasts lines, transplantable thymic tumor lines (15/0 & ff-2)
- Monoclonal antibodies specific for *Xenopus* B, T, NK cells; MHC I, II, Igs, CD45
- Ranaviruses (RV) isolates; knock-out and knock-in RV recombinants.
- The *XLRRI* trains visiting students and established scientists; and provide technical assistance by phone, e-mail and through a website (http://www.urmc.rochester.edu/smd/mbi/xenopus)
- Success of the *XLRRI* is evidenced by the increasing interest of new investigators, who request materials and assistance including comparative immunologists and virologists, conservation biologists, veterinarians, ecologists

Institute for Amphibian Biology (IAB)

(1) Institute for Amphibian Biology (IAB) in Hiroshima is supported by National Bio-Resorce Project (NBRP) of the Japanese government.

(2) IAB is specialized for *X. tropicalis* resources and developing inbred *X. tropicalis* strains.
[Ref. for the inbred strains: PLoS ONE 10(7): e0133963 (2015)]

(3) IAB is also distributing genetic materials such as cDNAs for WISH (BAC clones in future) and convenes *Xenopus* training courses every year.

(4) IAB is accepting graduate students from other Asian countries to promote *Xenopus* research.

(5) IAB, EXRC and NXR are convening monthly Skype meeting in the past five years.

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NBRP

Reagent Pipelines

ORFeome Project:

- An ORFeome is a set of clones (available as transformed bacteria) in which each Open Reading Frame (ORF) is cloned into a Gateway compatible vector for easy transfer to any Gateway destination vector.
- The First Version of the Xenopus laevis ORFeome, in which we have moved 90% of the available EST clones into a Gateway vector, is available as individual clones or the entire set from numerous distributors. (see EXRC: https://xenopusresource.org/about-orfeome)
- We have funds to complete a version 1.0 of the Xenopus tropicalis ORFeome and it will be available later this year.
- We have applied for funds from the NIH to generate version 2.0 of the Xenopus tropicalis ORFeome, in which we will generate clones for the missing ~50% of genes for which there are currently no available full-length ESTs, using RT-PCR to amplify the best predicted mRNA.

Proteome Database: Kirshner.med.harvard.edu/MADX

Write to Leonid Peshkin (pesha@hms.harvard.edu) for data re your favorite gene

International Xenopus Board

Incorporated as a non-profit organization to further the use of Xenopus in scientific inquiry, by:

- organizing a biennial international scientific conference
- helping to organize an annual Resources and Emerging Technologies meeting
- representing and promoting communication among Xenopus researchers, and
- promoting the development and use of Xenopus resources.
- http://www.xenbase.org/entry/doNewsRead.do?id=249

2016 Xenopus White Paper:

http://www.xenbase.org/entry/doNewsRead.do?id=220

Please feel free to cite the White Paper in your grant applications.
The White Paper has also been reorganized into a review article that you also can cite:
Sater A, Moody SA. 2017. **Using Xenopus to understand human disease and developmental Disorders.** Genesis. 2017 Jan 17. doi: 10.1002/dvg.22997. [Epub ahead of print] Review. PMID: 28095616

Open Discussion

- Create a committee that includes physician-scientists to promote Xenopus as a model for human disease.
- Use the 2016 White Paper to justify using Xenopus as a model.
- Put together a Special Issue of genesis, The Journal of Genetics and Development, to highlight recent advances in Xenopus research and resources.
- Cite Resource Centers and Xenbase in your publications.