The Expression Disruption Screen

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Browser Handbook

(v1.0)

Index

Notes:

This pdf version of the Browser Handbook is available for download at http://www.upo.es/CABD/EDscreen/handbook.html .

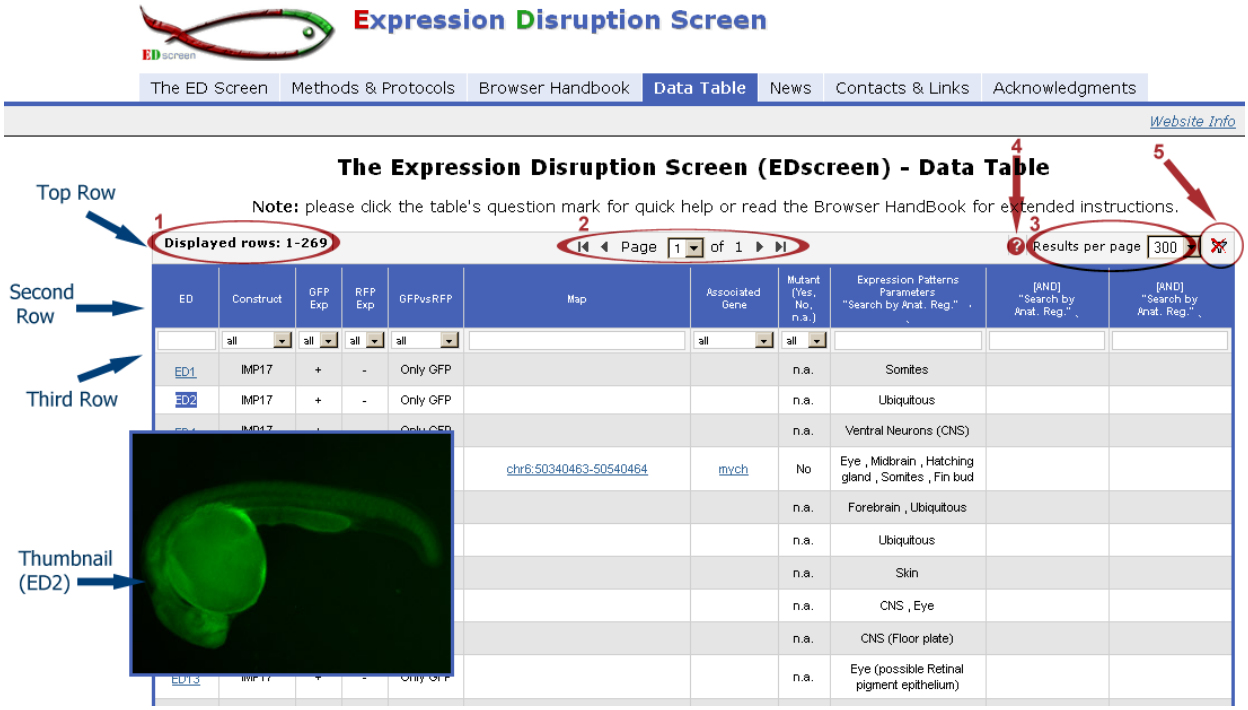
If visiting the page at low screen resolutions it might be better to click the images in the Handbook's sections to open them at their original size.

CABD - Centro Andaluz de Biología del Desarollo
http://www.cabd.es

A) Data Table

One of the most important pages of the site is the Data Table, containing all Expression Disruption Screen entries and allowing the users to interactively search information via filters (selectors in drop-down lists or text inputs, including operators).

Once the Data Table fully loads (it might take a while, depending of Internet connection speed, computer specs., operating system, browser):



- Top Row: Number of displayed rows **(1)**, selection of table pages **(2)** and number of rows per page **(3)**. Clicking on the question mark **(4)** makes the Quick Help to pop-up, which contains the list of all anatomical terms used to describe the ED expression patterns. At the rightmost side there is a red cross **(5)**: clicking on it resets all filters.

- Second Row: contains descriptions for each column (this will be detailed next).

- Third Row: used to filter data (text inputs or selecting from drop-down lists).

B) Detailed descriptions for each Data Table column

(all examples are from data on RC / v1.0 of EDscreen site)

B1) ED

- This column presents the ED number attributed to each stable transgenic line generated by the EDscreen.
- Filter (text input): intended ED number
- On Mouse Hover : thumbnail of the ED case
- On Mouse Click: access to the respective ED page

Reminder: visitors can click here to open a list of all ED pages included in the current version of the site; this might be handy, providing an alternative method to browse the information in those pages (beyond using the Data Table).

B2) Construct

- Four different versions of the ED vector were used in the ED screen (IIC, IMP16, IMP17 and IMPCherry). Most of the ED lines were generated using the IIC vector which is the most up-to-date version of ED. For more information on these vectors please go to the "Methods & Protocols" section.
- Filter (selector): IIC, IMP16, IMP17, IMPCherry, n.a. (not available)

B3 and B4) GFP and RFP Expression

- In these columns the presence or absence of GFP and RFP expression is discriminated for each ED line.
- Filter (selector): + (expression), - (no expression)

B5) GFP vs RFP Expression

- In this column is indicated if the GFP and RFP expression patterns are similar or different for each ED line.
- Filter (selector): Only GFP, GFP ~ RFP (Similar), GFP ≠ RFP (Different)

B6) Map

- This column contains the coordinates of the mapped ED lines. These coordinates correspond to the Jul. 2010 zebrafish (Danio rerio) Zv9 assembly. Also, a link is available for the genomic landscape of the corresponding ED line in a shared session in the UCSC genome browser. Here you will find a track indicating the exact insertion point of ED, with its corresponding orientation, either GFP RFP or RFP GFP oriented (see example below). Other useful tracks are also available, as the enhancer associated epigenetic marks H3K4me1 and H3K27Ac and the promoter associated epigenetic mark H3K4me3 at different developmental times (Bogdanovic et al., 2012).

- Filter (text input): write **chr##** (replacing ## by the chromosome number; note that not all links follow this standard, example: ED45, ED54) ; (hint: writing ' **:** ' (colon) returns a complete list of ED lines with links to UCSC)
- On mouse click: when available, link to the respective position on genome.ucsc.edu (UCSC Genome Bioinformatics). Example, ED198: chr15:32792486-32992495.

B7) Associated Gene

- After mapping the insertion point of an ED line, the expression patterns of nearby genes were compared to GFP and RFP expression. When nearby genes show similar expression patterns to the reporter genes (GFP and/or RFP), that ED line is considered to be associated to that gene. In this column the identified associated gene is annotated. In addition, a link to the gene web page in the zfin site is available.
- Filter (selector): Drop-down list of associated genes
- On mouse click: when available, gene link at zfin.org (Zebrafish International Resource Center)

B8) Mutant

- This column discriminates if an ED line is mutant or not. This was accessed by performing *in situ* hybridization or qPCR for the associated gene in 24hpf embryos from an incross of the corresponding ED line. When a decrease in the levels of the transcript are detected, the ED lie is considered mutant and annotated in this column.
- Filter (selector): Yes, No, n.a. (not available)

B9, B10 and B11) Expression Patterns Parameters, "Search by Anatomical Region"

- The first column (B9) describes the anatomical regions showing expression of GFP and/or RFP for each ED line. ED lines can be searched by expression patterns using anatomical terms. Second and third columns (B10 and B11) are available to perform searches using combination of terms. For a deeper description on how to search ED lines by anatomical terms, see section C2.
- Filter (text input): a reference list of searchable anatomical terms is available when clicking in the question mark located at the top right side of the Data Table

C) Data Table: Filters

Interaction with the EDscreen data can be achieved by using the functionalities of the interesting HTML Table Filter Generator script that powers the Data Table.

Information can be filtered when selecting parameters from drop-down lists or when writing text inputs (and by combining such inputs with operators).

There are three operators that might be specially useful while searching EDscreen's Data Table:

- **=** : Exact match search, only the whole search term(s) is matched (EQUAL)
- **!** : Data that doesn't contain search term(s) is matched (NOT)
- **||** : Data containing at least one of the search terms is matched (OR)
- (for complete documentation please visit http://tablefilter.free.fr/doc.php)

C1) Next, a few examples about using both types of filters (selectors and text inputs):

Example1 (text input), on Map:

- **chr15** returns ED16, ED20, ED21, ED33, ED155, ED191, ED198

Displayed rows: 1-7 / Page 1 of 1 ? Results per page 300

ED	Construct	GFP Exp	RFP Exp	GFPvsRFP	Map	Associated Gene	Mutant (Yes, No, n.a.)	Expression Patterns Parameters "Search by Anat. Reg."	[AND] "Search by Anat. Reg."	[AND] "Search by Anat. Reg."
	all	all	all	all	chr15	all	all			
ED16	IMPCherry	+	-	Only GFP	chr15:19950951-20150952		n.a.	Ubiquitous , Heart		
ED20	IMP17	+	-	Only GFP	chr15:37178017-37378945	robo1	n.a.	Neurons (CNS)		
ED21	IMP17	+	-	Only GFP	chr15:37093376-37293385	robo1	n.a.	Dorsal Neurons (CNS) , Posterior lateral line , Forebrain		
ED33	IMP16	+	-	Only GFP	chr15:14597746-14797751		n.a.	Somites		
ED155	IIC	+	+	Different	chr15:32970161-33170165		n.a.	Somites , Fin bud , Basal expression		
ED191	IIC	+	+	Different	chr15:26253449-26453450	tbx2b	n.a.	Eye (dorsal) , Otic vesicle , Gut , Ubiquitous (faint)		
ED198	IIC	+	+	Different	chr15:32792486-32992495	mab21l1	n.a.	Forebrain , Midbrain , Eye , Hindbrain		

Example2 (text input and operator), on ED:

- **=ED8** exactly returns ED8 (else, if writing ED8, returns ED8, ED80, ED81, etc)
- **=ED5 || =ED29** returns both (ED5 or ED29)
- (for ED equal or greater than 100 it's enough to simply write the number, without '=ED')

Displayed rows: 1-2 / Page 1 of 1 ? Results per page 300

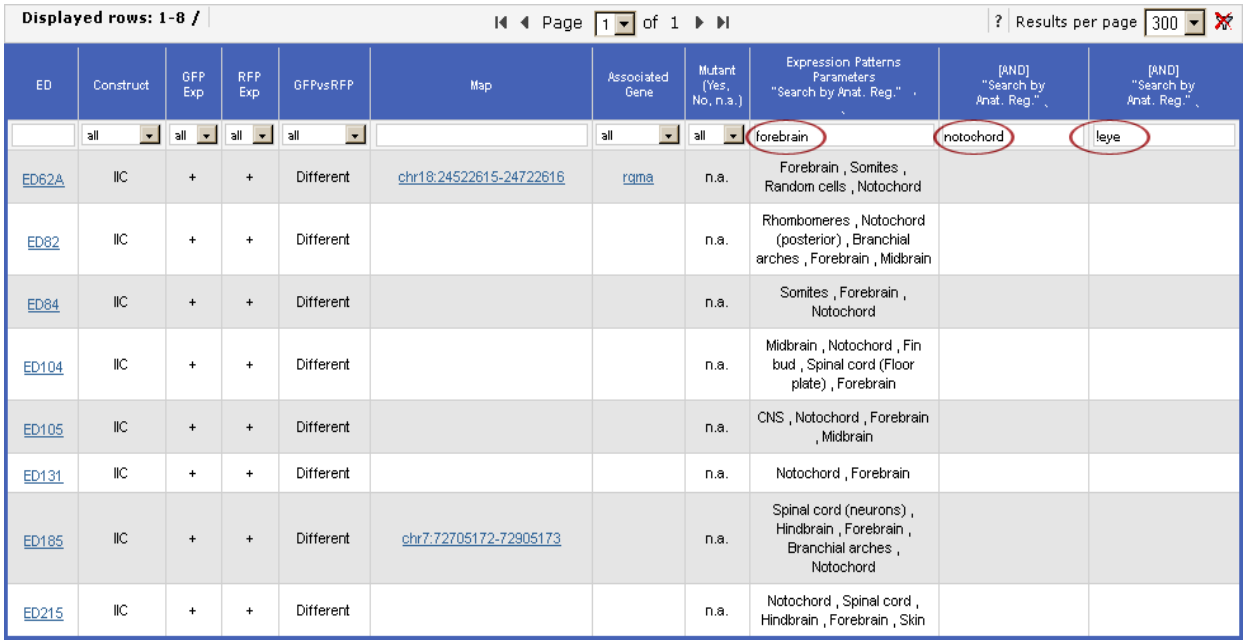
ED	Construct	GFP Exp	RFP Exp	GFPvsRFP	Map	Associated Gene	Mutant (Yes, No, n.a.)	Expression Patterns Parameters "Search by Anat. Reg."	[AND] "Search by Anat. Reg."	[AND] "Search by Anat. Reg."
=ED5 || =ED29	all	all	all	all		all	all			
ED5	IMP17	+	-	Only GFP	chr6:50340463-50540464	mych	No	Eye , Midbrain , Hatching gland , Somites , Fin bud		
ED29	IMP17	+	-	Only GFP			n.a.	Notochord		

C2) Searching ED lines by expression pattern using anatomical terms (see B9, B10, B11):

- Three columns are ready for text input (in order to not clutter the table, only the leftmost has visible text; the other columns are functionally equivalent though). Each column represents [AND] conditions which can be combined with operators:
- The first column (B9) describes the anatomical regions showing expression of GFP and/or RFP for each ED line. ED lines can be searched by expression patterns using anatomical terms. Second and third columns (B10 and B11) are available to perform searches using combination of terms.
- Filter (text input): a reference list of searchable anatomical terms is available when clicking on the question mark located at the top right side of the Data Table

Examples:

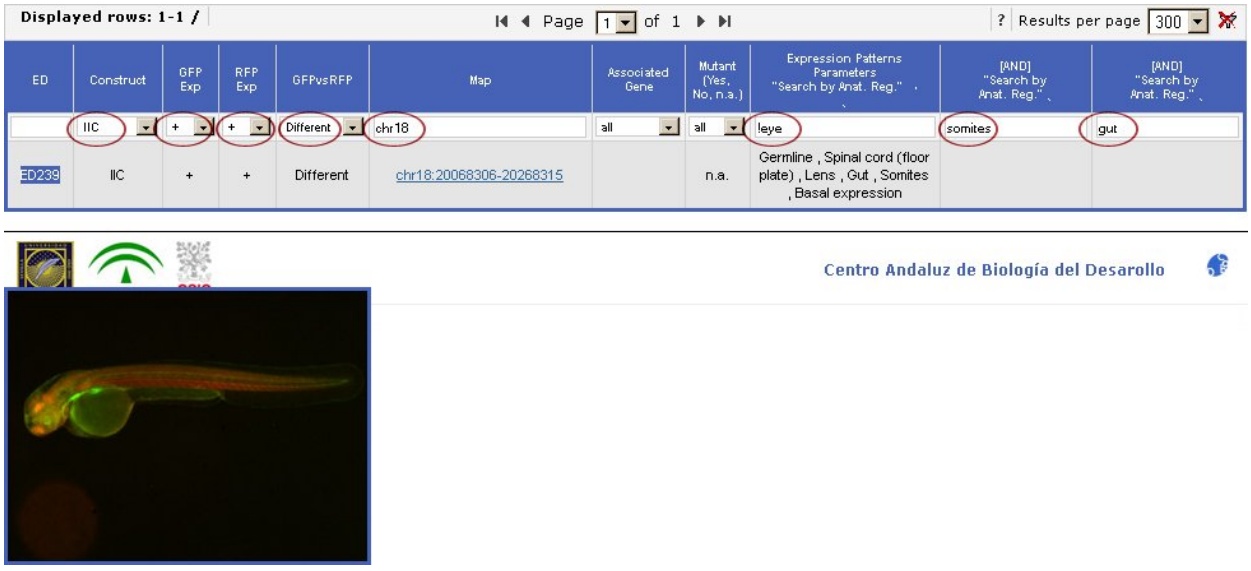
- **brain, eye, fin**
  - one term in each column - (brain [AND] eye [AND] fin) - results in ED5 (Mid**brain**)
- **forebrain, notochord, !eye**
  - results in ED62A, ED82, ED84, ED104, ED105, ED131, ED185, ED215 (all these without eye)
- **forebrain, notochord, eye**
  - removing the '**!**' (not condition) results in ED66 and ED196
- **forebrain, notochord**
  - results in all the previous two cases



Displayed rows: 1-8 / Page 1 of 1 ? Results per page 300

ED	Construct	GFP Exp	RFP Exp	GFPvsRFP	Map	Associated Gene	Mutant (Yes, No, n.a.)	Expression Patterns Parameters "Search by Anat. Reg."	[AND] "Search by Anat. Reg."	[AND] "Search by Anat. Reg."
	all	all	all	all		all	all	forebrain	notochord	!eye
ED62A	IIC	+	+	Different	chr18:24522615-24722616	rgma	n.a.	Forebrain , Somites , Random cells , Notochord		
ED82	IIC	+	+	Different			n.a.	Rhombomeres , Notochord (posterior) , Branchial arches , Forebrain , Midbrain		
ED84	IIC	+	+	Different			n.a.	Somites , Forebrain , Notochord		
ED104	IIC	+	+	Different			n.a.	Midbrain , Notochord , Fin bud , Spinal cord (Floor plate) , Forebrain		
ED105	IIC	+	+	Different			n.a.	CNS , Notochord , Forebrain , Midbrain		
ED131	IIC	+	+	Different			n.a.	Notochord , Forebrain		
ED185	IIC	+	+	Different	chr7:72705172-72905173		n.a.	Spinal cord (neurons) , Hindbrain , Forebrain , Branchial arches , Notochord		
ED215	IIC	+	+	Different			n.a.	Notochord , Spinal cord , Hindbrain , Forebrain , Skin		

This method may not yet be very robust but it already allows a good level of interactivity: together with the filters in all the other columns it is possible to arrive at more restricted sub-groups of ED cases or at individual cases, example, ED239:



D) ED Pages

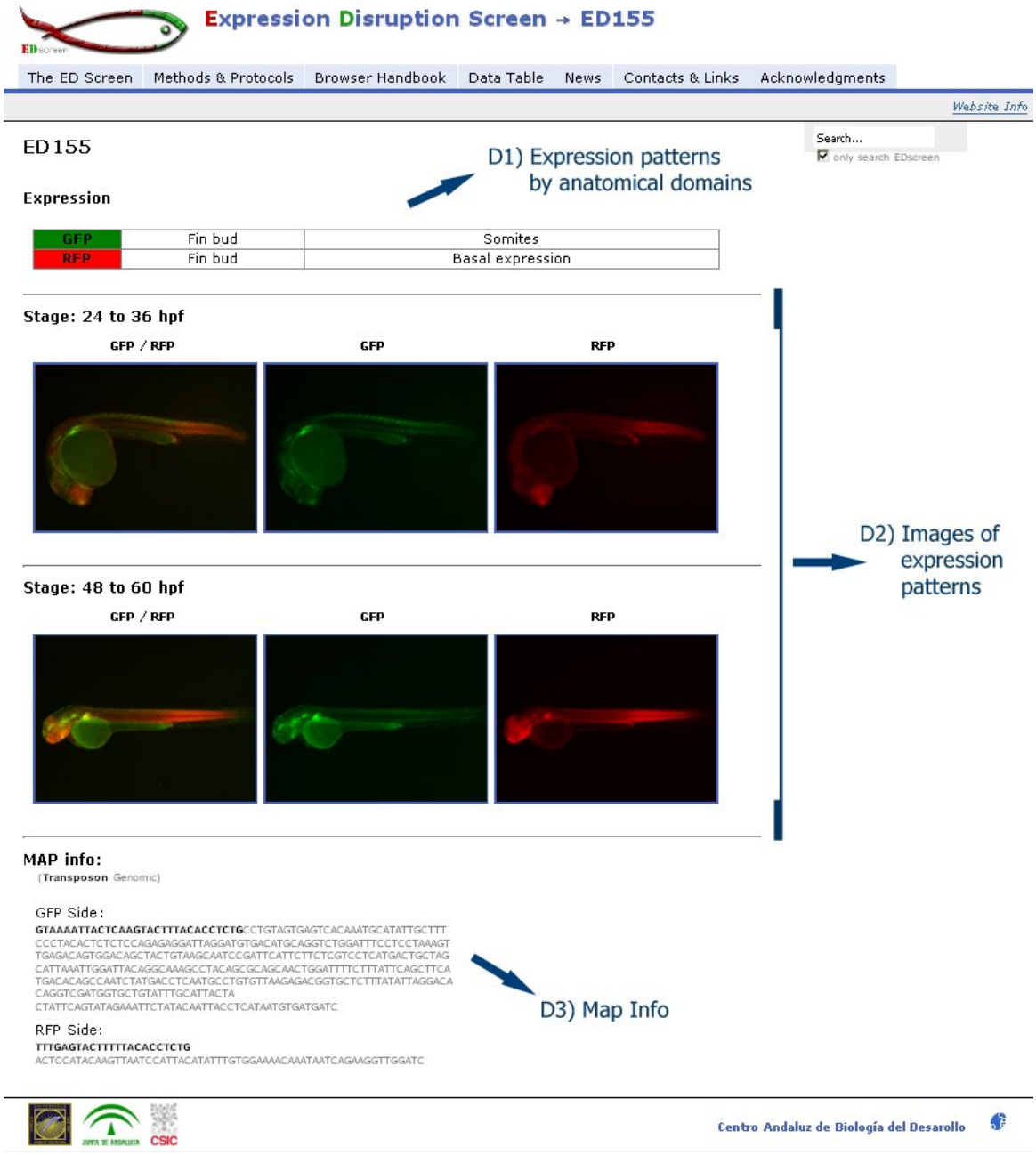
ED pages contain detailed information for each ED line distributed into three main sections: Expression patterns by anatomical domains, Images of expression patterns and Map info. The pages can be visited via:

- Data Table browsing
- Bookmarks folder (for example, created with the help of the 'ED - All Links' page.
- Or directly, by typing the intended ED url in the web browser:

  http://www.upo.es/CABD/EDscreen/ED/ED#####.html

  (replacing ##### by the ED number; example, 00155 to access ED155.

Each ED page is divided into three main sections with extra information in relation to what is visible in the Data Table.



D1) Expression patterns by anatomical domains:

- The GFP and RFP expression are annotated by anatomical domains, corresponding to developmental times that span from 24 to 60 hours post fertilization (hpf).
- In the data table (B9), these anatomical domains are concatenated and GFP and RFP expression is not discriminated.
- In the Data table, the GFP Exp, RFP Exp (B3, B4) and GFP vs RFP (B5) columns are relative to the contents of this Expression table.

D2) Images of expression patterns:

- If available, thumbnails are provided for the merge of GFP and RFP channels (GFP / RFP) and the individual channels (GFP or RFP) for 24 to 36 and 48 to 60 (hpf).
- A version of these images with higher resolution can be viewed if clicking on each thumbnail.

Note: the 'thumbnail' size is dynamically dependent of web browser width in pixels (if using modern browsers).

D3) Map Info

- When information about the ED insertion point is available, a sequence containing the transposon (at bold) and the contiguous genomic sequence will be displayed. Sequences were obtained by performing inverse PCR for the "GFP side" or "RFP side" tip of the transposon.
- Sequences from each side of the transposon (GFP or RFP side) can appear more than once and correspond to results obtained by independent rounds of inverse PCR.

E) References

1. Dynamics of enhancer chromatin signatures mark the transition from pluripotency to cell specification during embryogenesis.

Bogdanovic, O., Fernandez-Minan, A., Tena, J. J., de Lacalle-Mustienes, E., Hidalgo, C., van Kruysbergen, I., van Heeringen, S. J., Veenstra, G. J. C., and Gomez-Skarmeta, J. L.

Genome Research (2012)

Appendix: Website Info / Walkthrough

1) The ED Screen (Home Page)	Page loaded by default, when entering the website: contains a brief description of the Expression Disruption Screen objectives. Latest News related with the project may also be displayed.
2) Methods & Protocols (methods.html)	Description of the laboratory procedures used to perform the Expression Disruption Screen, including Map of ED insertions and Vectors used. **ED Sequence** is available here.
3) Browser Handbook (handbook.html)	Page containing information about the site's main contents, key navigation features and dedicated help sections for Data Table and ED pages. The Browser Handbook is also the place from where additional files can be downloaded.
4) Data Table & ED pages (data.html & /ED/)	The Data Table is the core page of the site's navigation: it can be used to select, compare parameters and have access to all available Expression Disruption Screen contents, including individual pages for each ED case (please see respective handbook sections). Visitors can also click here to open a list of all ED pages included in the current version of the site (it might be handy, providing an alternative method - beyond using the Data Table - to browse the information in those pages).
5) News (news.html)	Local to record the latest updates and developments and, with time, to eventually build a News Archive.
6) Contacts & Links (contacts.html)	If having any inquiry or feedback about EDscreen, please feel free to use the provided email, phone, fax or address contacts. A few ED related links are also displayed.
7) Acknowledgments (acknowledgments.html)	Information about the people behind ED screen (laboratory team, installations, project funding).

Generic Website Notes:

- The site is structured with a simple layout intended to be adaptable to various screen resolutions (based on a two-column liquid design template; also see '**Website Info**' page for extra information).
- Despite its 'liquid design' nature, and unless the user's browser / device has an adaptive zoom feature (like what is traditional in portable devices), it is recommended that the minimum resolution should not go lower than a width of 800px: this is mostly due to space requirements related with Data Table presentation and, although with a lower constraint, with the Expression Table Map Info sections on ED pages (such resolution constraints might be improved in eventual future code revisions; in portable devices the Data Table page will fit the physical screen). At the moment, optimum computer resolutions should be equal or greater than 1024x768.
- Although there was an effort to make the site multi-browser and cross-platform compatible, some features might not work so well in older browsers (ex: IE5.5 / 6, Netscape): in principle, this should not limit the presentation of the most important data nor have significant impacts on navigation.
- At the right top side of all pages (except the Data Table) there is a Google Search Box (by default, the search is limited to within EDscreen domain - http://www.upo.es/CABD/EDscreen/ - if the 'search only in EDscreen' box is kept checked).
- All pages have issue dates, at the bottom right corner, to inform when they were last updated.