**MOUSE AUDITORY BRAINSTEM RESPONSE (ABR) DATA RESOURCE**

**Dr NEIL J INGHAM, Prof KAREN P STEEL. 2018.**

This resource is intended to make available to the scientific community the entire dataset of mouse ABR recordings made as part of the Wellcome Trust Sanger Institute Mouse Genetics Project (MGP). The aim is to give third-party users the information required to interpret and reconstruct the evoked potential responses recorded using their own coded scripts and to perform their own analyses on the data. Responses were generated using custom software developed at the MRC Institute of Hearing Research, Nottingham, and Wellcome Trust Sanger Institute, Hinxton, by Tim Folkard and Neil Ingham, respectively. ABRs were recorded according to the methods detailed in Ingham *et al.* 2011 and Ingham *et al.* 2018. Here we provide:

1. ZIP files (19 totalling 11.4GB) containing the 9000+ ABR datafiles generated for during the MGP phenotyping screen.
2. an annotation of the datafile structure (contained within “ABR\_RESOURCE\_Datafile Annotation.xlsx”).
3. a list of mice tested during the screening period and meta-data associated with each mouse (contained within “ABR\_RESOURCE\_Mouse ID.xlsx”).
4. **ZIP-file Information.**

ZIP files (19 totalling 11.4GB) are provided containing the datafiles generated for each mouse tested. Each individual datafile is named according to the unique identifier barcode allocated to each mouse (listed in the mouse barcode column of “ABR\_RESOURCE\_Mouse ID.xlsx”, as described in section 3 below). Datafiles are stored across 19 zip-files in increasing alphanumeric order, with each zip-file named according to the first and last filename stored in the zip-file (for example, the first zip-files contains data from mouse M00013165 to M00145618). The zip-files are named as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | \_M00013165\_to\_M00145618.zip | 2. | \_M00145660\_to\_M00218577.zip |
| 3. | \_M00218786\_to\_M00286920.zip | 4. | \_M00286927\_to\_M00370330.zip |
| 5. | \_M00371702\_to\_M00491851.zip | 6. | \_M00491852\_to\_M00617707.zip |
| 7. | \_M00617709\_to\_M00754249.zip | 8. | \_M00754250\_to\_M00889693.zip |
| 9. | \_M00889694\_to\_M01025210.zip | 10. | \_M01025211\_to\_M01164518.zip |
| 11. | \_M01164520\_to\_M01328136.zip | 12. | \_M01328137\_to\_M01470166.zip |
| 13. | \_M01470167\_to\_M01623523.zip | 14. | \_M01623527\_to\_M01745797.zip |
| 15. | \_M01745798\_to\_M01867451.zip | 16. | \_M01867816\_to\_M02001583.zip |
| 17. | \_M02001765\_to\_M02135571.zip | 18. | \_M02135572\_to\_M02271105.zip |
| 19. | \_M02271106\_to\_M02405362.zip |  |  |

1. **Information within “ABR\_RESOURCE\_Datafile Annotation.xlsx”**

The file contains 2 worksheets, named "M02405362" and “Annotation”.

The worksheet named "M02405362" gives an example of the custom "csv" datafile generated from the ABR recording software. The datafile contains blocks of recorded data and metadata, each block starting with a row containing [Trace\_X] in the first column. Subsequent blocks are labelled with incrementing X-values. Related cells in the first 2 blocks are colour-coded, to help with cross-referencing to the “Annotation” worksheet.

The worksheet named "Annotation" gives a description of the cell contents of the first 2 blocks of data shown in sheet "M02405362". Cell references maintained between sheets, such that “Annotation!A1” describes the contents of “M02405362!A1”, etc. Cells and rows are colour-coded, with related information grouped together by colour. The contents of each cell give a description of the contents of the equivalent cell in the datafile worksheet (M02405362), to allow the user to understand the structure of the csv-datafiles provided in the various zip-files, and to facilitate their reconstruction of the ABR dataset and perform their own analyses on these data.

1. **Information within “ABR\_RESOURCE\_Mouse ID.xlsx”**

Three phenotyping pipelines were followed (named “MGP Pipeline 2”, Mouse GP” and “MGP Select”, as detailed in Ingham *et al.* 2018) and information for mice tested on each pipeline are kept in separate worksheets, labelled “Pipeline2 Controls”, “Pipeline2 Mutants”, “MouseGP Controls”, “Mouse GP Mutants”, “MGP Select Controls” and “MGP Select Mutants”.

In the “Controls” worksheets, mice are grouped into blocks (separated by yellow rows) of similar genetic background. For some of the positive control lines, heterozygote mice were used as controls.

In the “Mutants” worksheets, mice are grouped into blocks of 16 rows (separated by grey rows). Each block contains mice of the same genotype. For some genes / alleles, mice that were either heterozygote or homozygote for the targeted allele were tested.

The worksheets contain the following metadata, in columns from left-right across each sheet :-

|  |  |
| --- | --- |
| **Colony Prefix** | A 4-letter code to uniquely identify each mouse colony. |
| **Mouse Barcode**  | A unique code to identify each mouse (also used as the **ABR data filename**). |
| **Mouse Name** | A second unique identifier for each mouse (eg. MAKL13.1c – comprised of “colony prefix – MAKN” “mating number – 13”.”litter number – 1””alphabetically listed letter to refer to each mouse in the litter – c”) |
| **Pipeline** | “MGP Pipeline 2”, “Mouse GP”, or “MGP Select” |
| **Birth Date** | Date of Birth for the mouse (DD-Month-YY) |
| **Test Date** | Date of ABR test (DD-Month-YY) |
| **Age at Test** | In weeks (XX.x) |
| **Genotype** | Wildtype mice are denoted as +/+Heterozygote mice are denoted as *\**/+, eg *Brd8*/+ heterozygote *Brd8 allele*;Homozygote mice are denoted as \*/\*, eg *Herc3/Herc3* homozygote *Herc3 allele*;Hemizygote mice for X-linked-genes are denoted as \*/Y, eg *Acsl4*/Y. |
| **Genetic Background** | The genetic background of the mouse line. (See Ingham *et al.* 2018 for detail.) |
| **Allele**  | The allele of the targeted gene for the particular line.eg Acpl2<tm1a(KOMP)Wtsi> represents *Acpl2tm1a(KOMP)Wtsi* in standard nomenclature. |
| **Gene**  | The targeted gene. |
| **Click Threshold** | dB SPL threshold estimate for click stimulus. |
| **6kHz Threshold** | dB SPL threshold estimate for 6kHz stimulus. |
| **12kHz Threshold** | dB SPL threshold estimate for 12kHz stimulus. |
| **18kHz Threshold** | dB SPL threshold estimate for 18kHz stimulus. |
| **24kHz Threshold** | dB SPL threshold estimate for 24kHz stimulus. |
| **30kHz Threshold** | dB SPL threshold estimate for 30kHz stimulus. |

**References.**

* Ingham, N.J., Pearson, S. and Steel, K.P. (2011) Using the Auditory Brainstem Response (ABR) to determine sensitivity of hearing in mutant mice. Current Protocols in Mouse Biology 1:279-287. DOI:10.1002/9780470942390.mo110059
* Ingham, N.J., Pearson, S. et al. & Steel, K.P. (2018) Mouse screen reveals multiple new genes underlying mouse and human hearing loss. **IN PREPARATION for PLOS BIOLOGY**