

## APPENDIX

**Table 1 Details of the most relevant ocular MRI studies**

| MRI PROTOCOL  | PULSE SEQUENCE  | T <sub>R</sub> /T <sub>E</sub><br>ms/ms   | RESOLUTION                      |               | B <sub>0</sub><br>T | STUDY  | OCULAR STRUCTURES   | REMARKS  |
|---|---|---|---------------------------------|---------------|---------------------|--|---|--|
|   |   |   | SPATIAL<br>mm/mm/mm             | TEMPORAL<br>s |                     |  |   |  |
| high spatial resolution<br>[7, 27,31,32,36,38,41,48,49] | T <sub>1</sub> -, T <sub>2</sub> -weighted, proton density fast SE* | 200 to 1200/12, 1600/100, 1600 to 6400/12 | 0.02/0.02/0.057 to 0.39/0.39/12 | 5 to 1800     | 1 to 11             | mouse, rat and human <i>in vivo</i> and <i>ex vivo</i> | AH, VH**<br>ciliary body, retina/choroid, cornea, iris, lens, optic nerve | single and multiple slices   |
|   | T <sub>2</sub> -weighted, SE  | 3000/70                                   |                                 |               |                     |  |   |  |
|   | T <sub>1</sub> -weighted, SE  | 400/18                                    |                                 |               |                     |  |   |  |
| DWI and DTI<br>[41,42,53,54]                            | DWI-SE  | 2000/35                                   | 0.047/0.047/0.4                 | 1024          | 11                  | mouse <i>in vivo</i>                                   | retina  | 2 averages; total acquisition time: 2 h, $\Delta/\delta = 15/5$ (ms/ms); $b = 0.955$ s/mm <sup>2</sup>                             |
|   | DTI-SE  | 4000/12                                   | 0.078/0.078/2                   | not available | 4.7                 | bovine <i>ex vivo</i>                                  | lens  | $g_{DIFF} = 65$ mT/m; $\Delta = 6.4$ ms; $\delta = 3$ ms; diffusion encoding gradients: 6 different directions, the same amplitude |
|   |   | 2000/27                                   | 0.218/0.218/1                   | ~ 7200        |                     | human <i>ex vivo</i>                                   |   | $g_{DIFF} = 588$ mT/m; $\Delta = 14.5$ ms; $\delta = 2.5$ ms; 4 averages/phase encoding step                                       |
| BOLD fMRI [50]  | EPI   | 2000/30                                   | 3/3/3.5                         | not available | 3                   | human <i>in vivo</i>                                   | retina  | -  |
| T <sub>1</sub> relaxometry [28]                         | variable FA GE***   | 10/2.9                                    | 0.15/0.25/1                     | ~ 35          | 7                   | human <i>in vivo</i>                                   | eye   | flip angle: 20 <sup>0</sup>  |
| MTC [87, 89]  | fast SE   | 2000/14                                   | 0.313/0.5/1.5                   | not available | 1.5                 | human <i>in vivo</i>                                   | lens  | MT: 80 x 8.5 ms sinc pulses, offset: 1.2 kHz   |
|   | variable FA GE  | 180/8                                     | 0.625/0.625/3                   | not available |                     |  | optic nerve   | total scan time: 1 h; MT pulse: 64 ms, 4-lobed Hanning windowed sinc, bandwidth: 78 Hz, amplitude: 145 $\mu$ T, offset: 1 kHz      |
| ASL without and with contrast agents [56,57]            | GE EPI  | 3000/14                                   | 0.09/0.09/1.5                   | not available | 7                   | rat <i>in vivo</i>                                     | retina  | ASL: 2.9 s square pulse and 1 G/cm gradient simultaneously; duration of study: 4 h/animal  |
|   |   | 3000/13                                   | 0.042/0.042/0.4                 | ~ 6           |                     | mouse <i>in vivo</i>                                   |   | ASL: 2.9s square pulse and 2 G/cm gradient with 10 ms post-label delay; total scan time: 15 min                                    |
| MRE [90]  | variable FA GE  | 40/20                                     | 0.625/0.625/5                   | ~ 30          | 1.5                 | bovine <i>ex vivo</i>                                  | cornea and sclera   | flip angle: 20 <sup>0</sup>  |
| perfusion DCE MRI [59]                                  | SE  | 1000/22.7                                 | 0.125/0.25/1                    | 120           | 4.7                 | rat <i>in vivo</i>                                     | retina  | contrast agent: Magnevist  |
| perfusion MEMRI [60]                                    | SE  | 350/16.7                                  | 0.02/0.02/0.620                 | not available | 4.7                 |  | retina  | averages: 16; contrast agent: Teslascan  |
| perfusion DSC MRI [61]                                  | GE  | 200/6.5                                   | 0.03/0.03/0.8                   | not available | 7                   |  | retina/choroid  | scan time:4h; contrast agents: MION,CO <sub>2</sub> ,O <sub>2</sub>  |
| perfusion [56]  | GE EPI  | 3000/14                                   | 0.09/0.09/1.5                   | not available | 7                   | rat <i>in vivo</i>                                     | retina  | segments: 4; contrast agents: CO <sub>2</sub> and O <sub>2</sub>   |
|   |   | 150/5                                     | 0.06/0.06/1                     | 9.6           | 11                  | rat <i>in vivo</i>                                     | retina/choroid  | blood volume   |
| fMRI [61,83]  | GE  | 06/05/00                                  | 0.03/0.03/0.8                   | not available | 7                   |  |   | contrast agent: MION   |

\* SE: spin echo

\*\* AH, VH: aqueous humour, vitreous humour

\*\*\* GE: gradient echo