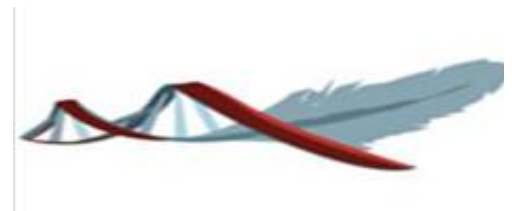


BirdBase Update:

Progress towards standardized gene nomenclature and tissue specific gene expression.

Fiona McCarthy, Carl Schmidt,
Parker Antin, Shane Burgess



Summary

1. What's in a name? A CGNC update.
2. BirdBase – a flock of genomes and CoGE
3. Chickspress – calling all expression data.
4. Ontology development: GOing from genotype to phenotype.
5. AgBase – expanding to poultry; seeking workshops for 2012.

1. Standardized Gene Nomenclature

- ❑ CGNC online database & regular data releases established.
 - incorporated into NCBI Entrez Gene
 - working to link with Ensembl, HGNC
- ❑ Human:Chicken 1:1 orthologs – automatically assigned nomenclature based on human gene names.
 - checked manually by CGNC biocurator(s)
- ❑ Manual biocuration focused on:
 - MHC genes (approx. 115)
 - hen egg genes (332 genes)

A Model Organism Database for Birds

Gene QuickSearch

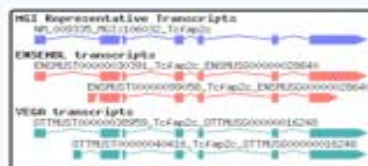
Explore BirdBase:

<http://birdbase.arizona.edu/birdbase/>

Genomes



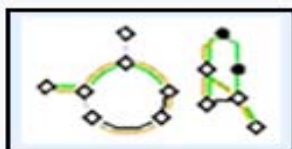
Genes



Gene Expression



Pathways



Annotation



Wiki



CGNC

 **Chicken Gene
Nomenclature Consortium**

The 6th International Chick Meeting

Roslin Institute, University of Edinburgh
 Sept. 17-20, 2011. Click [here](#) for information



AgBase is a curated resource for functional analysis of agricultural plant and animal gene products including Gene Ontology annotations.



<http://www.agbase.msstate.edu/>

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Journal Database

Proteogenomics

Microbial GBrowsers



AgBase Search

(For more information click [here](#), For help using this tool click [here](#))

Select Database:

Browse By:

Enter Multiple Queries (new line separated)

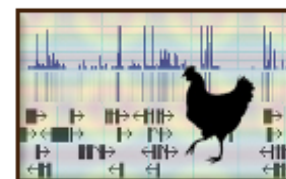
Search

Reset

[Search AgBase using BLAST](#)



[Bovine Gene Atlas](#)



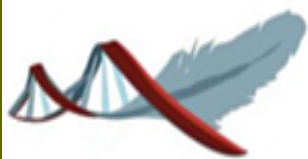
[Chickspress](#)



[Bird Base](#)



[Chicken Gene Nomenclature](#)



Chicken Gene Nomenclature Consortium

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<http://www.agnc.msstate.edu/>

CGNC Search:

Search Type

Search

Human Chicken Ortholog Predictions Search:

Search Type

Ortholog Type

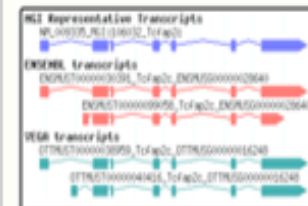
Search

BirdBase
Component
Partners:

Genomes



Genes

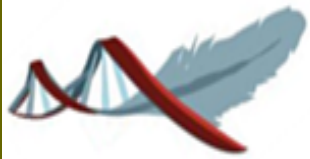


Gene Expression



With special thanks to the NRSP8
Bioinformatics program.

Nomenclature Guidelines



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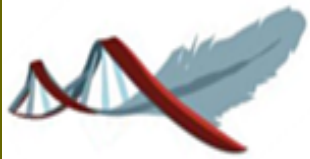
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- Guidelines for chicken gene nomenclature available online (*under construction*).
 - based on HGNC guidelines

Nomenclature Requests/Feedback



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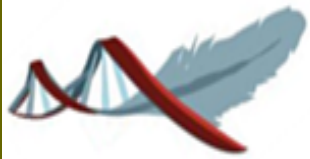


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- Guidelines for chicken gene nomenclature available online (*under construction*).
 - based on HGNC guidelines
- *But what if I don't like the nomenclature assigned to my favourite gene?*

Nomenclature Login



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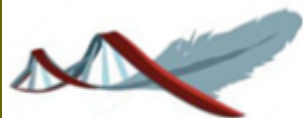
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- ❑ Guidelines for chicken gene nomenclature available online (*under construction*).
 - ❑ based on HGNC guidelines
- ❑ *But what if I don't like the nomenclature assigned to my favourite gene?*
- ❑ Calling all experts!



Chicken Gene Nomenclature Consortium

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STATISTICS

Species	Number of Genes	Genes With Nomenclature
Gallus gallus	23720	Automatic: 22715 Pending: 0 In Review: 0 Approved: 1005 Total: 23720

DOWNLOADS

Note: Checked columns will be included in a tab delimited file for your download. The columns will be ordered as in the list below.

Columns to Include

(required) AGNC ID

- ☒ Entrez Gene ID
- ☐ Entrez Gene Version
- ☒ Ensembl ID
- ☐ Ensembl Version
- ☒ Gene Symbol
- ☒ Gene Name
- ☒ Gene Synonym
- ☒ Species
- ☒ Curation Status
- ☒ Last Edit Date

Species to Include

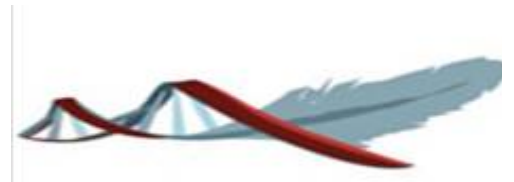
All ▼

Records to Include

- ☐ Automatic
- ☐ Pending
- ☐ In Review
- ☒ Approved

[Download](#)

CGNC Future Work



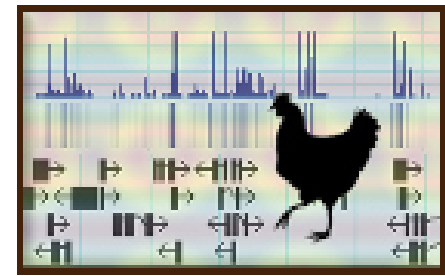
- ❑ Make manual biocuration list available.
- ❑ Grow links with public resources – Ensembl.
- ❑ Link with other nomenclature projects (e.g., HGNC).
- ❑ Expanding nomenclature to other birds (and Archosaurs).

2. BirdBase Progress Report



- Working with BGI Bird genome group to develop bird genome resources.
- Comparative genome browser for approx. 50 bird genomes?
- iPlant Comparative Genome browser (CoGe) – developing this platform for BirdBase.

3. Chickspress



- ❑ A compendium of chicken expression data.
- ❑ Displays tissue-specific gene product expression data.
 - transcript data (RNA-Seq)
 - proteomic data
 - proteogenomic data (unannotated genes)
- ❑ Collected 30 male and female Red Jungle Fowl tissues.
- ❑ Chicken expression data from MSU, UA, UD.



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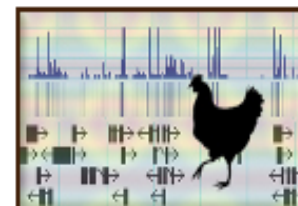
Select Database:

Browse By:

Enter Multiple Queries (new line separated)



[Bovine Gene Atlas](#)



[Chickspress](#)



[Bird Base](#)



Chickspress

MISSISSIPPI STATE
UNIVERSITY

Tissue: --All Tissues--
Adipose
Breast
Embryo
Heart
Kidney

Experiment Types: --All Experiment Types--
Proteogenomic Mapping
Proteomics
Transcriptomics

Experiments:(No selection highlighted will show all experiments)

--All Experiments--
Adipose RJF Proteome
Area Pellucida Leghorn HH4
Breast Muscle RJF Proteome
Embryo Leghorn 7 days
Heart RJF Proteome
Ileum Leghorn 6 weeks

Transcriptomics Data:(No selection highlighted will show all transcriptomics data)

RPKM Values
Novel Exons without known genes
Novel Exons from known genes
RNASeq Reads xyplot

Search Region/Landmark: chr28:1..200000

(chr:startLoc..endLoc, Gene Symbols or Entrez Gene ID)

Number of experiments found: 21

Submit

Reset

Chickspress is based on the May 2006 chicken (*Gallus gallus*) v2.1 assembly produced by the Genome Sequencing Center at the Washington University School of Medicine in St. Louis, MO, USA (WUSTL).

Chickspress Team

Mississippi State University

Fiona McCarthy
Cathy Gresham
Philippe Chouvarine
Shane Sanders

University of Arizona

Shane Burgess
Ken Pendarvis
Amanda Cooksey
Parker Antin

University of Delaware

Carl Schmidt
Colin Kern

BirdBase Library Links

IBDV infection-Spleen

IBDV infection-Spleen Control

Ileum

Jejunum

Kidney

Liver

LMH Active 2

LMH Active 3

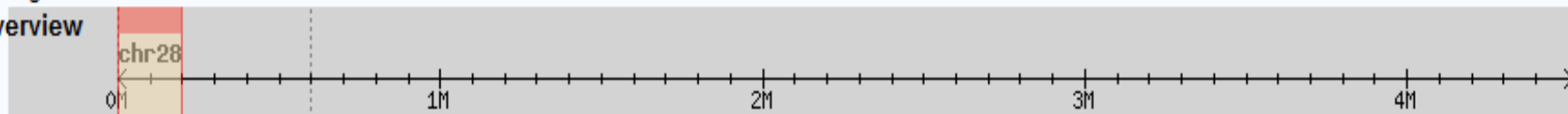
WHL embryonic brain

Data Source

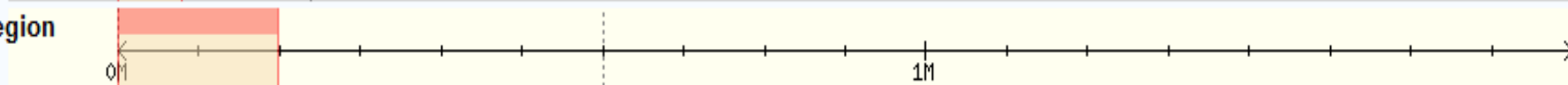
Gallus gallus

Scroll/Zoom: << < - Show 200 kbp + > >> Flip

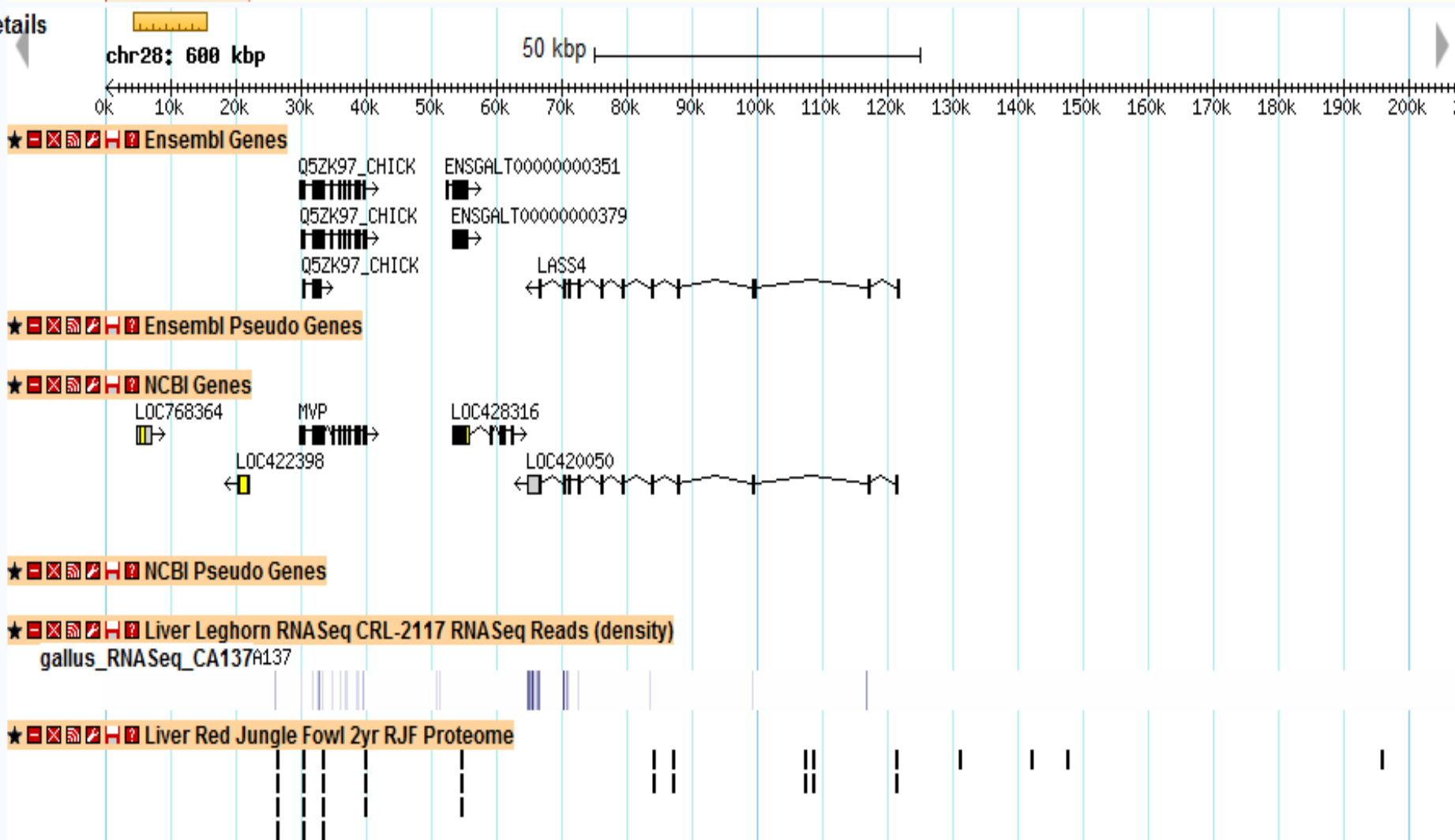
Overview



Region



Details



Chickspress: we want your data!



Chickspress

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calling on all
expression data!

Chickspress Metadata Login

* Required field

UserName*:

Password*:

Login

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4. Ontology development

- ❑ Phenotype – can be classified as physiology, behavior, anatomy.
 - Physiological – tryptophan metabolism
 - Behavior – flight, vocalization
 - Anatomy – beak shape, feather colour
- ❑ Gene Ontology (GO) – describes physiological & behavioral attributes.
- ❑ missing anatomy ontologies...

Chicken Anatomy Ontology

- ❑ NSF funded Phenotype RCN
- ❑ Asked to develop Avian Anatomy Ontology
 - Duncan Davidson (UK Medical Research Council) working on chicken developmental stages up to HH25-27.
 - we are working on adult anatomy.
- ❑ Currently have about 650 terms covering musculoskeletal and integument systems.
- ❑ Avian Anatomy Ontology development will facilitate annotation of poultry phenotypic data.

5. AgBase Progress Report

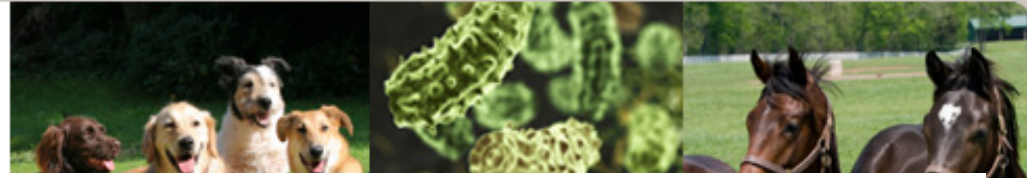


AgBase

- New AgBase grant (NIFA Grant no. 2011-67015-30332):
- Expand manual biocuration to other species (including turkey).
 - Will publish prioritized gene lists for manual biocuration on AgBase for public comment.
- Expanding annotation to data not covered by GO
 - e.g., tissue and cell expression, disease, drug effects



AgBase is a curated resource for
functional analysis of agricultural plant



Functional Modeling Workshops

- [Genomic Annotation and Functional Modeling Workshop](#), University of Kentucky: 15-16 August, 2011
- [National Biotechnology Development Agency Functional Modeling Workshop](#), NBS: 2-6 August, 2010
- [NMSU GO Workshop](#), New Mexico State University: 29 October, 2009
- [Texas A&M GO Workshop](#), Texas A&M University: 29 October, 2009
- [NCSU GO Workshop](#), North Carolina State University: 29 October, 2009
- [Functional and Systems Modeling Workshop](#), Iowa State: 11 June, 2009
- [Avian GO Workshop](#), MSU: 21-22 May, 2008

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[Search AgBase using BLAST](#)



Chicken Gene Nomenclature

Proteogenomics

Microbial GBrowsers

Acknowledgements

CGNC:

- Carole Nail, Philippe Chouvarine
- Swati Kumari, Yachi Spencer
- Janet Weber, Dave Burt
- Parker Antin, Shane Burgess, Carl Schmidt

BirdBase:

- Philippe Chouvarine
- Carl Schmidt, Parker Antin, Shane Burgess
- Eric Lyons, Nirav Merchant

Chickspress

- Cathy Gresham, Philippe Chouvarine
- Ken Pendarvis, Amanda Cooksey
- Carl, Schmidt, Susan Bridges, Parker Antin

Avian Anatomy Ontology:

- Radha Pulikanti, Duncan Davidson
- Samuel Camacaro, Heath Peebles
- Wasila, Melissa, Paul Mabee
- Shane Burgess/Dan Peterson

AgBase:

- Carl Schmidt, Vijay Shanker
- Ashique Mahmood, Catalina Tudor
- Cathy Gresham, Lakshmi Pillai, Tony Arick
- Shane Burgess, Susan Bridges

