Cre Portal (www.creportal.org) Tutorial

This tutorial contains two parts: first, a step-by-step example that you can use to follow along on your computer; and second, a short set of questions (with answers) for you to test your skills.

Aims

1. Find your way to the Cre Portal and search for a cre transgene or knock-in that uses a particular driver/promoter or is known to have activity in a particular anatomical/tissue system.
2. Explore the contents of the Results Page returned and learn about customizing it for your use.
3. Explore detailed information about the cre activity of a specific cre transgene or knock-in and learn about customizing the view and linking to other data.
    - Cre construct information
    - Availability of mouse resources from repositories
    - Specifics of cre activity/specificity for a transgene in an anatomical location (here reproductive system)
    - Images
    - Publications involving this cre transgene/knock-in
    - Phenotypes observed when mice carrying this cre transgene/knock-in were mated to different gene knock-out heterozygotes
4. Return to the Cre Portal main page and view the data report for 'all cre transgenes/knock-ins'.

Introduction

Cre is currently the most commonly used recombinase. It catalyzes site-specific recombination of DNA between loxP sites, thus making possible conditional mutagenesis, where specific genes can be knocked-out in particular tissues and at particular developmental time points. Other non-cre recombinases (such as Flp, Dre, phiC31, etc.) and various inducible forms of recombinases have been and are being developed. The Cre Portal contains curated data about all recombinase-containing transgenes and knock-ins developed in mice to provide a comprehensive resource delineating known activity patterns and allowing users to find relevant mouse resources for their studies.

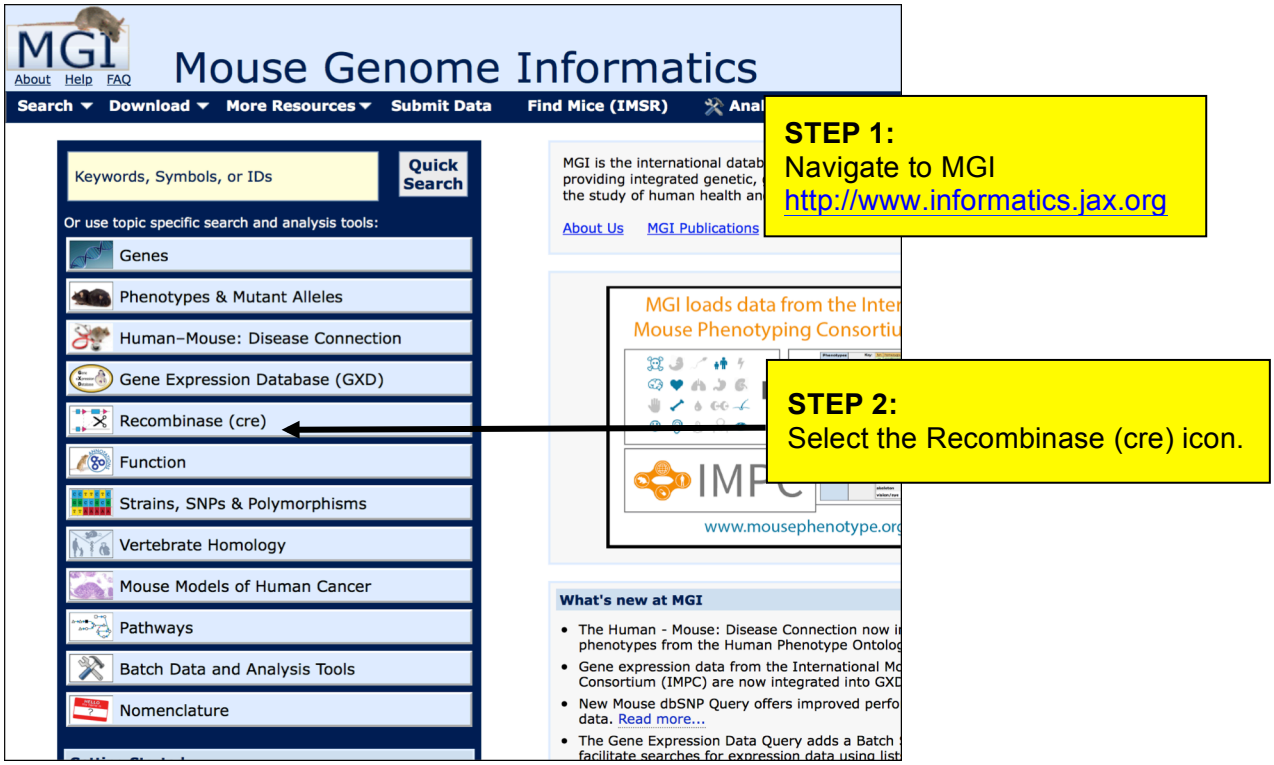
At present, researchers can search for "cre" data using the driver/promoter gene symbol or using an anatomical system in which the "cre" is expressed. In addition, data are available for all cre's in a HTML viewable table, or as downloadable tab-delimited text.

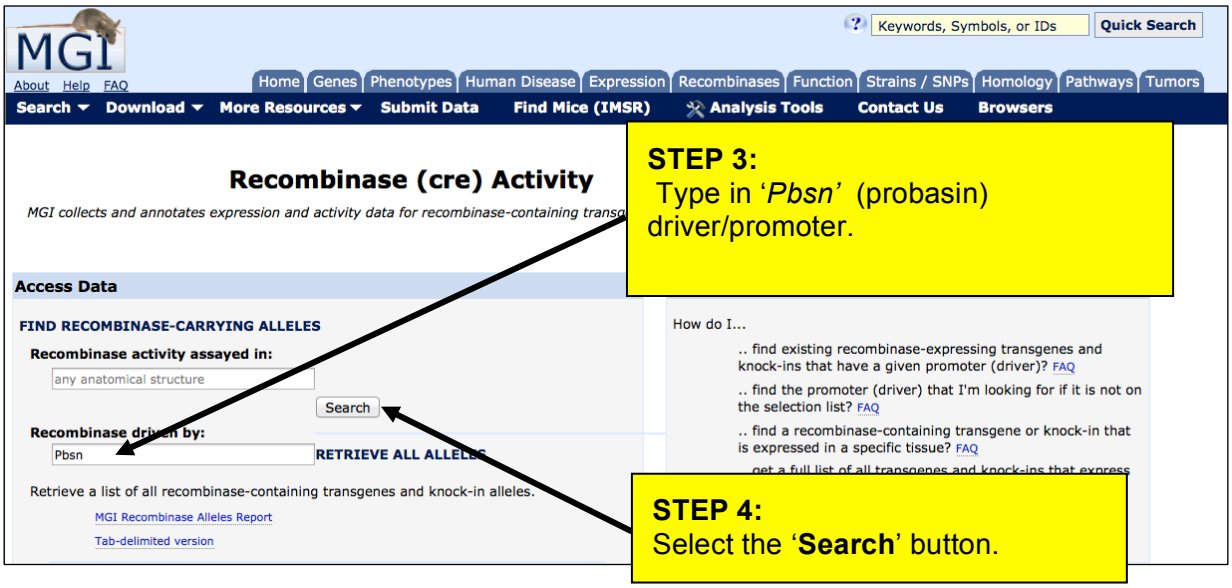
Help with using the Cre Portal is available on the www.creportal.org site. See the list of FAQs in the right-hand column or the 'Help Documents' tab in the bottom section of this page. You can also use the 'Contact Us' link in the navy blue navigation bar near the top of any of our web pages.

Worked examples:

1. Find the Cre Portal and search for a cre transgene or knock-in with a particular driver/promoter [or with cre activity in a particular anatomical/tissue system].

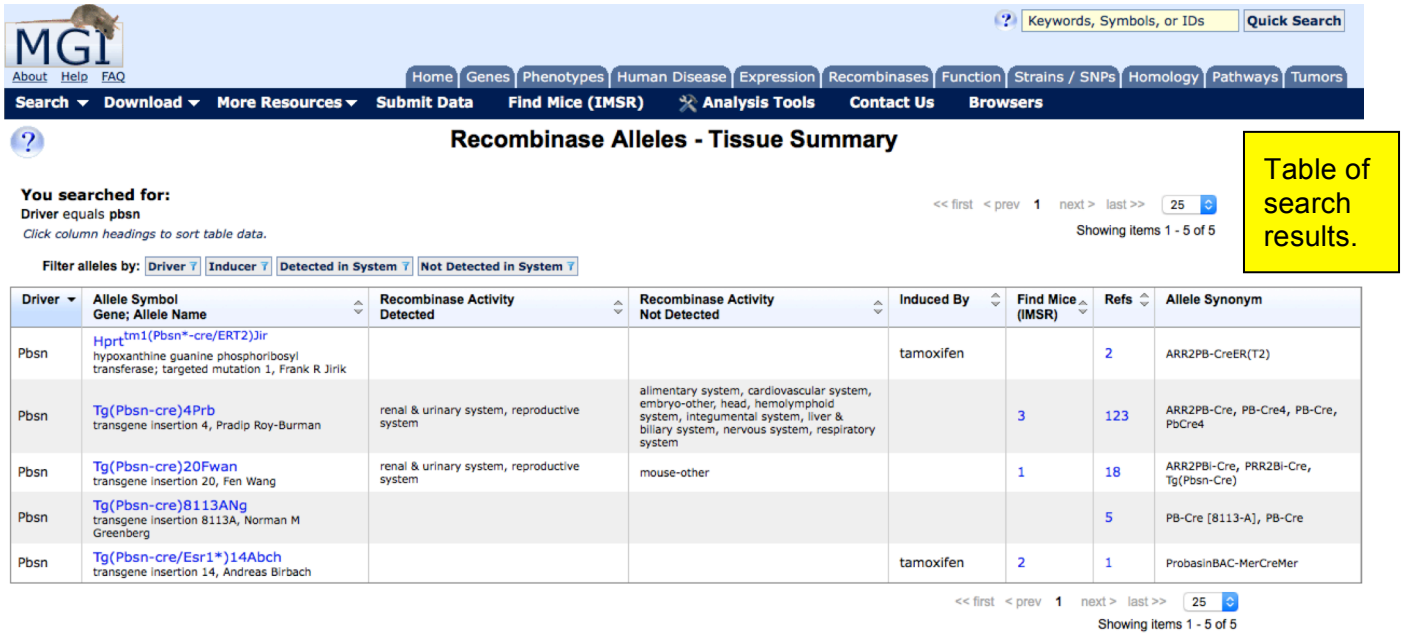
Type the URL: http://www.creportal.org into your web browser; OR go to the Mouse Genome Informatics (MGI) homepage (http://www.informatics.jax.org) and select the Recombinase (cre) icon. The following illustrates the latter route: visiting the MGI homepage and selecting the icon.



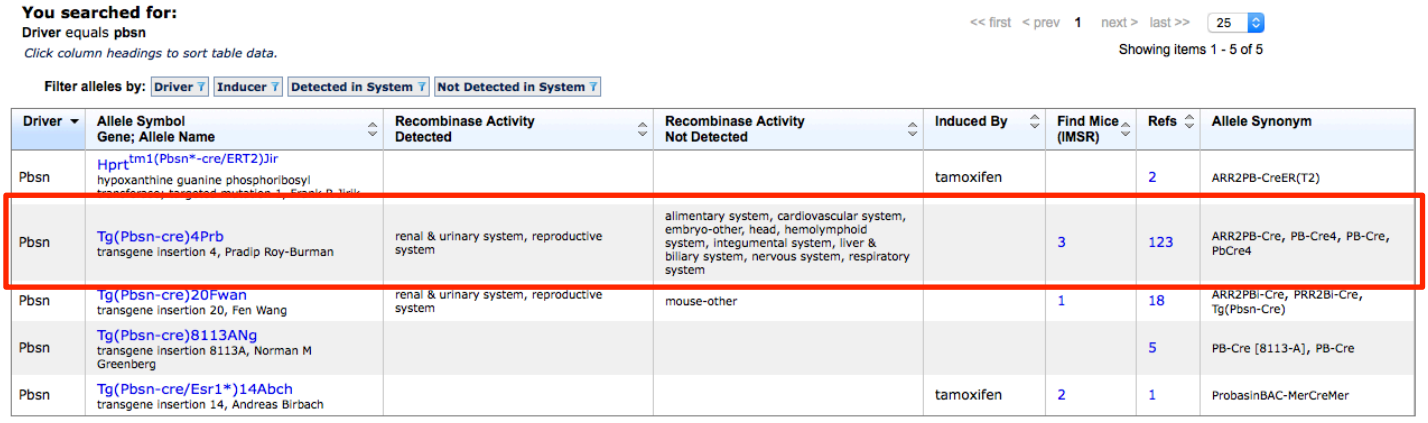


2. Explore the contents of the Results Page returned from your search and learn about customizing it for your use.

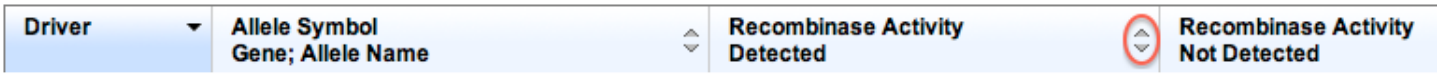
This is the default Results Page from the search illustrated on the previous page. Now let's explore the features of this page.



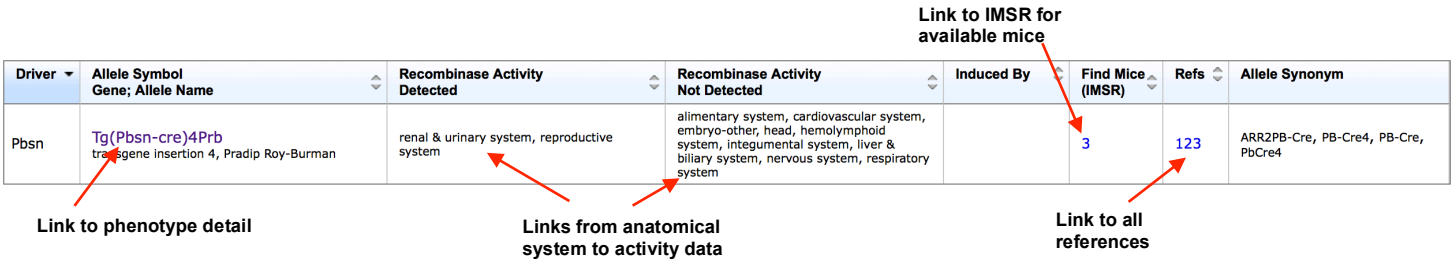
Let's look at the contents of the table.
This section of the page provides data summaries and links to additional information. Let's review a single data line representing one cre transgene. Outlined in red is the row of the table describing transgene, **Tg(Pbsn-cre)4Prb**, a transgene with cre driven by the *Pbsn* promoter.



The columns of the table can be sorted (as indicated by the up/down arrows in the column headers) **and reordered** (by placing the cursor in any column header). For example, perhaps you want an alphabetic sort of the Drivers in your Results Page; or to sort by the number of references (an indicator of how widely this cre line is used); or to sort by the Find Mice column to bring all those cre lines that are in public repositories to the top of your Results Page.
Each line of the table provides basic information about the cre transgene or knock-in, its driver,



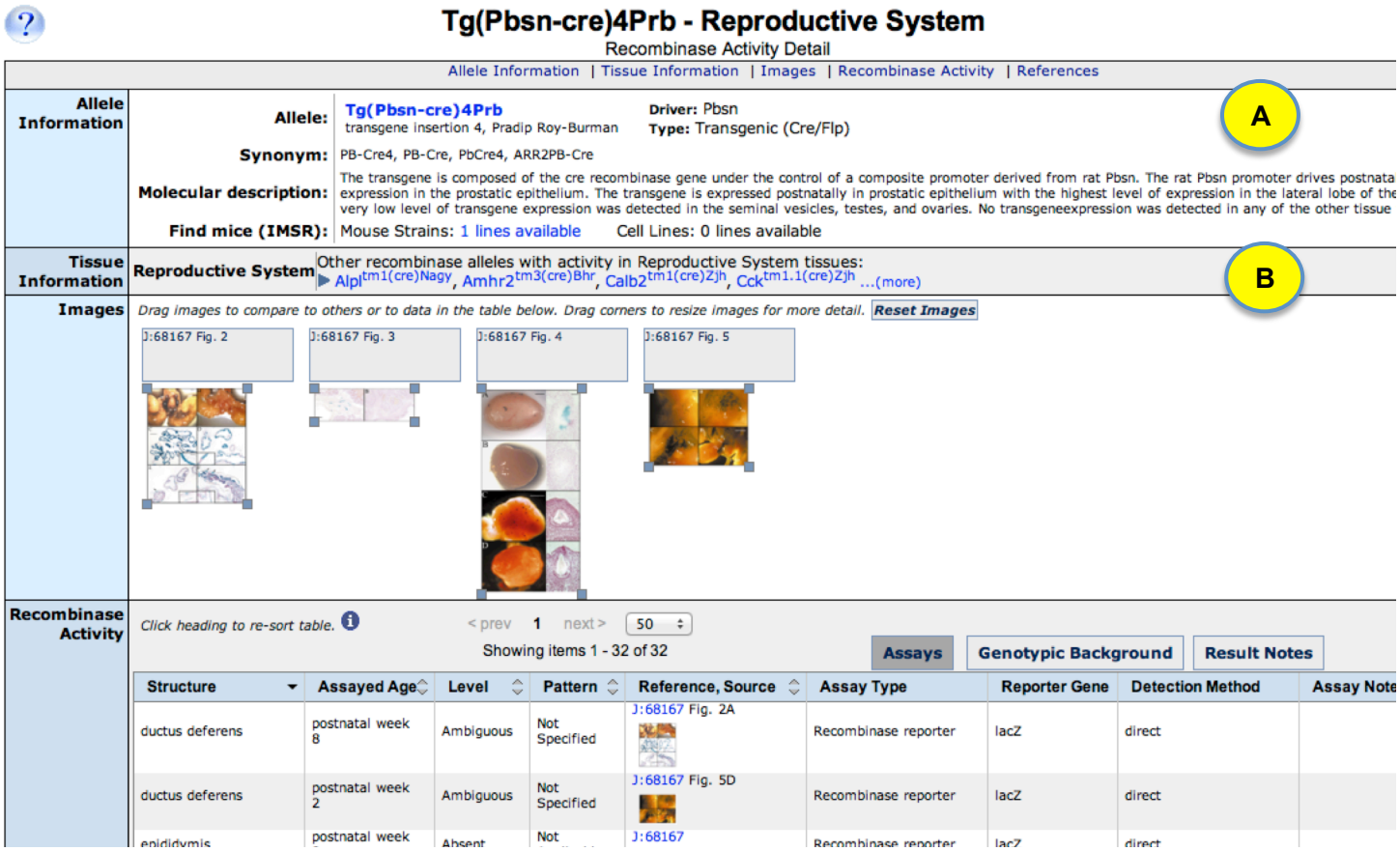
Within a row of data, each of which represents a single cre line transgene or knock-in, there are a number of links and actions possible that lead to further data details (shown below).
The link in the **Allele Symbol column** directs you to a page showing phenotypes reported in offspring of mice bearing this cre transgene and mice carrying floxed alleles of various genes (see page 9 of this tutorial).
The **Recombinase Activity Detected** and **Not Detected** columns show the anatomical systems where cre activity has been "Detected in…" or "Not detected in…" In turn, each anatomical system term is a link directing you to a page showing the data for cre activity in that system (next page of this tutorial). The number displayed in the **Find Mice (IMSR) column** is a link to the International Mouse Strain Resource (IMSR) page with information on what repository holds relevant cre lines and how to obtain them.
The number in the **Refs column** shows the number of publications about this cre and links to the full list of these publications (this number gives an idea of how widely this particular cre transgene has been used experimentally).



Step 3. Click on the allele symbol for **Tg(Pbsn-cre)4Prb** to go to the detail page for cre activity/specificity in the reproductive system for this cre transgene.

3. Explore detailed information about the cre activity of a specific cre transgene or knock-in and learn about customizing the view.

This is the cre specificity detail page for **Tg(Pnsn-cre)4Prb in the Reproductive System**. Many rows of the **Recombinase Activity** table have been omitted to save space in this tutorial document. We will explore each sections of this page (delineated by the blue title column at left).



Tg(Pbsn-cre)4Prb - Reproductive System

Recombinase Activity Detail

Allele Information | Tissue Information | Images | Recombinase Activity | References

Allele Information

Allele: Tg(Pbsn-cre)4Prb — transgene insertion 4, Pradip Roy-Burman — **Driver:** Pbsn — **Type:** Transgenic (Cre/Flp)

Synonym: PB-Cre4, PB-Cre, PbCre4, ARR2PB-Cre

Molecular description: The transgene is composed of the cre recombinase gene under the control of a composite promoter derived from rat Pbsn. The rat Pbsn promoter drives postnata expression in the prostatic epithelium. The transgene is expressed postnatally in prostatic epithelium with the highest level of expression in the lateral lobe of the very low level of transgene expression was detected in the seminal vesicles, testes, and ovaries. No transgeneexpression was detected in any of the other tissue

Find mice (IMSR): Mouse Strains: 1 lines available Cell Lines: 0 lines available

A

Tissue Information

Reproductive System Other recombinase alleles with activity in Reproductive System tissues: ▶ Alpl$^{tm1(cre)Nagy}$, Amhr2$^{tm3(cre)Bhr}$, Calb2$^{tm1(cre)Zjh}$, Cck$^{tm1.1(cre)Zjh}$ ...(more)

B

Images

Drag images to compare to others or to data in the table below. Drag corners to resize images for more detail. **Reset Images**

J:68167 Fig. 2 J:68167 Fig. 3 J:68167 Fig. 4 J:68167 Fig. 5

Recombinase Activity

Click heading to re-sort table. < prev 1 next > 50

Showing items 1 - 32 of 32

Assays | Genotypic Background | Result Notes

Structure	Assayed Age	Level	Pattern	Reference, Source	Assay Type	Reporter Gene	Detection Method	Assay Note
ductus deferens	postnatal week 8	Ambiguous	Not Specified	J:68167 Fig. 2A	Recombinase reporter	lacZ	direct	
ductus deferens	postnatal week 2	Ambiguous	Not Specified	J:68167 Fig. 5D	Recombinase reporter	lacZ	direct	
epididymis	postnatal week	Absent	Not	J:68167	Recombinase reporter	lacZ	direct	

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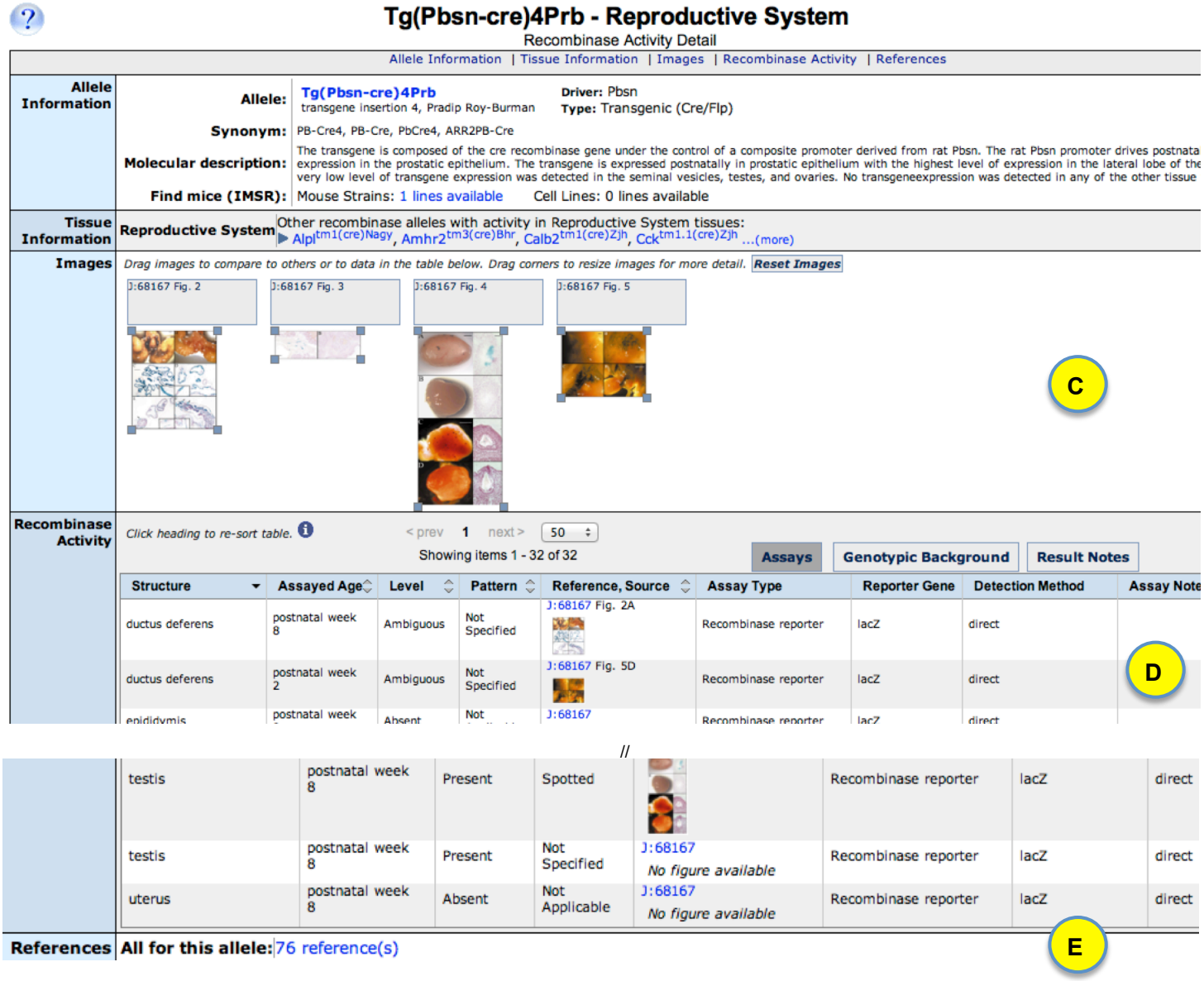
testis	postnatal week 8	Present	Spotted		Recombinase reporter	lacZ	direct
testis	postnatal week 8	Present	Not Specified	J:68167 *No figure available*	Recombinase reporter	lacZ	direct
uterus	postnatal week 8	Absent	Not Applicable	J:68167 *No figure available*	Recombinase reporter	lacZ	direct

References **All for this allele:** 76 reference(s)

A. Allele Information. This section contains essentials about the cre transgene itself; its correct nomenclature (symbol and name), the driver involved, other synonyms that have been used in publications, a molecular description of the what the transgene is carrying (in this case, the cre recombinase gene under the control of a composite promoter derived from the rat *Pbsn* gene) and a 'Find mice' IMSR summary indicating whether mice or cell lines carrying this transgene are available from pubic repositories.

B. Tissue Information. This section lists all other cre transgenes and knock-ins that have reported activity in the Reproductive System. Each symbol is a link to the cre specificity page for that transgene or knock-in for the Reproductive System. The …(more) indicates there are others and clicking on (more) will bring back the entire list.



Tg(Pbsn-cre)4Prb - Reproductive System

Recombinase Activity Detail

Allele Information | Tissue Information | Images | Recombinase Activity | References

Allele Information

Allele: Tg(Pbsn-cre)4Prb — transgene insertion 4, Pradip Roy-Burman
Driver: Pbsn
Type: Transgenic (Cre/Flp)
Synonym: PB-Cre4, PB-Cre, PbCre4, ARR2PB-Cre
Molecular description: The transgene is composed of the cre recombinase gene under the control of a composite promoter derived from rat Pbsn. The rat Pbsn promoter drives postnata expression in the prostatic epithelium. The transgene is expressed postnatally in prostatic epithelium with the highest level of expression in the lateral lobe of the very low level of transgene expression was detected in the seminal vesicles, testes, and ovaries. No transgeneexpression was detected in any of the other tissue
Find mice (IMSR): Mouse Strains: 1 lines available Cell Lines: 0 lines available

Tissue Information

Reproductive System Other recombinase alleles with activity in Reproductive System tissues: ▶ Alpl$^{tm1(cre)Nagy}$, Amhr2$^{tm3(cre)Bhr}$, Calb2$^{tm1(cre)Zjh}$, Cck$^{tm1.1(cre)Zjh}$ ...(more)

Images

Drag images to compare to others or to data in the table below. Drag corners to resize images for more detail. **Reset Images**

J:68167 Fig. 2 | J:68167 Fig. 3 | J:68167 Fig. 4 | J:68167 Fig. 5

C

Recombinase Activity

Click heading to re-sort table. < prev 1 next > 50

Showing items 1 - 32 of 32

Assays | Genotypic Background | Result Notes

Structure	Assayed Age	Level	Pattern	Reference, Source	Assay Type	Reporter Gene	Detection Method	Assay Note
ductus deferens	postnatal week 8	Ambiguous	Not Specified	J:68167 Fig. 2A	Recombinase reporter	lacZ	direct	
ductus deferens	postnatal week 2	Ambiguous	Not Specified	J:68167 Fig. 5D	Recombinase reporter	lacZ	direct	
epididymis	postnatal week	Absent	Not	J:68167	Recombinase reporter	lacZ	direct	

D

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testis	postnatal week 8	Present	Spotted		Recombinase reporter	lacZ	direct
testis	postnatal week 8	Present	Not Specified	J:68167 *No figure available*	Recombinase reporter	lacZ	direct
uterus	postnatal week 8	Absent	Not Applicable	J:68167 *No figure available*	Recombinase reporter	lacZ	direct

References **All for this allele:** 76 reference(s)

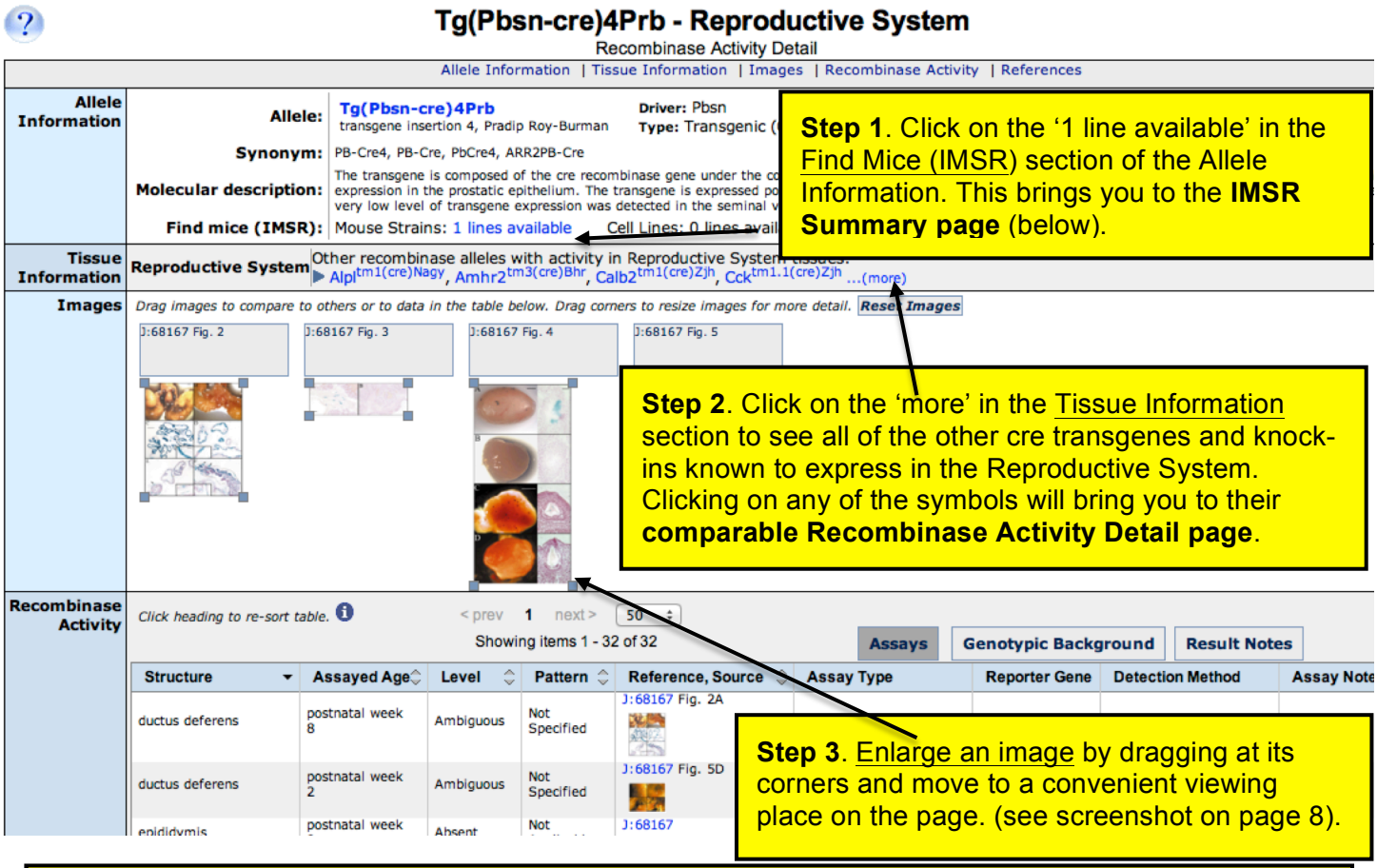
E

C. Images. This section presents a gallery of thumbnail images for cre activity for the tissue being viewed. Images can be enlarged by dragging at the corners and may be moved around the window for convenient viewing. Enlarging an image also activates a pop-up with caption and attribution information.

D. Recombinase Activity. This tabular section provides the annotation detail for the cre activity, including anatomical structure, age, activity level & pattern, and data source. The last columns of the table (separated by a gray bar) are controlled by tabs at the top of the table and allow this section of the table to show variably 'Assay' or 'Genotypic Background' information or 'Result Notes'. The view shown here is 'Assay' information, consisting of Assay Type, Reporter Gene, Detection Method, and Assay Notes. Observe that all columns in this table are sortable, as indicated by the up/down arrowheads after the column heading title. For example, one might want to sort by age to group all data together for a certain age; or by structure; or by level to place all the 'present' vs. 'absent' together. Finally, clicking on the small image in the table highlights the corresponding image in the image gallery so it is easier to identify the image you may want to enlarge.

E. References. This section lists the number of publications for this cre transgene and links to the full list.

Now we will look at some of the links and actions on this page....

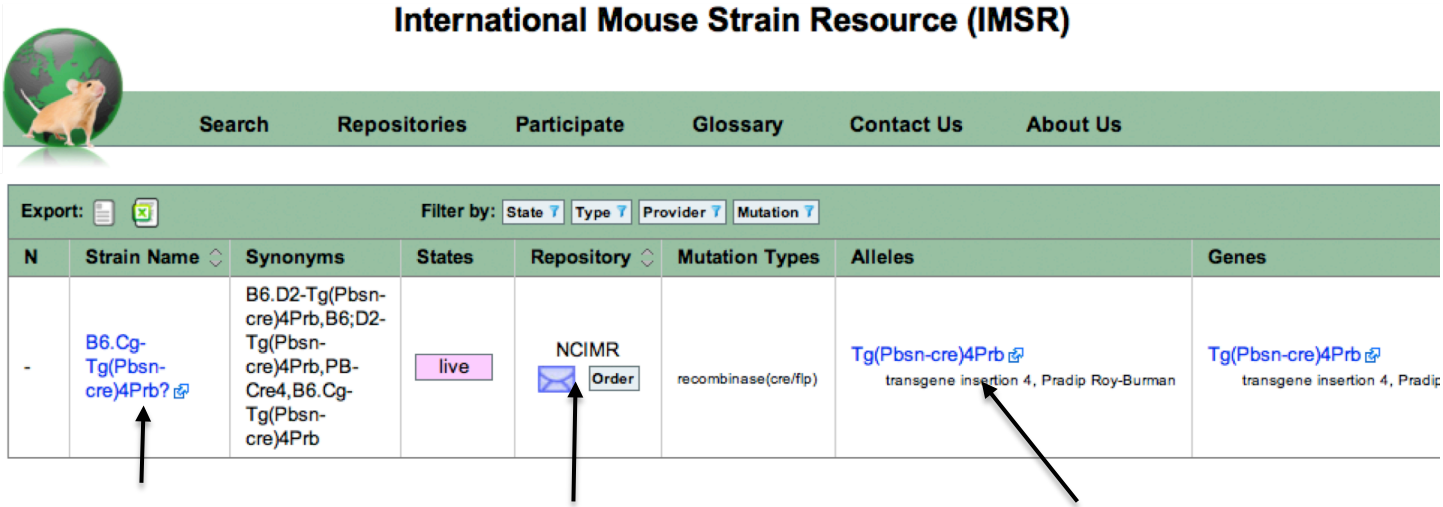


Step 1. Click on the '1 line available' in the Find Mice (IMSR) section of the Allele Information. This brings you to the **IMSR Summary page** (below).

Step 2. Click on the 'more' in the Tissue Information section to see all of the other cre transgenes and knock-ins known to express in the Reproductive System. Clicking on any of the symbols will bring you to their **comparable Recombinase Activity Detail page**.

Step 3. Enlarge an image by dragging at its corners and move to a convenient viewing place on the page. (see screenshot on page 8).

Below, Result of Step 1. View of IMSR (International Mouse Strain Resource) results and access to a Tg(Pbsn-cre)4Prb bearing strain.



Links to repository's strain information page

Repository abbreviation and email link for questions or to order mice. (NCIMR is the NCI Mutant Resource)

Link to MGI allele/phenotype page for this transgene (later in this tutorial, page 9)

Below, Result of Step 2. List of all other cre transgenes and knock-ins that show activity in the Reproductive Systerm (there are 100 listed here). Each symbol is a link to the respective Reproductive System cre details for that transgene or knock-in. Note the (less) at the end of the list, which will collapse the list back to its original few.

Tissue Information	**Reproductive System**	Other recombinase alleles with activity in Reproductive System tissues: ▼ Alpl$^{tm1(cre)Nagy}$, Amhr2$^{tm3(cre)Bhr}$, Calb2$^{tm1(cre)Zjh}$, Cck$^{tm1.1(cre)Zjh}$, Cdkn2a$^{tm3(cre)Cjs}$, Chat$^{tm1(cre)Lowl}$, Cort$^{tm1(cre)Zjh}$, Crh$^{tm1(cre)Zjh}$, Ctsk$^{tm1(cre)Ska}$ Dlx5$^{tm1(cre/ERT2)Zjh}$, En1$^{tm2(cre)Wrst}$, Gad2$^{tm2(cre)Zjh}$, Gt(ROSA)26Sor$^{tm1.1(cre)Jphe}$, Gt(ROSA)26Sor$^{tm1(cre/ERT2)TyJ}$, Gt(ROSA)26Sor$^{tm1(FLP1)Dym}$, Gt(ROSA)26Sor$^{tm2(cre/ERT2)Jphe}$, Hnf4a$^{tm1(cre)Sdv}$, Hprt$^{tm1(cre)Mnn}$, Hsd11b2$^{tm1(cre)Anft}$, Krt19$^{tm1(cre)Mmt}$, Lyz2$^{tm1(cre)Ifo}$, Mapt$^{tm1(cre)Nagy}$, Mnx1$^{tm4(cre}$ Myf5$^{tm3(cre)Sor}$, Omp$^{tm4(cre)Mom}$, Osr1$^{tm1(EGFP/cre/ERT2)Amc}$, Pax3$^{tm1(cre)Joe}$, Plekha5$^{Tg(AMH-cre)1Flor}$, Pvalb$^{tm1(cre)Arbr}$, Runx1$^{tm1(cre/Esr1*)Jms}$, Runx1$^{tm2.1(cre/Esr1*)Jms}$, Shh$^{tm1(EGFP/cre)Cjt}$, Six1$^{tm1(cre,ALPP)Xli}$, Sox17$^{tm1(cre)Heli}$, Sox17$^{tm2.1(cre)Heli}$, Sst$^{tm2.1(cre)Zjh}$, Tg(Abpa-cre)1Cmal, Tg(Acta2- cre/ERT2)12Pcn, Tg(Acta2-cre/ERT2)51Pcn, Tg(ACTB-cre)1Tes, Tg(ACTFLPe)9205Dym, Tg(Adipoq-cre)1Evdr, Tg(Alb1-cre)1Dlr, Tg(Amh-cre)8815Reb, Tg(A cre)1Dek, Tg(ATP6V1B1-cre)45Rnel, Tg(CAG-cre/Esr1*)1Lbe, Tg(Camk2a-cre)T29-1Stl, Tg(CD2-cre)4Kio, Tg(Cdh16-cre)91Igr, Tg(Cdh5-cre)7Mlia, Tg(Cdh cre/ERT2)CIVE23Mlia, Tg(Cga-cre)3Sac, Tg(Chst4-cre)1Hkwa, Tg(Cyp11a1-cre)16Mchu, Tg(Cyp17a1-cre)ACmk, Tg(CYP19A1-cre)1Jri, Tg(Cyp19a1- cre)5909Gle, Tg(Cyp19a1-cre)5912Gle, Tg(Ddx4-cre)1Dcas, Tg(Ddx4-cre/ERT2)1Dcas, Tg(Dhh-cre)1Mejr, Tg(dlx6a-cre)1Mekk, Tg(DMRT1-cre)1Svs, Tg(E cre)C5379Lmgd, Tg(Eno2-cre)2Lfp, Tg(Fabp4-cre)1Rev, Tg(FOXJ1-cre)F26Htzm, Tg(Fshr-cre)1Ldu, Tg(Gata1-cre)1Sho, Tg(Gcm1-cre)1Chrn, Tg(Gdf9- cre)5092Coo, Tg(GFAP-cre)25Mes, Tg(GFAP-cre/Esr1*,-lacZ)ASbk, Tg(GFAP-cre/Esr1*,-lacZ)BSbk, Tg(Gh1-cre)1Sac, Tg(Gh1-cre)bKnmn, Tg(Grik4-cre)G3 4Stl, Tg(Hoxb7-cre)13Amc, Tg(Hspa2-cre)1Eddy, Tg(Inha-cre)1Zuk, Tg(Inha-cre)2Zuk, Tg(Inha-cre)3Zuk, Tg(Ins2-cre)25Mgn, Tg(Itgax-cre)1-1Reiz, Tg(K cre)29066/2Sig, Tg(Kera-cre)KC4.3Wwk, Tg(Kit-cre)143Hmb, Tg(KLK3-cre)13Saa, Tg(KRT14-cre)1Amc, Tg(KRT14-cre)1Cgn, Tg(KRT14-cre/ERT)20Efu, Tg(KRT1-5-cre)5132Jlj, Tg(KRT18-cre/ERT2)1Rgo, Tg(KRT5-cre/ERT)1Cmch, Tg(KRT5-cre/ERT)SCmch, Tg(Krt8-cre/ERT2)1Xin, Tg(Lck-cre)548Jxm, Tg(Lhb cre)1Sac, Tg(Mbp-cre)6Gvn, Tg(Mbp-cre)9Gvn, Tg(MMTV-cre)1Mam, Tg(MMTV-cre)4Mam, Tg(MMTV-cre)FMam, Tg(Msx2-cre)5Rem, Tg(Mx1-cre)29-4Her, Tg(Myh11-cre,-EGFP)2Mik, Tg(Nes-cre)1Kln, Tg(Neurog3-cre)24Syos, Tg(Neurog3-cre)C1Able, Tg(Nr5a1-cre)1Kmor, Tg(Nr5a1-cre)2Klp, Tg(Nr5a1-cre)2Lc Tg(Nr5a1-cre)7Lowl, Tg(Osr1-cre)4Mrt, Tg(Pax2-cre)10Shwl, Tg(Pbsn-cre)20Fwan, Tg(Pcp2-cre)1Amc, Tg(Pcp2-cre)2Mpin, Tg(Pf4-cre)Q3Rsko, Tg(Pgk2- cre)1Yna, Tg(Plp1-cre/ERT)3Pop, Tg(Pomc1-cre)16Lowl, Tg(Pres-cre)1Jnz, Tg(Prm1-cre)1Osb, Tg(Prnp-cre/ERT)28.8Ics, Tg(Rarb-cre)1Bhr, Tg(REN-cre)1H Tg(Rxfp2-cre)1Aia, Tg(Rxfp2-cre)5Aia, Tg(S100a4-cre)1Egn, Tg(Scx-cre)HShuk, Tg(Sim1-cre)1Lowl, Tg(Slco1c1-icre/ERT2)1Mrks, Tg(Sprr2f-cre)1Dcas, Tg(Stra8-cre)1Reb, Tg(Sycp1-cre)4Min, Tg(Tagln-cre)1Her, Tg(Tbx18-icre)1Fech, Tg(Tek-cre)5326Sato, Tg(Tek-cre/ERT2)1Soff, Tg(Tex101-icre)2Lzj, Tg(T cre)1Vln, Tg(Tie1-cre)9Ref, Tg(Tmem100-EGFP/cre/ERT2)30Amc, Tg(TNS4-cre)1Shlo, Tg(TSPY-cre)33aYfcl, Tg(Vav1-cre)1Awr, Tg(Vav1-cre)8Cgp, Tg(Vav cre)A2Kio, Tg(Vil-cre)997Gum, Tg(Wfs1-cre/ERT2)3Aibs, Tg(Wnt1-cre)11Rth, Tg(Zp3-cre)93Knw, Th$^{tm1(cre)Te}$, Twist2$^{tm1.1(cre)Dor}$, Vip$^{tm1(cre)Zjh}$ (less)

Below, Result of Step 3. The enlarged image was made by dragging the image corners. If you click an image, the image legend and attribution pops up to the right of the image. Multiple images may be enlarged and moved as you work. Note the 'Reset Images' Button (arrow) that can be used to bring all images enlarged or moved back to their original size and placement on this page.

Tg(Pbsn-cre)4Prb - Reproductive System

Recombinase Activity Detail

Allele Information | Tissue Information | Images | Recombinase Activity | References

Allele Information

Allele: Tg(Pbsn-cre)4Prb — transgene insertion 4, Pradip Roy-Burman — **Driver:** Pbsn — **Type:** Transgenic (Cre/Flp)

Synonym: PB-Cre4, PB-Cre, PbCre4, ARR2PB-Cre

Molecular description: The transgene is composed of the cre recombinase gene under the control of a composite promoter derived from rat Pbsn. The rat Pbsn promoter drives postnatal transgene expression in the prostatic epithelium. The transgene is expressed postnatally in prostatic epithelium with the highest level of expression in the lateral lobe of the prostate g very low level of transgene expression was detected in the seminal vesicles, testes, and ovaries. No transgeneexpression was detected in any of the other tissue types exan

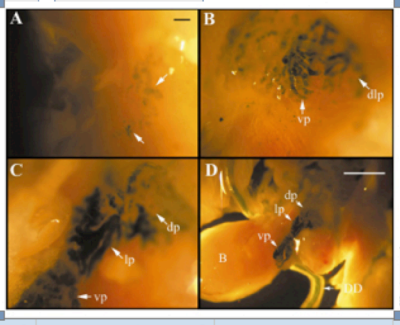
Find mice (IMSR): Mouse Strains: 1 lines available Cell Lines: 0 lines available

Tissue Information — **Reproductive System**: Other recombinase alleles with activity in Reproductive System tissues: ▶ Alpl$^{tm1(cre)Nagy}$, Amhr2$^{tm3(cre)Bhr}$, Calb2$^{tm1(cre)Zjh}$, Cck$^{tm1.1(cre)Zjh}$ ...(more)

Images

Drag images to compare to others or to data in the table below. Drag corners to resize images for more detail. **Reset Images**

J:68167 Fig. 2 | J:68167 Fig. 3 | J:68167 Fig. 4 | J:68167 Fig. 5



J:68167 Fig. 5 close X

Drag image, resize at corners.

Abbreviations - vp, ventral prostate lobe; dlp, dorsal/lateral prostate; dp, dorsal prostate lobe; lp, lateral prostate lobe; B, bladder; DD, ductus deferens. Arrows in A - recombinase activity in prostatic buds. Scale bars - A,B,C 0.1 mm; D 1 mm.

Reprinted with permission from Elsevier from doi:10.1016/S0925-4773(00)00551-7 Mech Dev 101: 61-9, Wu X; Wu J; Huang J; Powell WC; Zhang J; Matusik RJ; Sangiorgi FO; Maxson RE; Sucov HM; Roy-Burman P, Generation of a prostate epithelial cell-specific Cre transgenic mouse model for tissue-specific gene ablation. Copyright 2001

Drag image to compare to others or to data in the table below. Drag corners to resize image for more detail.

Recombinase Activity

Click heading to re-sort table. < prev 1 next

Showing items

enotypic Background | Result Notes

Structure	Assayed Age	Level	Pattern	Reference, Source	Assay Type	Reporter Gene	Detection Method	Assay Note
ductus deferens	postnatal week 8	Ambiguous	Not Specified	J:68167 Fig. 2A	Recombinase reporter	lacZ	direct	

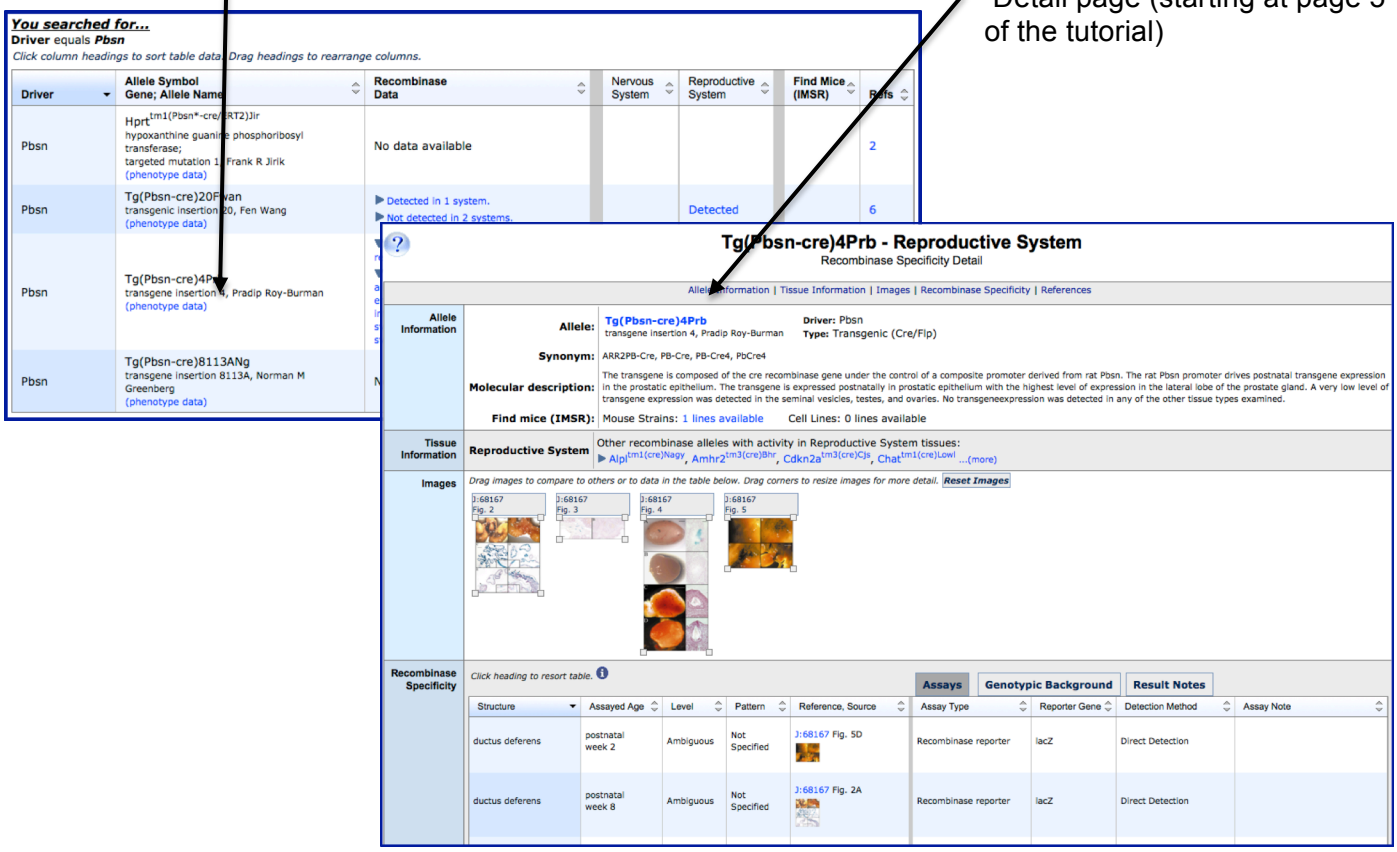
Finally, we learn about phenotypes observed when mice carrying a particular cre transgene/knock-in are mated to mice carrying different genes with loxP sites (genes that will be knocked-out when exposed to cre recombinase).

Phenotype data can be accessed either :

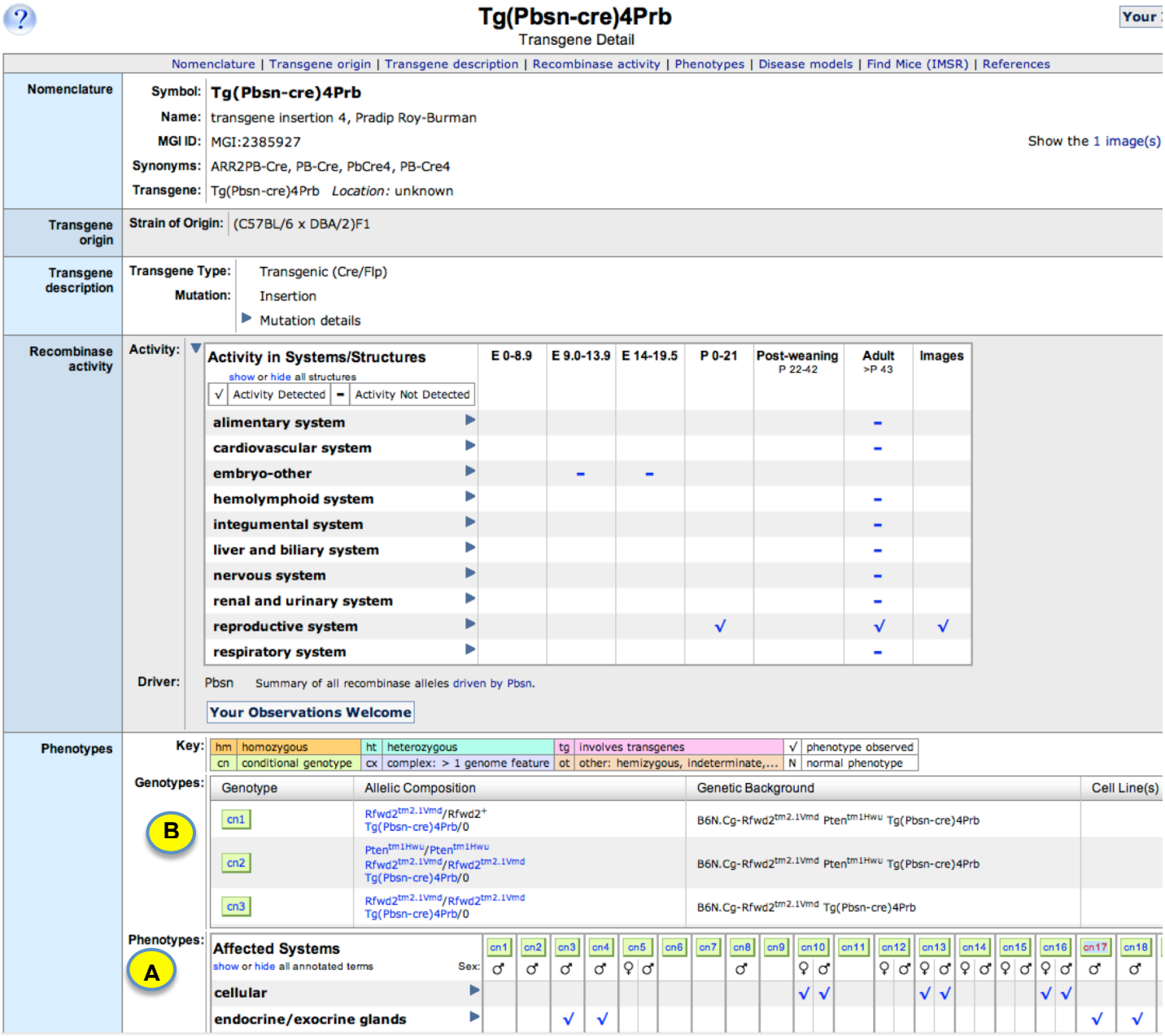
1. By clicking on the phenotype data link in the cre search summary page (see page 5 of the tutorial).

OR

2. By clicking on the transgene or knock-in symbol on the Recombinase Detail page (starting at page 5 of the tutorial)



This is the **Transgene detail page for Tg(Pbsn-cre)4Prb, which contains the phenotype data**. Like the Recombinase Activity page for the Reproductive System, the information at the top of the page is basic information on nomenclature, the description of the molecular construct and includes links to IMSR to obtain mice carrying this transgene. There is also a section summarizing recombinase activity with links to the Recombinase Activity pages as we have reviewed previously. Two phenotype sections on this page, labeled (A) Phenotypes and (B) Genotypes are described below.



Tg(Pbsn-cre)4Prb
Transgene Detail

Nomenclature | Transgene origin | Transgene description | Recombinase activity | Phenotypes | Disease models | Find Mice (IMSR) | References

Nomenclature
Symbol: **Tg(Pbsn-cre)4Prb**
Name: transgene insertion 4, Pradip Roy-Burman
MGI ID: MGI:2385927 Show the 1 image(s)
Synonyms: ARR2PB-Cre, PB-Cre, PbCre4, PB-Cre4
Transgene: Tg(Pbsn-cre)4Prb *Location:* unknown

Transgene origin
Strain of Origin: (C57BL/6 x DBA/2)F1

Transgene description
Transgene Type: Transgenic (Cre/Flp)
Mutation: Insertion
Mutation details

Recombinase activity
Activity:

Activity in Systems/Structures (show or hide all structures; √ Activity Detected; – Activity Not Detected)	E 0-8.9	E 9.0-13.9	E 14-19.5	P 0-21	Post-weaning P 22-42	Adult >P 43	Images
alimentary system						–	
cardiovascular system						–	
embryo-other		–	–				
hemolymphoid system						–	
integumental system						–	
liver and biliary system						–	
nervous system						–	
renal and urinary system						–	
reproductive system				√		√	√
respiratory system						–	

Driver: Pbsn Summary of all recombinase alleles driven by Pbsn.
Your Observations Welcome

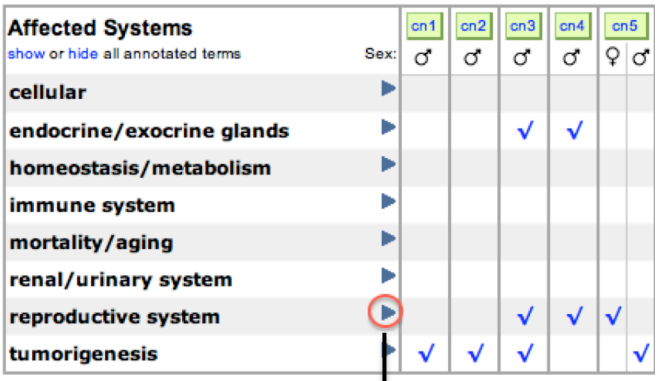
Phenotypes
Key: hm homozygous; ht heterozygous; tg involves transgenes; √ phenotype observed; cn conditional genotype; cx complex: > 1 genome feature; ot other: hemizygous, indeterminate,...; N normal phenotype

Genotypes: (B)

Genotype	Allelic Composition	Genetic Background	Cell Line(s)
cn1	Rfwd2$^{tm2.1Vmd}$/Rfwd2^{+} Tg(Pbsn-cre)4Prb/0	B6N.Cg-Rfwd2$^{tm2.1Vmd}$ Pten^{tm1Hwu} Tg(Pbsn-cre)4Prb	
cn2	Pten^{tm1Hwu}/Pten^{tm1Hwu} Rfwd2$^{tm2.1Vmd}$/Rfwd2$^{tm2.1Vmd}$ Tg(Pbsn-cre)4Prb/0	B6N.Cg-Rfwd2$^{tm2.1Vmd}$ Pten^{tm1Hwu} Tg(Pbsn-cre)4Prb	
cn3	Rfwd2$^{tm2.1Vmd}$/Rfwd2$^{tm2.1Vmd}$ Tg(Pbsn-cre)4Prb/0	B6N.Cg-Rfwd2$^{tm2.1Vmd}$ Tg(Pbsn-cre)4Prb	

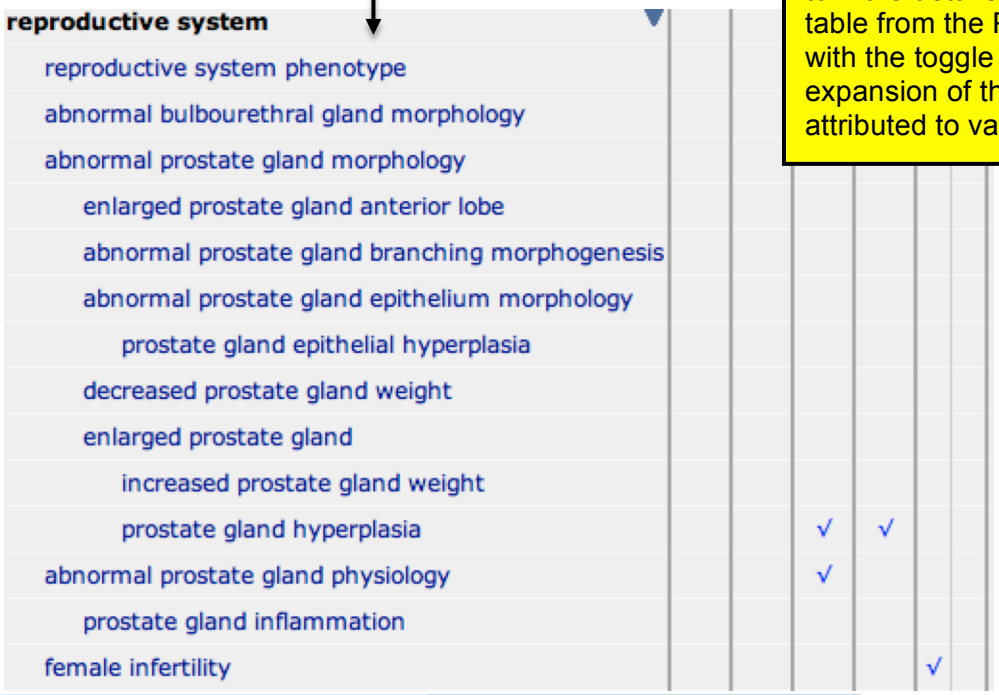
Phenotypes: (A)

Affected Systems (show or hide all annotated terms)	Sex:	cn1	cn2	cn3	cn4	cn5	cn6	cn7	cn8	cn9	cn10	cn11	cn12	cn13	cn14	cn15	cn16	cn17	cn18
cellular											√	√		√	√			√	√		
endocrine/exocrine glands				√	√													√	√

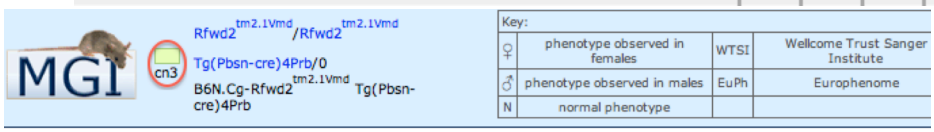


Affected Systems (show or hide all annotated terms)	Sex:	cn1 ♂	cn2 ♂	cn3 ♂	cn4 ♂	cn5 ♀	cn5 ♂
cellular							
endocrine/exocrine glands				√	√		
homeostasis/metabolism							
immune system							
mortality/aging							
renal/urinary system							
reproductive system				√	√	√	
tumorigenesis		√	√	√			√

A. The Phenotypes Section provides a high-level look at the kinds of systems affected in mice carrying this transgene in conjunction with other genes (the genotype). This section displays a matrix of 'Affected systems' (left column) by Genotype (row), where each abbreviation along the top of the matrix represents a unique genotype. As in other examples, there is a toggle (▶) that expands the table to more detailed data. Left, a copy of the table from the Phenotype Page (page 10) with the toggle circled. Below, the expansion of the reproductive system terms attributed to various genotypes.



reproductive system						
reproductive system phenotype						
abnormal bulbourethral gland morphology						
abnormal prostate gland morphology						
enlarged prostate gland anterior lobe						
abnormal prostate gland branching morphogenesis						
abnormal prostate gland epithelium morphology						
prostate gland epithelial hyperplasia						
decreased prostate gland weight						
enlarged prostate gland						
increased prostate gland weight						
prostate gland hyperplasia				√	√	
abnormal prostate gland physiology				√		
prostate gland inflammation						
female infertility						√



MGI cn3 Rfwd2$^{tm2.1Vmd}$/Rfwd2$^{tm2.1Vmd}$ Tg(Pbsn-cre)4Prb/0 B6N.Cg-Rfwd2$^{tm2.1Vmd}$ Tg(Pbsn-cre)4Prb

Key:			
♀	phenotype observed in females	WTSI	Wellcome Trust Sanger Institute
♂	phenotype observed in males	EuPh	Europhenome
N	normal phenotype		

reproductive system

prostate gland hyperplasia (J:172653)
- ♂ • in 3 of 4 mice at 40 weeks of age (J:172653)
- • in all mice at 52 weeks of age (J:172653)

abnormal prostate gland physiology (J:172653)
- ♂ • cells in the ventral and lateral prostate exhibit increased proliferation compared to in wild-type mice (J:172653)

tumorigenesis

prostate intraepithelial neoplasia (J:172653)
- ♂ • low grade in 2 of 6 mice at 52 weeks of age (J:172653)

endocrine/exocrine glands

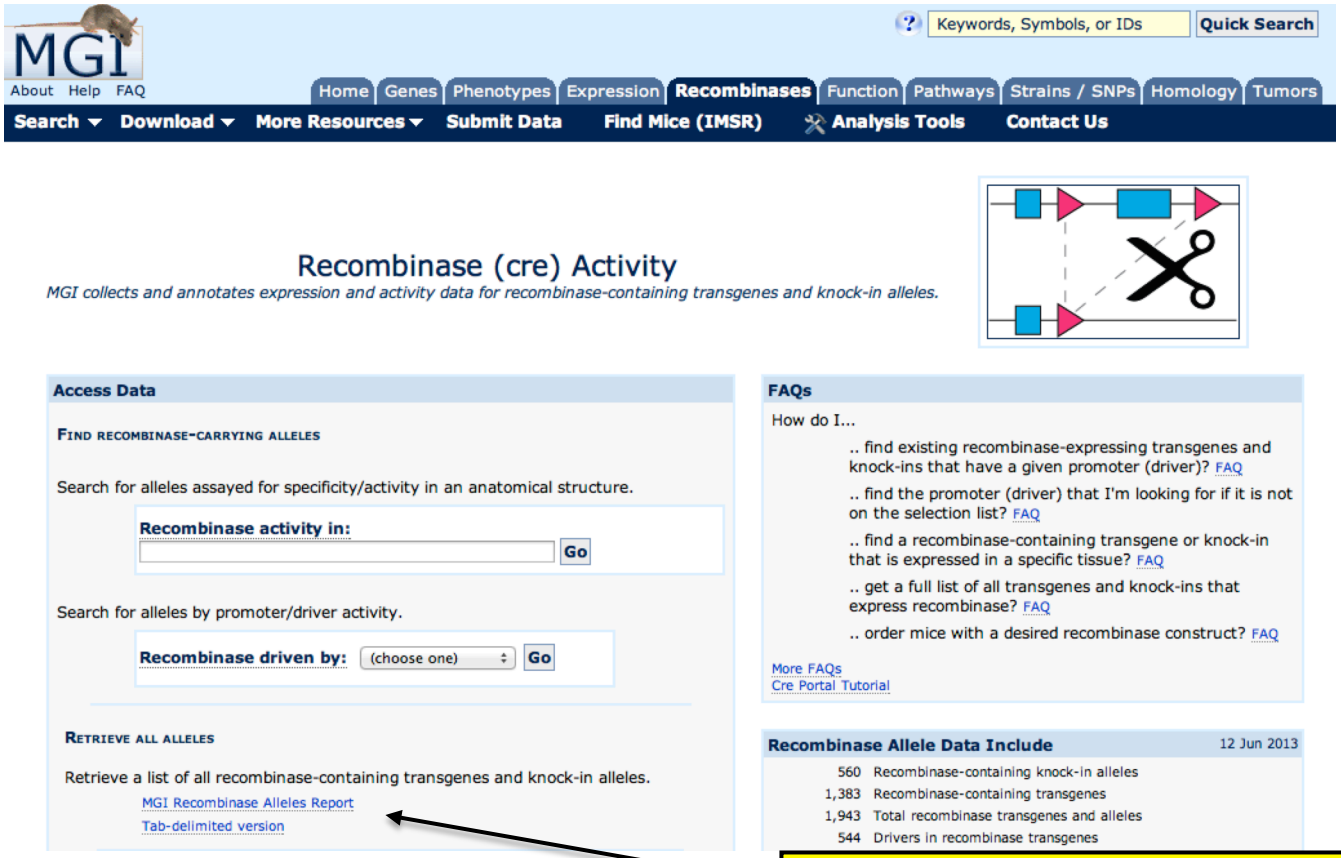
prostate gland hyperplasia (J:172653)
- ♂ • in 3 of 4 mice at 40 weeks of age (J:172653)
- • in all mice at 52 weeks of age (J:172653)

abnormal prostate gland physiology (J:172653)
- ♂ • cells in the ventral and lateral prostate exhibit increased proliferation compared to in wild-type mice (J:172653)

B. Genotypes. Each genotype includes its allelic composition and genetic background. The third conditional genotype described, cn3, includes the Tg(Pbsn-cre)4Prb transgene and Rfwd2 targeted alleles on a congenic B6N background. Click on the cn3 button to open a new window containing phenotypic details reported in the mice (shown at left).

4. Return to the Cre Portal main page & view the data report for 'all cre transgenes/knock-ins'

Find the Cre Portal main page using http://www.creportal.org. Locate the "Retrieve All Alleles Section" and choose either the MGI Recombinase Alleles Report (an html page view format) or the Tab-delimited version if you wish to copy the file into Excel or some other analysis program.



Step 1. Locate the file link of interest.

Step 2. Follow the link. Here a few lines of the html web page version are shown.

MGI Recombinase Alleles Report

This report provides a list of all recombinase-containing alleles in the MGI database.

Each allele symbol is linked to its respective MGI Allele Detail page, containing phenotypic and disease model data; each Anatomical System for an allele is linked to its MGI Recombinase Detail page. A link is provided to the International Mouse Strain Resource (IMSR) strain if a repository holds mice carrying the listed allele.

To search for floxed, frt, or other recombinase target-containing alleles in MGI, use the Phenotype and Alleles Query Form.

To search repositories for specific strains carrying mutations of all types, use the IMSR Search Form.

Driver	Allele Symbol	Name	Detected in	Absent in	IMSR Strain	Allele ID
8430408G22Rik	8430408G22Rik$^{tm1(EGFP/cre)Shin}$	RIKEN cDNA 8430408G22 gene; targeted mutation 1, Donghun Shin				MGI:3526084
A930038C07Rik	Tg(A930038C07Rik-cre)4Aibs	transgene insertion 4, Ed Lein			B6;C3-Tg(A930038C07Rik-cre)4Aibs/J	MGI:3850200
AAT	Tg(AAT-cre)31Rbrc	transgene insertion 31, RIKEN BioResource Center			C57BL/6J-Tg(AAT-cre)31Rbrc/Rbrc	MGI:4415186
AAT	Tg(AAT-cre)43Rbrc	transgene insertion 43, RIKEN BioResource Center			C57BL/6J-Tg(AAT-cre)43Rbrc/Rbrc	MGI:4415189
AAT	Tg(AAT-cre)50Rbrc	transgene insertion 50, RIKEN BioResource Center			C57BL/6J-Tg(AAT-cre)50Rbrc/Rbrc	MGI:4415191
Abpa	Tg(Abpa-cre)1Cmal	transgene insertion 1, Charles M Allan	reproductive system			MGI:4431035
Acan	Acan$^{tm1(cre/ERT2)Crm}$	aggrecan; targeted mutation 1, Benoit de Crombrugghe	embryo-other limbs postnatal-other respiratory system sensory organs	cardiovascular system liver & biliary system nervous system renal & urinary system		MGI:4420223
Acp5	Tg(Acp5-cre)4Rda	transgene insertion 4, Rachel A Davey	alimentary system cardiovascular system head liver & biliary system postnatal-other respiratory system			MGI:3053813
Acp5	Tg(Acp5-cre)3Rda	transgene insertion 3, Rachel A Davey	alimentary system head hemolymphoid system liver & biliary system postnatal-other			MGI:3053816

Self Directed Tasks

1. Using the Cre Portal, find cre carrying transgenes or knock-ins that are driven by *AMH*.
How many are there?
Which one do you think has been used most experimentally?
Are any mice available with these cre transgenes from public repositories? If so, from where?
For the *AMH* driven cre transgenes, what tissues are listed as "not detected" for cre recombinase activity?
What ages were assayed?

(explanation note: You will note that the search is case in-sensitive. In your results you will see AMH and Amh cre alleles. This is because nomenclature follows that of the species where the gene originated. AMH is the human gene (all capital letters); Amh is the mouse gene (1st letter only capitalized).

2. For Tg(AMH-cre)1Flor, what tissues were reported with staining 'Present' (indicating cre activity) at postnatal day 35?

What reporter gene was used in the assays for Tg(AMH-cre)1Flor and Tg(Amh-cre)8815Reb?

3. For Tg(AMH-cre)1Flor, when mated to other targeted mutations, what other classes of phenotypes are observed in addition to "reproductive" related?

Answers (These are likely to change due to database updates, etc.)

1. From www.creportal.org, select the driver *Amh* in the 'search for alleles by promoter/driver specificity' and then click 'GO'.

There are 4 cre transgenes with an *Amh* driver. One is driven by the human *AMH* promoter, the other 3 by the mouse *Amh* promoter. These symbols follow species' nomenclature convention. You can also learn this by reading the molecular description in the transgene detail pages.

Because there are 46 references for Tg(AMH-cre)1Flor, this allele is likely to have been used most frequently.

Yes, 2 of these cre transgenes are available from public repositories.
Tg(AMH-cre)1Flor is available from the EMMA repository (EM) in Europe as frozen embryos.
Tg(Amh-cre)8815Reb is available from the Jackson Laboratory repository (JAX) as live mice.

On the summary page, for the Tg(AMH-cre)1Flor transgene, in the Recombinase Activity Not Detected column, the data indicate recombinase (cre) activity is not detected in the anatomical class "embryo-other". Following this link to this 'anatomical class' one sees that cre activity was not detected at embryonic day 12.5 and 13.5.

2. For Tg(AMH-cre)1Flor at day 35, staining was found in ovary antral follicle, ovary secondary follicle and ovary stratum granulosum.

The reporter gene for cre transgene Tg(AMH-cre)1Flor was lacZ; for cre transgene Tg(Amh-cre)8815Reb, the reporter gene was hemagglutinin.

3. Through the "phenotype data" link for Tg(AMH-cre)1Flor, you can see that there are cellular, endocrine/exocrine gland phenotypes and homeostasis/metabolism phenotypes observed.

We welcome your feedback in improving this resource. Contact us through the "Contact Us" link in the navy blue navigation bar at the far right; or email mgi-help@jax.org