

A Digital Atlas of Ion Channel Expression Patterns in the Two-Week-Old Rat Brain

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Online Resource 1

ESM_1. List of ion channels examined in the P14 rat brain.

ISH data are viewable using the entry interface of Genepaint.org (<http://www.genepaint.org/>) by entering the gene symbol or Genepaint set ID (a database internal ID). In the Genepaint.org database, images of individual sections can be viewed at full resolution by using the virtual microscope tools. Additionally, the full template sequence, specimen properties, gene accession number and Entrez Gene ID can be retrieved and images can be downloaded as described in the Manual of Genepaint under “Zoom Viewer” on the Genepaint.org home page [see also (Geffers et al. 2012)].

Supplemental references

Geffers, L., Herrmann, B., & Eichele, G. (2012). Web-based digital gene expression atlases for the mouse. *Mamm Genome*, 23(9-10), 525-538, doi:10.1007/s00335-012-9413-3.

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|---------------------------------------|---|------------------|---------------|--------|------|--------|---------------------|---------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Calcium Voltage-Gated Channels | | | | | | | | |
| Cacna1a | Calcium channel voltage-dependent P/Q-type alpha-1A subunit | RB43 | | | | | | |
| Cacna1b | Calcium channel voltage-dependent N-type alpha-1B subunit | RB44 | | | | | | |
| Cacna1c | Calcium channel voltage-dependent L-type alpha-1C subunit | RB45 | | | | | | |
| Cacna1d | Calcium channel voltage-dependent L-type alpha-1D subunit | RB46 | | | | | | |
| Cacna1e | Calcium channel voltage-dependent R-type alpha-1E subunit | RB47 | | | | | | |
| Cacna1f | Calcium channel voltage-dependent L-type alpha-1F subunit | RB48 | | | | | | |
| Cacna1g | Calcium channel voltage-dependent T-type alpha-1G subunit | RB49 | | | | | | |
| Cacna1h | Calcium channel voltage-dependent T-type alpha-1H subunit | RB57 | | | | | | |
| Cacna1i | Calcium channel voltage-dependent T-type alpha-1I subunit | RB58 | | | | | | |
| Cacna1s | Calcium channel voltage-dependent L-type alpha-1S subunit | RB59 | | | | | | |
| Cacna2d1 | Calcium channel voltage-dependent alpha 2/delta subunit 1 | RB60 | | | | | | |
| Cacna2d2 | Calcium channel voltage-dependent alpha 2/delta subunit 2 | RB61 | | | | | | |
| Cacna2d3 | Calcium channel voltage-dependent alpha 2/delta subunit 3 | RB62 | | | | | | |
| Cacna2d4 | Calcium channel voltage-dependent alpha 2/delta subunit 4 | RB63 | | | | | | |
| Cacnb1 | Calcium channel voltage-dependent beta-1 subunit | RB64 | | | | | | |
| Cacnb2 | Calcium channel voltage-dependent beta-2 subunit | RB65 | | | | | | |
| Cacnb3 | Calcium channel voltage-dependent beta-3 subunit | RB66 | | | | | | |
| Cacnb4 | Calcium channel voltage-dependent beta-4 subunit | RB67 | | | | | | |
| Cacng1 | Calcium channel voltage-dependent gamma-1 subunit | | ND | ND | ND | ND | gcgtgaccctcttctcatc | gtctgggttggtccatgtg |
| Cacng2 | Calcium channel voltage-dependent gamma-2 subunit | RB68 | | | | | | |
| Cacng3 | Calcium channel voltage-dependent gamma-3 subunit | RB69 | | | | | | |
| Cacng4 | Calcium channel voltage-dependent gamma-4 subunit | RB70 | | | | | | |
| Cacng5 | Calcium channel voltage-dependent gamma-5 subunit | RB71 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

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|-----------------|---|------------------|---------------|--------|------|--------|---------|---------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Cacng6 | Calcium channel voltage-dependent gamma-6 subunit | RB72 | | | | | | |
| Cacng7 | Calcium channel voltage-dependent gamma-7 subunit | RB73 | | | | | | |
| Cacng8 | Calcium channel voltage-dependent gamma-8 subunit | RB74 | | | | | | |

Cyclic Nucleotide Gated Channels

| | | | | | | | | |
|-------|---|-------|----|----|----|----|----------------------|----------------------|
| Cnga1 | Cyclic-nucleotide-gated cation channel alpha 1 | RB130 | D | D | D | D | cgtgcagctcatttctgac | ggctctgccttctgtatga |
| Cnga2 | Cyclic-nucleotide-gated cation channel alpha 2 | | ND | ND | D | ND | actgtgacctcaggactctg | atcttgccattggccttga |
| Cnga3 | Cyclic-nucleotide-gated cation channel alpha 3 | | ND | ND | ND | ND | ggagaccggagaactggctg | gctcagctccatgaaaacga |
| Cnga4 | Cyclic-nucleotide-gated cation channel alpha 4 | RB131 | D | ND | ND | ND | attggtctatagatgcctag | cctcaagagtcccagtgcat |
| Cngb1 | Cyclic-nucleotide-gated cation channel beta 1 | | ND | ND | ND | ND | aaggagaggatgtggctgag | ccttctccatgccctccag |
| Cngb3 | Cyclic-nucleotide-gated cation channel beta 3 | | ND | ND | D | D | ccaaacaccagacaacagga | actccgaagaagatgtagag |
| Hcn1 | Potassium hyperpolarization-activated cyclic nucleotide-gated channel 1 | RB123 | | | | | | |
| Hcn2 | Potassium hyperpolarization-activated cyclic nucleotide-gated channel 2 | RB319 | | | | | | |
| Hcn3 | Potassium hyperpolarization-activated cyclic nucleotide-gated channel 3 | RB334 | | | | | | |
| Hcn4 | Potassium hyperpolarization-activated cyclic nucleotide-gated channel 4 | RB340 | | | | | | |

Potassium Voltage-Gated Channels

| | | | | | | | | |
|--------|---|------|--|--|--|--|--|--|
| Kcna1 | Potassium voltage-gated channel subfamily A member 1 | RB86 | | | | | | |
| Kcna2 | Potassium voltage-gated channel subfamily A member 2 | RB87 | | | | | | |
| Kcna3 | Potassium voltage-gated channel subfamily A member 3 | RB88 | | | | | | |
| Kcna4 | Potassium voltage-gated channel subfamily A member 4 | RB89 | | | | | | |
| Kcna5 | Potassium voltage-gated channel subfamily A member 5 | RB90 | | | | | | |
| Kcna6 | Potassium voltage-gated channel subfamily A member 6 | RB91 | | | | | | |
| Kcna7 | Potassium voltage-gated channel subfamily A member 7 | RB92 | | | | | | |
| Kcna10 | Potassium voltage-gated channel subfamily A member 10 | RB93 | | | | | | |
| Kcnab1 | Potassium voltage-gated channel beta-1 subunit | RB94 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Kcnab2 | Potassium voltage-gated channel beta-2 subunit | RB95 | | | | | | |
| Kcnab3 | Potassium voltage-gated channel beta-3 subunit | RB96 | | | | | | |
| Kcnb1 | Potassium voltage-gated channel subfamily B member 1 | RB97 | | | | | | |
| Kcnb2 | Potassium voltage-gated channel subfamily B member 2 | RB98 | | | | | | |
| Kcnc1 | Potassium voltage-gated channel subfamily C member 1 | RB99 | | | | | | |
| Kcnc2 | Potassium voltage-gated channel subfamily C member 2 | RB79 | | | | | | |
| Kcnc3 | Potassium voltage-gated channel subfamily C member 3 | RB80 | | | | | | |
| Kcnc4 | Potassium voltage-gated channel subfamily C member 4 | RB175 | | | | | | |
| Kcnd1 | Potassium voltage-gated channel subfamily D member 1 | RB82 | | | | | | |
| Kcnd2 | Potassium voltage-gated channel subfamily D member 2 | RB83 | | | | | | |
| Kcnd3 | Potassium voltage-gated channel subfamily D member 3 | RB311 | | | | | | |
| Kcne1 | Potassium voltage-gated channel subfamily E member 1 | RB85 | | | | | | |
| Kcne1l | KCNE1-like | RB105 | | | | | | |
| Kcne2 | Potassium voltage-gated channel subfamily E member 2 | RB106 | | | | | | |
| Kcne3 | Potassium voltage-gated channel subfamily E member 3 | RB107 | | | | | | |
| Kcne4 | Potassium voltage-gated channel subfamily E member 4 | RB108 | D | D | D | D | cagccgtttaagagttccac | tgtgctattcagaggctcca |
| Kcnf1 | Potassium voltage-gated channel subfamily F member 1 | RB109 | | | | | | |
| Kcng1 | Potassium voltage-gated channel subfamily G member 1 | RB110 | | | | | | |
| Kcng2 | Potassium voltage-gated channel subfamily G member 2 | RB111 | | | | | | |
| Kcng3 | Potassium voltage-gated channel subfamily G member 3 | RB335 | | | | | | |
| Kcng4 | Potassium voltage-gated channel subfamily G member 4 | RB152 | | | | | | |
| Kcnh1 | Potassium voltage-gated channel subfamily H member 1 | RB336 | | | | | | |
| Kcnh2 | Potassium voltage-gated channel subfamily H member 2 | RB337 | | | | | | |
| Kcnh3 | Potassium voltage-gated channel subfamily H member 3 | RB338 | | | | | | |

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| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|---------|---------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Kcnh4 | Potassium voltage-gated channel subfamily H member 4 | RB339 | | | | | | |
| Kcnh5 | Potassium voltage-gated channel subfamily H member 5 | RB341 | | | | | | |
| Kcnh6 | Potassium voltage-gated channel subfamily H member 6 | RB342 | | | | | | |
| Kcnh7 | Potassium voltage-gated channel subfamily H member 7 | RB343 | | | | | | |
| Kcnh8 | Potassium voltage-gated channel subfamily H member 8 | RB344 | | | | | | |
| Kcnq1 | Potassium voltage-gated channel subfamily KQT member 1 | RB345 | | | | | | |
| Kcnq2 | Potassium voltage-gated channel subfamily KQT member 2 | RB346 | | | | | | |
| Kcnq3 | Potassium voltage-gated channel subfamily KQT member 3 | RB347 | | | | | | |
| Kcnq4 | Potassium voltage-gated channel subfamily KQT member 4 | RB348 | | | | | | |
| Kcnq5 | Potassium voltage-gated channel subfamily KQT member 5 | RB176 | | | | | | |
| Kcnrg | Potassium channels regulator | RB207 | | | | | | |
| Kcns1 | Potassium voltage-gated channel subfamily S member 1 | RB177 | | | | | | |
| Kcns2 | Potassium voltage-gated channel subfamily S member 2 | RB178 | | | | | | |
| Kcns3 | Potassium voltage-gated channel subfamily S member 3 | RB179 | | | | | | |
| Kcnv1 | Potassium voltage-gated channel subfamily V member 1 | RB180 | | | | | | |
| Kcnv2 | Potassium voltage-gated channel subfamily V member 2 | RB181 | | | | | | |

Inwardly-Rectifying Potassium Channels

| | | | | | | | | |
|-------|--|-------|--|--|--|--|--|--|
| Kcnj1 | Potassium inwardly-rectifying channel subfamily J member 1 | RB100 | | | | | | |
| Kcnj2 | Potassium inwardly-rectifying channel subfamily J member 2 | RB77 | | | | | | |
| Kcnj3 | Potassium inwardly-rectifying channel subfamily J member 3 | RB78 | | | | | | |
| Kcnj4 | Potassium inwardly-rectifying channel subfamily J member 4 | RB102 | | | | | | |
| Kcnj5 | Potassium inwardly-rectifying channel subfamily J member 5 | RB117 | | | | | | |
| Kcnj6 | Potassium inwardly-rectifying channel subfamily J member 6 | RB103 | | | | | | |
| Kcnj8 | Potassium inwardly-rectifying channel subfamily J member 8 | RB104 | | | | | | |

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| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|---|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Kcnj9 | Potassium inwardly-rectifying channel subfamily J member 9 | RB56 | | | | | | |
| Kcnj10 | Potassium inwardly-rectifying channel subfamily J member 10 | RB50 | | | | | | |
| Kcnj11 | Potassium inwardly-rectifying channel subfamily J member 11 | RB51 | | | | | | |
| Kcnj12 | Potassium inwardly-rectifying channel subfamily J member 12 | RB52 | | | | | | |
| Kcnj13 | Potassium inwardly-rectifying channel subfamily J member 13 | RB53 | D | ND | D | D | cagctgcggttctcttctct | ggttggccatctttgtgagc |
| Kcnj14 | Potassium inwardly-rectifying channel subfamily J member 14 | RB54 | | | | | | |
| Kcnj15 | Potassium inwardly-rectifying channel subfamily J member 15 | RB55 | | | | | | |
| Kcnj16 | Potassium inwardly-rectifying channel subfamily J member 16 | RB101 | | | | | | |

Two-P Potassium Channels

| | | | | | | | | |
|--------|---|-------|----|----|----|----|--------------------|---------------------|
| Kcnk1 | Potassium channel subfamily K member 1 | RB124 | | | | | | |
| Kcnk2 | Potassium channel subfamily K member 2 | RB268 | | | | | | |
| Kcnk3 | Potassium channel subfamily K member 3 | RB125 | | | | | | |
| Kcnk4 | Potassium channel subfamily K member 4 | RB126 | | | | | | |
| Kcnk5 | Potassium channel subfamily K member 5 | RB127 | | | | | | |
| Kcnk6 | Potassium channel subfamily K member 6 | RB128 | | | | | | |
| Kcnk7 | Potassium channel subfamily K member 7 | RB129 | | | | | | |
| Kcnk9 | Potassium channel subfamily K member 9 | RB305 | | | | | | |
| Kcnk10 | Potassium channel subfamily K member 10 | RB267 | | | | | | |
| Kcnk12 | Potassium channel subfamily K member 12 | RB296 | | | | | | |
| Kcnk13 | Potassium channel subfamily K member 13 | RB297 | | | | | | |
| Kcnk15 | Potassium channel subfamily K member 15 | RB298 | | | | | | |
| Kcnk16 | Potassium channel subfamily K member 16 | RB299 | | | | | | |
| Kcnk18 | Potassium channel subfamily K member 18 | | ND | ND | ND | ND | gtgggtgctgctcttctc | tcaaccactgtcaggttgc |

Calcium-Activated Potassium Channels

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Kcna1 | Potassium calcium-activated channel subfamily M alpha member 1 | RB313 | | | | | | |
| Kcnmb1 | Potassium calcium-activated channel subfamily M beta member 1 | RB314 | D | D | D | D | actggagaccaactctctg | atggccaccggaggcaacag |
| Kcnmb2 | Potassium calcium-activated channel subfamily M beta member 2 | RB138 | | | | | | |
| Kcnmb3 | Potassium calcium-activated channel subfamily M beta member 3 | | ND | ND | ND | ND | actttgccttcacctgtgag | agatgatccctgtctccgtg |
| Kcnmb4 | Potassium calcium-activated channel subfamily M beta member 4 | RB315 | | | | | | |
| Kcnn1 | Potassium intermediate/small conductance calcium-activated channel subfamily N, member 1 | RB316 | | | | | | |
| Kcnn2 | Potassium intermediate/small conductance calcium-activated channel subfamily N, member 2 | RB317 | | | | | | |
| Kcnn3 | Potassium intermediate/small conductance calcium-activated channel subfamily N, member 3 | RB318 | | | | | | |
| Kcnn4 | Potassium intermediate/small conductance calcium-activated channel protein 4 | RB351 | | | | | | |
| Kcnt1 | Potassium channel subfamily T member 1 | | | | | | | |
| Kcnt2 | Potassium channel subfamily T member 2 | RB132 | D | D | D | D | ggatcagaacgtatgccaga | gaggttgagttgcggtgaat |
| Kcnu1 | Potassium channel subfamily U member 1 | | ND | D | ND | ND | gtcaagggccaagaggact | atgcgctgacgaaatactcc |

Sodium Voltage-Gated Channels

| | | | | | | | | |
|--------|--|-------|---|---|---|---|----------------------|---------------------|
| Scn1a | Sodium channel voltage-gated type I alpha subunit | RB182 | | | | | | |
| Scn1b | Sodium channel voltage-gated type I beta subunit | RB183 | | | | | | |
| Scn2a1 | Sodium channel voltage-gated type II alpha subunit | RB406 | D | D | D | D | aacctgcactggagactgct | actgaccgtgccatctttc |
| Scn2b | Sodium channel voltage-gated type II beta subunit | RB357 | | | | | | |
| Scn3a | Sodium channel voltage-gated type III alpha subunit | RB184 | | | | | | |
| Scn3b | Sodium channel voltage-gated type III beta subunit | RB185 | | | | | | |
| Scn4a | Sodium channel voltage-gated type IV alpha subunit | RB186 | | | | | | |
| Scn4b | Sodium channel voltage-gated type IV beta subunit | RB307 | | | | | | |
| Scn5a | Sodium channel voltage-gated type V alpha subunit | RB300 | | | | | | |
| Scn7a | Sodium channel voltage-gated type VII alpha subunit | RB276 | | | | | | |
| Scn8a | Sodium channel voltage-gated type VIII alpha subunit | RB308 | | | | | | |

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|-----------------|--|------------------|---------------|--------|------|--------|---------|---------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Scn9a | Sodium channel voltage-gated type IX alpha subunit | RB277 | | | | | | |
| Scn10a | Sodium channel voltage-gated type X alpha subunit | RB306 | | | | | | |
| Scn11a | Sodium channel voltage-gated type XI alpha subunit | RB194 | | | | | | |

CatSper and Two-Pore Channels

| | | | | | | | | |
|----------|-----------------------------------|-------|----|----|----|----|----------------------|----------------------|
| Catsper1 | Cation channel sperm associated 1 | | ND | ND | ND | ND | cctcaagctaatcgctctgg | ggaggagcacaagtccaac |
| Catsper2 | Cation channel sperm associated 2 | RB293 | D | D | D | D | tagaggagcgcaagaggtg | ctggccaagacacaggt |
| Catsper3 | Cation channel sperm associated 3 | | ND | ND | ND | ND | actggatgtgtcattctgg | agccacagtgtagacggtc |
| Catsper4 | Cation channel sperm associated 4 | | ND | ND | D | D | ggagcgtcatggagaagaag | ggtaatggcgttagtaccac |
| Tpcn1 | Two-pore segment channel 1 | RB75 | D | D | D | D | acacatgtttgagctgctg | cccactgaagaactccatgc |
| Tpcn2 | Two-pore segment channel 2 | RB76 | D | D | D | D | gtggttggtcctctgtca | ccaggagctgcttatgacct |

Transient Receptor Potential Channels

| | | | | | | | | |
|-------|--|-------|---|----|----|----|----------------------|----------------------|
| Trpa1 | Transient receptor potential cation channel subfamily A member 1 | RB146 | D | ND | D | D | caccttgggcagcttattg | gctctggacctcagcaatg |
| Trpc1 | Transient receptor potential cation channel subfamily C member 1 | RB4 | D | D | D | D | gtccaccccacactggtag | gcagtcctctgctcttgg |
| Trpc2 | Transient receptor potential cation channel subfamily C member 2 | RB5 | D | D | D | D | ggtcacaggcttctgtggt | acaggatgaccacgtccagg |
| Trpc3 | Transient receptor potential cation channel subfamily C member 3 | | D | ND | D | D | acgaagtgaaactgaaagaa | ccacattgtgccagagtca |
| Trpc4 | Transient receptor potential cation channel subfamily C member 4 | RB147 | D | ND | D | D | aatacagtcagccaacgcag | ggaggagcacactctctgc |
| Trpc5 | Transient receptor potential cation channel subfamily C member 5 | RB139 | D | D | D | D | tgagaccagagctattgatg | ctccccaaaactccgtgaat |
| Trpc6 | Transient receptor potential cation channel subfamily C member 6 | RB140 | D | D | D | D | cagcagccacctatggcta | gccaacctcttccctctc |
| Trpc7 | Transient receptor potential cation channel subfamily C member 7 | RB18 | D | ND | ND | ND | tgaggaattctgaaaacctg | ctgttcaccctcaggtggt |
| Trpm1 | Transient receptor potential cation channel subfamily M member 1 | RB19 | D | D | D | ND | gaatgcagaagaccaatgg | aaacgtcttctatccatg |
| Trpm2 | Transient receptor potential cation channel subfamily M member 2 | RB141 | D | D | D | D | gatacgtggatgaccaagg | cggctacaacctgccattc |
| Trpm3 | Transient receptor potential cation channel subfamily M member 3 | RB21 | D | D | D | D | gagtcgcctcccgaatg | ccattccttggtcatcaggt |
| Trpm4 | Transient receptor potential cation channel subfamily M member 4 | RB25 | D | D | D | D | agttaccgagtggaacagtg | atccgtgcatcagacagcc |
| Trpm5 | Transient receptor potential cation channel subfamily M member 5 | RB22 | D | D | D | D | acctggtggtgcctggtg | actggtcaggatccaggcac |

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|-----------------|---|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Trpm6 | Transient receptor potential cation channel subfamily M member 6 | | ND | ND | D | D | cagcgtcagcaggagtttc | gggtcagaggggaagtctct |
| Trpm7 | Transient receptor potential cation channel subfamily M member 7 | RB6 | D | D | D | D | gggtgctgctggatataatg | gtccggagagctctctgctg |
| Trpm8 | Transient receptor potential cation channel subfamily M member 8 | RB37 | D | ND | ND | D | ttaccagagactccaaggcc | gttgaaactccttgggtg |
| Trpv1 | Transient receptor potential cation channel subfamily V member 1 | RB142 | D | ND | ND | ND | ctgagcttctccctgaggtc | catgtctatctcagtgctt |
| Trpv2 | Transient receptor potential cation channel subfamily V member 2 | RB36 | D | D | D | D | ctttcaggctggagacttcc | acactgaagagtcggtcacg |
| Trpv3 | Transient receptor potential cation channel subfamily V member 3 | | ND | ND | ND | D | ccagaatggctgagaagcag | cagtcactcacctcgttg |
| Trpv4 | Transient receptor potential cation channel subfamily V member 4 | RB26 | ND | D | ND | D | agtctcagtagtgcctggg | ccggtgaagactttgagga |
| Trpv5 | Transient receptor potential cation channel subfamily V member 5 | | ND | ND | ND | D | agtggcccaggagagggacg | gcttagggatgtagtcctgg |
| Trpv6 | Transient receptor potential cation channel subfamily V member 6 | RB27 | D | ND | D | D | actcagccttccacccatg | tgatcagagcctggacattg |
| Mcoln1 | Mucolipin 1 | RB2 | D | D | D | D | gctgtggaccagtacctgac | agagccagagctgagccatt |
| Mcoln2 | Mucolipin 2 | RB32 | D | D | D | D | gtccgaacagtggtagctga | ccctcagacacttctcttc |
| Mcoln3 | Mucolipin 3 | RB33 | D | D | ND | D | agcttctctagaagatcag | ttcggtcctatgtagccttc |
| Pkd2 | Polycystic kidney disease 2 related | RB3 | D | D | D | D | ggcctggccgagagggctgg | tggagctcatcatgccatag |
| Pkd2l1 | Polycystic kidney disease 2-like 1 | | ND | ND | ND | ND | agagtcctgtgtccggctg | agactctgacggggtgtgaa |
| Pkd2l2 | Polycystic kidney disease 2-like 2 | RB34 | D | D | D | D | cagcttccagtcctagacc | accctcatctcggtagacg |
| Pkdrej | Polycystic kidney disease (polycystin) and REJ homolog (sperm receptor for egg jelly homolog, sea urchin) | RB35 | D | D | D | D | tttgggtacctggtgttcg | tgttctgaaggctgacacg |

Anion channels

| | | | | | | | | |
|-------|---|-------|---|---|---|---|----------------------|----------------------|
| Vdac1 | Voltage-dependent anion-selective channel protein 1 | RB133 | D | D | D | D | aagtcaccgagtgaccagag | gctgtattcctaaagcgagt |
| Vdac2 | Voltage-dependent anion-selective channel protein 2 | RB134 | D | D | D | D | agatgaccttgacagtgcc | cgagtgcagttggtacctga |
| Vdac3 | Voltage-dependent anion-selective channel protein 3 | RB135 | D | D | D | D | gacggcgttggttcgagaag | taggttgcctgatgcttcc |

Amiloride Receptors

| | | | | | | | | |
|-------|--|-------|---|---|---|---|----------------------|-----------------------|
| Accn1 | Amiloride-sensitive cation channel 1, neuronal | RB325 | D | D | D | D | ggagccacgatgagaacatg | ctgtctaggtcttggcct |
| Accn2 | Amiloride-sensitive cation channel 2, neuronal | RB326 | D | D | D | D | tgggttcgctggccgtcctg | atctgtgttccgggatctc |
| Accn3 | Amiloride-sensitive cation channel 3 | | D | D | D | D | tgctgcctacctcgtgcac | agttgaaggtgtagcattgcc |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Accn4 | Amiloride-sensitive cation channel 4, pituitary | RB327 | D | ND | ND | ND | tgagggaactgaaggaacag | cttctgtcccaggaatagga |
| Accn5 | Amiloride-sensitive cation channel 5, intestinal | | ND | ND | ND | ND | ccggctgtgacattctgtaa | cggaggactttggagactat |
| Scnn1a | Amiloride-sensitive sodium channel alpha-subunit | RB349 | D | D | D | D | gcagctcccgcgacctctg | tctggttcacagttggaag |
| Scnn1b | Amiloride-sensitive sodium channel beta-subunit | | ND | D | D | D | atccagacctacctgagctg | acagcctccatcagcttctc |
| Scnn1g | Amiloride-sensitive sodium channel gamma-subunit | RB350 | D | D | D | D | gcagttcatgagtcgaaga | acatcccacgaagaagcag |

Nicotinic Acetylcholine Receptors

| | | | | | | | | |
|---------|--|-------|----|---|----|----|---------------------|----------------------|
| Chrna1 | Cholinergic receptor nicotinic alpha 1 (muscle) | RB328 | | | | | | |
| Chrna2 | Cholinergic receptor nicotinic alpha 2 (neuronal) | RB201 | | | | | | |
| Chrna3 | Cholinergic receptor nicotinic alpha 3 (neuronal) | RB162 | | | | | | |
| Chrna4 | Cholinergic receptor nicotinic alpha 4 (neuronal) | RB163 | | | | | | |
| Chrna5 | Cholinergic receptor nicotinic alpha 5 (neuronal) | RB164 | | | | | | |
| Chrna6 | Cholinergic receptor nicotinic alpha 6 (neuronal) | RB165 | | | | | | |
| Chrna7 | Cholinergic receptor nicotinic alpha 7 (neuronal) | RB166 | | | | | | |
| Chrna9 | Cholinergic receptor nicotinic alpha 9 (neuronal) | RB167 | | | | | | |
| Chrna10 | Cholinergic receptor nicotinic alpha 10 (neuronal) | RB168 | | | | | | |
| Chrb1 | Cholinergic receptor nicotinic beta 1 (muscle) | RB169 | | | | | | |
| Chrb2 | Cholinergic receptor nicotinic beta 2 (neuronal) | RB206 | | | | | | |
| Chrb3 | Cholinergic receptor nicotinic beta 3 (neuronal) | RB170 | | | | | | |
| Chrb4 | Cholinergic receptor nicotinic beta 4 (neuronal) | RB171 | | | | | | |
| Chrnd | Cholinergic receptor nicotinic delta (muscle) | | ND | D | ND | ND | cagcatgttctgtctgagg | agctctctcccacatgacct |
| Chrne | Cholinergic receptor nicotinic epsilon (muscle) | RB172 | | | | | | |
| Chrng | Cholinergic receptor nicotinic gamma (muscle) | RB173 | | | | | | |

Dopamine Receptors

| | | | | | | | | |
|-------|----------------------|-------|---|---|---|---|---------------------|----------------------|
| Drd1a | Dopamine receptor D1 | RB329 | D | D | D | D | atgcatagagacggtgagc | aaggagccaccacatcagtc |
|-------|----------------------|-------|---|---|---|---|---------------------|----------------------|

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|----------------------|------------------|---------------|--------|------|--------|---------|---------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Drd2 | Dopamine receptor D2 | RB330 | | | | | | |
| Drd3 | Dopamine receptor D3 | RB331 | | | | | | |
| Drd4 | Dopamine receptor D4 | RB332 | | | | | | |
| Drd5 | Dopamine receptor D5 | RB333 | | | | | | |

GABA-A Receptors

| | | | | | | | | |
|--------|---|-------|----|----|---|---|----------------------|---------------------|
| Gabbr1 | Gamma-aminobutyric acid (GABA) B receptor, 1 | RB289 | | | | | | |
| Gabbr2 | Gamma-aminobutyric acid (GABA) B receptor, 2 | RB290 | | | | | | |
| Gabra1 | Gamma-aminobutyric acid (GABA) A receptor alpha 1 | RB291 | | | | | | |
| Gabra2 | Gamma-aminobutyric acid (GABA) A receptor alpha 2 | RB292 | | | | | | |
| Gabra3 | Gamma-aminobutyric acid (GABA) A receptor alpha 3 | RB294 | | | | | | |
| Gabra4 | Gamma-aminobutyric acid (GABA) A receptor alpha 4 | RB394 | | | | | | |
| Gabra5 | Gamma-aminobutyric acid (GABA) A receptor alpha 5 | RB295 | | | | | | |
| Gabra6 | Gamma-aminobutyric acid (GABA) A receptor alpha 6 | RB395 | | | | | | |
| Gabrb1 | Gamma-aminobutyric acid (GABA) A receptor beta 1 | RB229 | | | | | | |
| Gabrb2 | Gamma-aminobutyric acid (GABA) A receptor beta 2 | RB249 | | | | | | |
| Gabrb3 | Gamma-aminobutyric acid (GABA) A receptor beta 3 | RB250 | | | | | | |
| Gabrd | Gamma-aminobutyric acid (GABA) A receptor delta | RB251 | | | | | | |
| Gabre | Gamma-aminobutyric acid (GABA) A receptor epsilon | RB252 | | | | | | |
| Gabrg1 | Gamma-aminobutyric acid (GABA) A receptor gamma 1 | RB230 | | | | | | |
| Gabrg2 | Gamma-aminobutyric acid (GABA) A receptor gamma 2 | RB396 | | | | | | |
| Gabrg3 | Gamma-aminobutyric acid (GABA) A receptor gamma 3 | RB254 | | | | | | |
| Gabrp | Gamma-aminobutyric acid (GABA) A receptor pi | | ND | ND | D | D | gtatcccagcaggagacagg | tggaagggacgtaggttcc |
| Gabrq | Gamma-aminobutyric acid (GABA) A receptor theta | RB255 | | | | | | |
| Gabrr1 | Gamma-aminobutyric acid (GABA) A receptor rho 1 | RB256 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|---|------------------|---------------|--------|------|--------|---------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Gabbr2 | Gamma-aminobutyric acid (GABA) A receptor rho 2 | RB397 | D | D | D | D | ctggctggctaccaagaag | gtgtgatctggaatagtgtg |

Glycine Receptors

| | | | | | | | | |
|------|--------------------------|-------|--|--|--|--|--|--|
| Gla1 | Glycine receptor alpha-1 | RB257 | | | | | | |
| Gla2 | Glycine receptor alpha-2 | RB253 | | | | | | |
| Gla3 | Glycine receptor alpha-3 | RB309 | | | | | | |
| Gla4 | Glycine receptor alpha-4 | RB259 | | | | | | |
| Glrβ | Glycine receptor beta | RB310 | | | | | | |

Glutamate Receptors

| | | | | | | | | |
|--------|---|-------|--|--|--|--|--|--|
| Gria1 | Glutamate receptor ionotropic AMPA1 | RB273 | | | | | | |
| Gria2 | Glutamate receptor ionotropic AMPA2 | RB274 | | | | | | |
| Gria3 | Glutamate receptor ionotropic AMPA3 | RB399 | | | | | | |
| Gria4 | Glutamate receptor ionotropic AMPA4 | RB275 | | | | | | |
| Grid1 | Glutamate receptor ionotropic delta 1 | RB320 | | | | | | |
| Grid2 | Glutamate receptor ionotropic delta 2 | RB321 | | | | | | |
| Grik1 | Glutamate receptor ionotropic kainate 1 | RB322 | | | | | | |
| Grik2 | Glutamate receptor ionotropic kainate 2 | RB323 | | | | | | |
| Grik3 | Glutamate receptor ionotropic kainate 3 | RB324 | | | | | | |
| Grik4 | Glutamate receptor ionotropic kainate 4 | RB148 | | | | | | |
| Grik5 | Glutamate receptor ionotropic kainate 5 | RB149 | | | | | | |
| Grin1 | Glutamate receptor ionotropic NMDA1 | RB269 | | | | | | |
| Grin2a | Glutamate receptor ionotropic NMDA2A | RB150 | | | | | | |
| Grin2b | Glutamate receptor ionotropic NMDA2B | RB232 | | | | | | |
| Grin2c | Glutamate receptor ionotropic NMDA2C | RB270 | | | | | | |
| Grin2d | Glutamate receptor ionotropic NMDA2D | RB233 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|---|------------------|---------------|--------|------|--------|-------------------|---------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Grin3a | Glutamate receptor ionotropic NMDA3A | RB271 | | | | | | |
| Grin3b | Glutamate receptor ionotropic NMDA3B | RB272 | D | D | D | D | gctccagctggtgaact | ggccctgaaatgaggtgtg |
| Grina | Glutamate receptor ionotropic N-methyl D-aspartate-associated protein 1 | RB400 | | | | | | |
| Grm1 | Glutamate receptor metabotropic 1 | RB236 | | | | | | |
| Grm2 | Glutamate receptor metabotropic 2 | RB143 | | | | | | |
| Grm3 | Glutamate receptor metabotropic 3 | RB144 | | | | | | |
| Grm4 | Glutamate receptor metabotropic 4 | RB234 | | | | | | |
| Grm5 | Glutamate receptor metabotropic 5 | RB403 | | | | | | |
| Grm6 | Glutamate receptor metabotropic 6 | RB145 | | | | | | |
| Grm7 | Glutamate receptor metabotropic 7 | RB235 | | | | | | |
| Grm8 | Glutamate receptor metabotropic 8 | RB404 | | | | | | |

5-HT3 (Serotonin) Receptors

| | | | | | | | | |
|-------|--|-------|----|----|---|---|----------------------|--------------------|
| Htr1a | 5-hydroxytryptamine (serotonin) receptor 1A | RB174 | | | | | | |
| Htr1b | 5-hydroxytryptamine (serotonin) receptor 1B | RB377 | | | | | | |
| Htr1d | 5-hydroxytryptamine (serotonin) receptor 1D | RB405 | | | | | | |
| Htr1f | 5-hydroxytryptamine (serotonin) receptor 1F | RB378 | | | | | | |
| Htr2a | 5-hydroxytryptamine (serotonin) receptor 2A | RB379 | | | | | | |
| Htr2b | 5-hydroxytryptamine (serotonin) receptor 2B | | ND | ND | D | D | actgcctccatcatgcatct | atccttaatagggactgg |
| Htr2c | 5-hydroxytryptamine (serotonin) receptor 2C | RB380 | | | | | | |
| Htr3a | 5-hydroxytryptamine (serotonin) receptor 3A, ionotropic | RB370 | | | | | | |
| Htr3b | 5-hydroxytryptamine (serotonin) receptor 3B, ionotropic | RB371 | | | | | | |
| Htr4 | 5-hydroxytryptamine (serotonin) receptor 4, G protein-coupled | RB151 | | | | | | |
| Htr5a | 5-hydroxytryptamine (serotonin) receptor 5A, G protein-coupled | RB372 | | | | | | |
| Htr6 | 5-hydroxytryptamine (serotonin) receptor 6, G protein-coupled | RB373 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|---|------------------|---------------|--------|------|--------|---------|---------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Htr7 | 5-hydroxytryptamine (serotonin) receptor 7, adenylate cyclase-coupled | RB374 | | | | | | |

Inositol Receptors

| | | | | | | | | |
|-------|--|-------|---|---|---|---|----------------------|----------------------|
| Itpr1 | Inositol 1,4,5-trisphosphate receptor type 1 | RB375 | D | D | D | D | accgggatgccccatcccgg | atcagggtcggcctccctcc |
| Itpr2 | Inositol 1,4,5-trisphosphate receptor type 2 | RB258 | D | D | D | D | agaagaaagacagcttcatg | ctgtgctgtcttggcgtag |
| Itpr3 | Inositol 1,4,5-trisphosphate receptor type 3 | RB191 | D | D | D | D | cagctaaggaagatgctgct | agtctgatccacgccagag |

Purinergic Receptors P2X

| | | | | | | | | |
|-------|--------------------|-------|---|----|---|---|----------------------|----------------------|
| P2rx1 | P2X purinoceptor 1 | RB312 | D | D | D | D | tgtgcagagaaccagaagg | tcacatgtctcacagtgcc |
| P2rx2 | P2X purinoceptor 2 | RB301 | D | D | D | D | gctcctcctgtgtgactgg | gtggatgtggagtctgttg |
| P2rx3 | P2X purinoceptor 3 | RB302 | D | ND | D | D | ggaccattgggatcatcaac | cacgtccatgactctgttg |
| P2rx4 | P2X purinoceptor 4 | RB303 | D | D | D | D | agacgccgactgcactcctg | ccaacgtgttctccaccgg |
| P2rx5 | P2X purinoceptor 5 | RB260 | | | | | | |
| P2rx6 | P2X purinoceptor 6 | RB261 | | | | | | |
| P2rx7 | P2X purinoceptor 7 | RB304 | D | D | D | D | ggcaccatcaagtggatctt | ccctccgtgacattctctgt |

Ryanodine Receptors

| | | | | | | | | |
|------|----------------------|-------|--|--|--|--|--|--|
| Ryr1 | Ryanodine receptor 1 | RB192 | | | | | | |
| Ryr2 | Ryanodine receptor 2 | RB356 | | | | | | |
| Ryr3 | Ryanodine receptor 3 | RB193 | | | | | | |

Chloride Channels

| | | | | | | | | |
|-------|---------------------------------------|-------|----|----|----|----|----------------------|-----------------------|
| Clca1 | Calcium-activated chloride channel 1 | | | | | | | |
| Clca2 | Calcium-activated chloride channel 2 | | ND | D | ND | ND | acctctcccagcaggctctg | tcgttgccaatgggtactgtc |
| Clca3 | Calcium-activated chloride channel 3 | | ND | ND | D | ND | agctgaagatgggatctttg | gagaggcctgagtccacatg |
| Clca4 | Calcium-activated chloride channel 4 | | ND | D | D | D | gaagttgccttgggcagag | tagccacggctctgcattc |
| Clca5 | Calcium-activated chloride channel 5 | RB237 | D | D | D | D | aggggcaaaccacaagctat | attagccccgacgagttcac |
| Clcn1 | Chloride channel, voltage-sensitive 1 | RB238 | | | | | | |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|----------------------|-----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Clcn2 | Chloride channel, voltage-sensitive 2 | RB244 | | | | | | |
| Clcn3 | Chloride channel, voltage-sensitive 3 | RB245 | | | | | | |
| Clcn4 | Chloride channel, voltage-sensitive 4 | RB246 | | | | | | |
| Clcn5 | Chloride channel, voltage-sensitive 5 | RB247 | | | | | | |
| Clcn6 | Chloride channel, voltage-sensitive 6 | RB248 | | | | | | |
| Clcn7 | Chloride channel, voltage-sensitive 7 | RB391 | | | | | | |
| Clcnka | Chloride channel, voltage-sensitive ClC-Ka | RB392 | | | | | | |
| Clcnkb | Chloride channel, voltage-sensitive ClC-Kb | RB264 | D | D | D | D | agtgagtcagcctgggagtc | gatgtgacagaacgcattgg |
| Clic1 | Chloride intracellular channel 1 | | D | D | D | D | atcccgggccgtgagaccg | ttggcgccatcactcccagc |
| Clic2 | Chloride intracellular channel 2 | | D | D | D | D | caagcttagcgtcaacacc | cgttggcagaaaggacagtt |
| Clic3 | Chloride intracellular channel 3 | RB265 | D | ND | D | D | ccatcctactctatgatggg | gggtgccaggccaggaaagtc |
| Clic4 | Chloride intracellular channel 4 | RB266 | D | D | D | D | atggcgctgctgatgccct | ttctatgctctcaccatca |
| Clic5 | Chloride intracellular channel 5 | RB227 | D | D | D | D | tgcaaggtgatggacaaatg | aggccttcattcacgtaag |
| Clic6 | Chloride intracellular channel 6 | RB228 | D | ND | D | ND | atggacgtagggagaacggc | gagacgctgtgagaatgggc |

Other Potassium Channels

| | | | | | | | | |
|--------|---|-------|---|----|----|----|----------------------|----------------------|
| Kcnip1 | Kv channel interacting protein 1 | RB212 | | | | | | |
| Kcnip2 | Kv channel interacting protein 2 | RB213 | D | D | D | D | agcgcctattctggccacc | agcagcttgaggaaacgctg |
| Kcnip3 | Kv channel interacting protein 3 | RB214 | D | ND | ND | ND | gttgctgtaatacaagtgg | agctggccaagccctctgg |
| Kcnip4 | Kv channel interacting protein 4 | RB215 | D | D | D | D | cacggaccacaatggagctg | tgtagccatctttgttatg |
| Kctd1 | Potassium channel tetramerisation domain containing 1 | RB216 | D | D | D | D | actgctcctccggcattacc | gttgtcagtgccgatgagg |
| Kctd2 | Potassium channel tetramerisation domain containing 2 | RB210 | D | D | D | D | atacgggacaacgagaacag | tgattgctctctctctcag |
| Kctd3 | Potassium channel tetramerisation domain containing 3 | RB211 | D | D | D | D | atcgtgcagctgaatgttg | ttctgcctctgtctgagaa |
| Kctd4 | Potassium channel tetramerisation domain containing 4 | RB187 | D | D | D | D | ccggaggagtctctgtgtc | tgaagagcatcgctgtaac |
| Kctd5 | Potassium channel tetramerisation domain containing 5 | RB188 | D | D | D | D | gccctggctcagcggccag | ggtagggctctctctgatta |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|--|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Kctd6 | Potassium channel tetramerisation domain containing 6 | RB189 | D | D | D | D | gacgcctggagatgccactg | tatccatctgctccagcact |
| Kctd7 | Potassium channel tetramerisation domain containing 7 | RB190 | D | D | D | D | agactcggagggtcggtact | catgttctccagctgtcca |
| Kctd8 | Potassium channel tetramerisation domain containing 8 | | D | D | D | D | accgagacgacaagatctgg | tcacagctggatgtggagag |
| Kctd9 | Potassium channel tetramerisation domain containing 9 | RB205 | D | D | D | D | atttaagccgctgcaacctc | ttacagagcctcagggatgc |
| Kctd10 | Potassium channel tetramerisation domain containing 10 | | D | D | D | D | cagccgtgaagctgtctac | aagcgcaggagagcttatc |
| Kctd11 | Potassium channel tetramerisation domain containing 11 | | D | D | D | D | gcttaaggatgggtcctctg | cctagtgtcaacctccag |
| Kctd12 | Potassium channel tetramerisation domain containing 12 | | D | D | D | D | atggctctggcggacagcac | acggacaccacggtacagcg |
| Kctd13 | Potassium channel tetramerization domain containing 13 | RB208 | D | D | D | D | acagtctgaagcccctgacc | agttgagaattgtaccaag |
| Kctd14 | Potassium channel tetramerisation domain containing 14 | RB209 | D | D | D | D | atatacggtgccctcagc | ccaccacaggcttaacgat |
| Kctd15 | Potassium channel tetramerisation domain containing 15 | RB240 | D | D | D | D | aaggcctggggcttcaatg | accgggtgagtacagccgg |
| Kctd16 | Potassium channel tetramerisation domain containing 16 | RB241 | D | D | D | ND | catggtgccctgtaactct | agtctggatgtgccctgac |
| Kctd17 | Potassium channel tetramerisation domain containing 17 | RB242 | D | D | D | D | acggcctgagttcggagtcc | ccgcctccacctgcacctgg |
| Kctd18 | Potassium channel tetramerisation domain containing 18 | RB243 | D | D | D | D | accacttgccaatgagatg | atggcatctgtccatcagt |
| Kctd19 | Potassium channel tetramerisation domain containing 19 | | ND | ND | D | D | gagctttgtgcctttctgga | gtatatagtacctctgtg |
| Kctd20 | Potassium channel tetramerisation domain containing 20 | RB239 | D | D | D | D | aggtagctctcaggcccag | aatcagaactgtgcggaac |
| Kctd21 | Potassium channel tetramerisation domain containing 21 | | ND | ND | ND | ND | agcctttggtggcaaggag | ggcatcttcccactgaacat |

Auxiliary Subunits

| | | | | | | | | |
|-------|--|-------|----|----|---|---|----------------------|-----------------------|
| Abcc4 | ATP-binding cassette, Multidrug resistance-associated protein 4 | RB362 | D | D | D | D | ccaggactgcattcagagg | aacctgccagcatccaagg |
| Abcc8 | ATP-binding cassette, sub-family C (CFTR/MRP), member 8 | RB136 | | | | | | |
| Abcc9 | ATP-binding cassette, sub-family C (CFTR/MRP), member 9 | RB137 | | | | | | |
| Anxa7 | Annexin A7 | RB363 | D | D | D | D | cctccctggctccatattgc | aggtgggtagcctgtcgggg |
| Bsnd | Bartter syndrome, infantile, with sensorineural deafness (Barttin) | RB364 | | | | | | |
| Cftr | Cystic fibrosis transmembrane conductance regulator (ABCC7) | | ND | ND | D | D | cagatcaggttgccctcaag | tcgctcgaatcacttggtatg |
| Cul5 | Cullin-5 | RB365 | D | D | D | D | aactagaggtagctttattg | aacataggactctgcactc |

D: Detected (green); ND: Not Detected (yellow)

ESM_1. List of ion channels examined in the P14 rat brain

| Rat Gene Symbol | Gene Name | Genepaint Set Id | qPCR Analysis | | | | | |
|-----------------|---|------------------|---------------|--------|------|--------|----------------------|----------------------|
| | | | Tissue | | | | Primer | |
| | | | Brain | Thymus | Lung | Kidney | Forward | Reverse |
| Cybb | Cytochrome B-245 heavy chain | RB366 | D | D | D | D | gtggagtgggtgtgtaatgc | cgagtcacagccacatacag |
| Fxyd1 | FXYP domain-containing ion transport regulator 1 | RB367 | D | D | D | D | ccacaccctgcggatcgccg | ttggtgaattgcaccggc |
| Fxyd2 | FXYP domain-containing ion transport regulator 2 | RB393 | D | D | D | D | gacggagaatccctcgagt | tgctgaggagaatgaggagt |
| Fxyd3 | FXYP domain-containing ion transport regulator 3 | RB369 | D | D | D | D | cctgttgctccttagcag | agagaatccctgcacagatg |
| Gck | Glucokinase (hexokinase 4) | RB407 | | | | | | |
| Grin1a | GRINL1A complex locus 1 | RB376 | | | | | | |
| Mtap1a | Microtubule-associated protein 1A | RB381 | | | | | | |
| Mink1 | Misshapen-like kinase 1 | RB398 | | | | | | |
| Ms4a2 | Membrane-spanning 4-domains, subfamily A, member 2 | RB401 | D | D | D | D | ctgagcaacaactccgctta | tcatcggggaccttactacg |
| Nola1 | GAR1 ribonucleoprotein homolog (yeast) | RB402 | D | D | D | D | gagggtggaagagggtgt | atgtcccctcctcggaatc |
| Nox1 | NADPH oxidase homolog 1 | RB217 | D | D | D | D | tactctgacctctgctccag | ggaagacatcctcactgact |
| Nudt9 | ADP-ribose pyrophosphatase, mitochondrial precursor | RB231 | D | D | D | D | cgtaactgtccgctcctcag | cttcgctcgactttgaacc |
| Psm1 | Proteasome (prosome, macropain) 26S subunit, non-ATPase, 1 | RB218 | | | | | | |
| Sh3kbp1 | SH3-domain binding protein 1 | RB219 | D | D | D | D | atggcagacgaggagtgtt | agtgttccggtcttcagg |
| Shkbp1 | SH3KBP1 binding protein 1 | RB220 | D | D | D | D | gacttctctcggcctctt | gattccaagactggtggag |
| Slc12a5 | Solute carrier family 12, (potassium-chloride transporter) member 5 | RB221 | | | | | | |
| Stx1b | Syntaxin-1B1 | RB382 | D | ND | ND | ND | cgtaactgtccgctcctcag | cttcgctcgactttgaacc |
| Tnfaip1 | Tumor necrosis factor, alpha-induced protein 1, endothelial | | ND | ND | ND | ND | agccagagggccgacggag | agattaccacggcaggag |
| Tomm40 | Translocase of outer mitochondrial membrane 40 homolog (yeast) | RB262 | D | D | D | D | gtggcctgggactgggtca | gtatgggtcacctgaaaccg |
| Tpte | Transmembrane phosphoinositide 3-phosphatase and tensin homolog | RB263 | D | ND | ND | ND | tggtcttccgagtgtatg | taaatgacagccacgagcac |

D: Detected (green); ND: Not Detected (yellow)