

## Group Average Biomechanical Response of the Brain

### SUPPLEMENTARY MATERIAL

Table S1: Calibrated linear viscoelastic material properties for the six groups using the group-average MRE data from Section 3.2. A detailed explanation of the calibration scheme and associated Prony series parameters can be found in Alshareef et al. (2021) [12].

|                       |                  | G0 (Pa) | G1 (Pa) | t1 (ms) | G2 (Pa) | t2(ms) | G3 (Pa) | t3(ms) | Ginf (Pa) |
|-----------------------|------------------|---------|---------|---------|---------|--------|---------|--------|-----------|
| <b>Young Male</b>     | Cerebellum Gray  | 5535    | 322     | 48.6    | 508     | 6.4    | 3877    | 0.3    | 828       |
|                       | Cortical Gray    | 4427    | 274     | 61.6    | 471     | 13.9   | 2763    | 1.1    | 920       |
|                       | Deep Gray        | 10994   | 534     | 48.5    | 842     | 6.9    | 8268    | 0.3    | 1350      |
|                       | Brainstem        | 2435    | 388     | 22.7    | 692     | 1.3    | 705     | 1.3    | 650       |
|                       | Cerebellum White | 7189    | 381     | 46.4    | 601     | 7.2    | 5179    | 0.3    | 1027      |
|                       | Cerebrum White   | 5235    | 749     | 21.6    | 3388    | 1.0    | n/a     | n/a    | 1098      |
| <b>Young Female</b>   | Cerebellum Gray  | 6060    | 299     | 53.3    | 506     | 5.8    | 4555    | 0.3    | 700       |
|                       | Cortical Gray    | 5480    | 367     | 60.7    | 554     | 7.5    | 3585    | 0.6    | 973       |
|                       | Deep Gray        | 8917    | 685     | 35.0    | 797     | 6.1    | 6131    | 0.4    | 1303      |
|                       | Brainstem        | 4120    | 352     | 39.5    | 518     | 7.8    | 2263    | 0.6    | 988       |
|                       | Cerebellum White | 4614    | 633     | 16.1    | 2984    | 0.7    | n/a     | n/a    | 997       |
|                       | Cerebrum White   | 5727    | 737     | 21.5    | 3745    | 1.0    | n/a     | n/a    | 1245      |
| <b>Mid-Age Male</b>   | Cerebellum Gray  | 7058    | 364     | 56.8    | 639     | 5.0    | 5285    | 0.2    | 769       |
|                       | Cortical Gray    | 4569    | 683     | 20.8    | 2877    | 1.1    | n/a     | n/a    | 1009      |
|                       | Deep Gray        | 6042    | 915     | 22.2    | 3691    | 1.1    | n/a     | n/a    | 1436      |
|                       | Brainstem        | 3639    | 290     | 42.4    | 401     | 8.5    | 2082    | 0.7    | 868       |
|                       | Cerebellum White | 4595    | 329     | 71.2    | 467     | 12.0   | 2788    | 1.0    | 1010      |
|                       | Cerebrum White   | 5625    | 803     | 21.6    | 3642    | 1.0    | n/a     | n/a    | 1179      |
| <b>Mid-Age Female</b> | Cerebellum Gray  | 5081    | 344     | 47.0    | 494     | 5.6    | 3561    | 0.4    | 682       |
|                       | Cortical Gray    | 4571    | 282     | 79.1    | 482     | 12.4   | 2865    | 0.9    | 943       |
|                       | Deep Gray        | 8965    | 626     | 36.7    | 772     | 7.0    | 6358    | 0.4    | 1208      |
|                       | Brainstem        | 5339    | 323     | 45.3    | 461     | 6.0    | 3591    | 0.3    | 964       |
|                       | Cerebellum White | 7867    | 470     | 42.1    | 615     | 5.6    | 5883    | 0.3    | 898       |
|                       | Cerebrum White   | 6898    | 430     | 60.5    | 634     | 7.6    | 4716    | 0.6    | 1118      |

|                     |                  |      |     |      |      |      |      |     |      |
|---------------------|------------------|------|-----|------|------|------|------|-----|------|
| <b>Older Male</b>   | Cerebellum Gray  | 3762 | 291 | 53.6 | 403  | 7.7  | 2208 | 0.7 | 860  |
|                     | Cortical Gray    | 4022 | 255 | 66.3 | 418  | 13.1 | 2581 | 1.0 | 769  |
|                     | Deep Gray        | 5411 | 815 | 22.2 | 3324 | 1.1  | n/a  | n/a | 1272 |
|                     | Brainstem        | 2674 | 440 | 23.0 | 1460 | 1.3  | n/a  | n/a | 775  |
|                     | Cerebellum White | 4179 | 676 | 22.1 | 2355 | 1.3  | n/a  | n/a | 1148 |
|                     | Cerebrum White   | 4852 | 683 | 21.6 | 3181 | 1.0  | n/a  | n/a | 988  |
| <b>Older Female</b> | Cerebellum Gray  | 5399 | 340 | 46.3 | 545  | 5.8  | 3829 | 0.3 | 685  |
|                     | Cortical Gray    | 3963 | 575 | 21.7 | 2531 | 1.1  | n/a  | n/a | 858  |
|                     | Deep Gray        | 8938 | 501 | 43.3 | 731  | 6.1  | 6471 | 0.3 | 1234 |
|                     | Brainstem        | 2539 | 406 | 21.8 | 1460 | 1.2  | n/a  | n/a | 673  |
|                     | Cerebellum White | 4462 | 627 | 23.2 | 2766 | 1.1  | n/a  | n/a | 1069 |
|                     | Cerebrum White   | 4993 | 286 | 90.2 | 502  | 13.7 | 3245 | 0.9 | 959  |

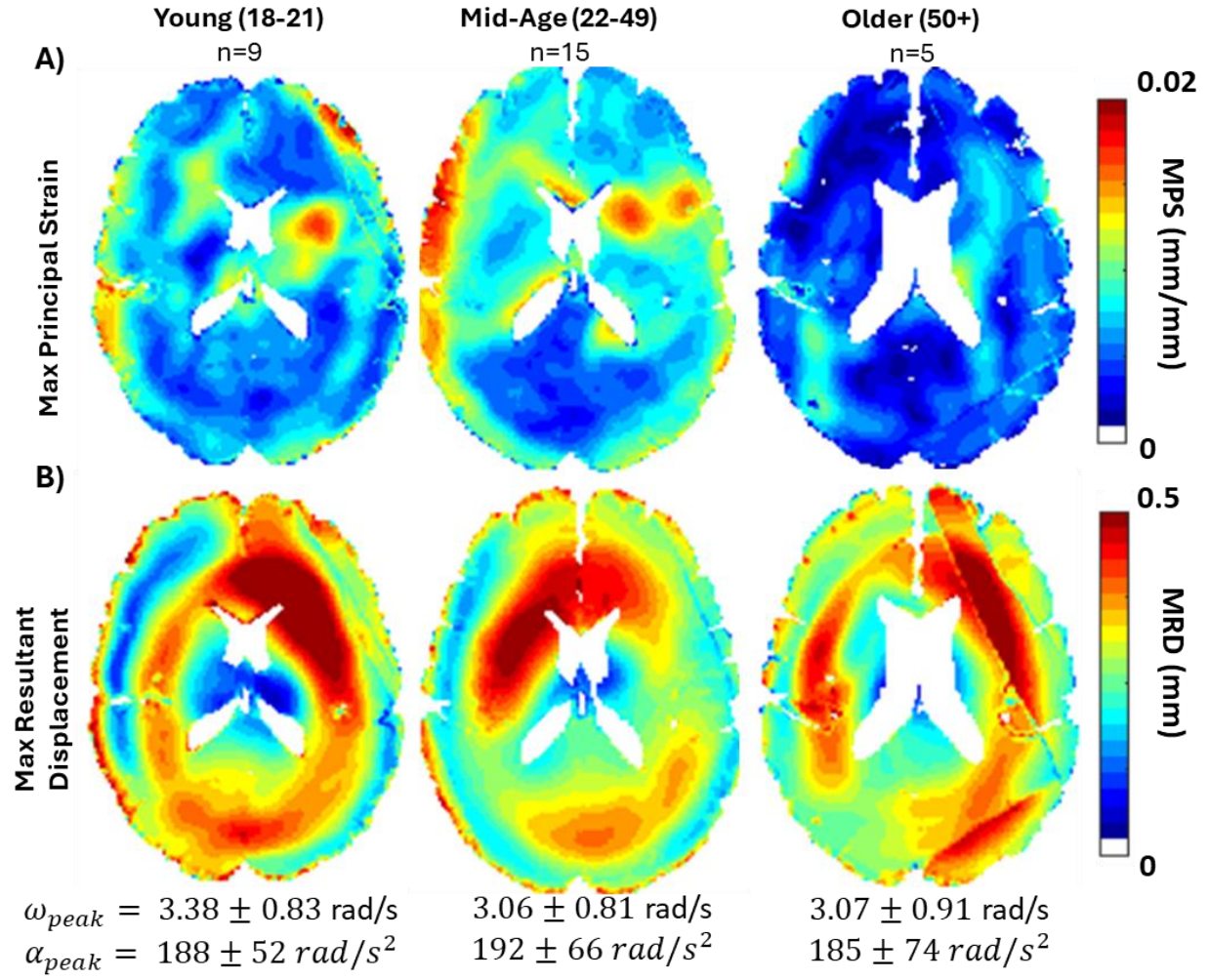


Figure S1: The standard deviation of (A) maximum principal strain (MPS) and (B) maximum resultant displacement from tagged MRI experiments were computed for the three age groups and are shown for an axial slice of the brain. Note that discontinuities in the displacement and strain fields for the older group-average result from inconsistent MRI field of view during acquisition.