
Supplementary information

Transplantation of human neural progenitor cells secreting GDNF into the spinal cord of patients with ALS: a phase 1/2a trial

In the format provided by the authors and unedited

| Subject | Side | Description | Severity | Outcome* | Start (Post-op | Stop (Post-op |
|---------|-------------------------------|---|----------|--------------------|----------------|---------------|
| | | | | | Day) | day) |
| 101 | Treated | Leg Pain - Needles | 8 | Change in Severity | 0 | 3 |
| | Treated | Leg Pain - Needles | 3 | Ongoing | 3 | - |
| | Bilateral | Leg Pain - Aching | 5 | Ongoing | 594 | - |
| 102 | Treated | Foot Numbness/Tingling | 2 | Change in Severity | 0 | 170 |
| | Treated | Leg Numbness/Tingling | 5 | Resolved | 170 | 215 |
| | Treated | Foot Numbness | Moderate | Resolved | 160 | 215 |
| | Untreated | Leg Pain - Dull | 2 | Resolved | 179 | 179 |
| | Bilateral | Leg Pain - Dull | 3 | Ongoing | 335 | - |
| 103 | Treated | Knee Pain (Intermittent) - Sharp | 4 | Ongoing | 95 | - |
| | Treated | Leg Soreness | 4 | Ongoing | 40 | - |
| | Treated | Leg Pain - Burning | 7 | Change in Severity | 246 | 338 |
| | Treated | Leg Pain - Dull Burning | 3 | Ongoing | 338 | - |
| 104 | Treated | Leg Pain - Aching | 7 | Change in Severity | 0 | 1 |
| | Treated | Leg Pain - Aching | 3 | Change in Severity | 1 | 3 |
| | Treated | Leg Pain - Aching | 6 | Resolved | 3 | 152 |
| | Treated | Foot Pain (intermittent) - Aching | 6 | Resolved | 1 | 61 |
| | Untreated | Foot Pain - Sharp | 8 | Resolved | 68 | 319 |
| 105 | Treated | Thigh Pain - Pins and needles | 5 | Change in Severity | 26 | 47 |
| | Treated | Thigh Pain - Pins and needles | 2 | Ongoing | 47 | - |
| 106 | Treated | Leg Pain - Aching | 7 | Resolved | 0 | 2 |
| | Bilateral | Leg Pain - Shooting | 4 | Resolved | 8 | 11 |
| | Treated | Leg Pain - Stabbing/Burning | 6 | Resolved | 214 | 275 |
| | Bilateral | Leg - Loss of pin sensation | Mild | Ongoing | 180 | - |
| 107 | Treated | Calf Pain - Shooting | 5 | Resolved | 0 | 5 |
| | Treated | Knee Pain - Shooting | 8 | Resolved | 0 | 5 |
| | Treated | Foot Pain - Shooting | 8 | Resolved | 0 | 7 |
| | Bilateral | Leg Pain - Bee Stings/Pin Pricks | 7 | Change in Severity | 55 | 58 |
| | Bilateral | Leg Pain - Sharp | 4 | Change in Severity | 58 | 91 |
| | Bilateral | Leg Pain - Ant bites | 9 | Change in Severity | 91 | 91 |
| | Bilateral | Leg Pain - Ant bites | 3 | Resolved | 91 | 113 |
| Treated | Leg - Decreased pin sensation | Mild | Resolved | 33 | 92 | |
| 108 | Untreated | Leg Pain - Aching | 5 | Resolved | 47 | 77 |
| 109 | Treated | Leg Pain - Stabbing | 5 | Resolved | 0 | 7 |
| | Bilateral | Calf Cramping (Intermittent) | 8 | Ongoing | 245 | - |
| | Bilateral | Leg Soreness | 3 | Ongoing | 337 | - |
| | Untreated | Leg Itching (Intermittent) | Moderate | Resolved | 28 | 43 |
| | Treated | Leg Itching (Intermittent) | Severe | Change in Severity | 28 | 43 |
| | Treated | Leg Itching (Intermittent) | Mild | Resolved | 43 | 184 |
| 110 | Treated | Thigh Pain - Shooting | 5 | Resolved | 0 | 8 |
| | Treated | Thigh Tingling | 5 | Resolved | 0 | 8 |
| | Treated | Lower Leg Pain - Pins and Needles | 5 | Ongoing | 5 | - |
| | Bilateral | Cramping | 7 | Ongoing | 95 | - |
| | Bilateral | Leg - Decreased pin sensation | Mild | Resolved | 2 | 265 |
| 111 | Untreated | Radiating when laying Down | 2 | Resolved | 222 | 371 |
| | Treated | Radiating when laying Down | 2 | Resolved | 222 | 371 |
| | Treated | Radiating warmth from hip to knee | 3 | Ongoing | 19 | - |
| | Bilateral | Leg - Decreased pin sensation | Mild | Ongoing | 34 | - |
| 112 | Treated | Lower Leg Tingling | 5 | Resolved | 0 | 3 |
| 113 | Treated | Leg Pain - Shooting/Tingling | 5 | Ongoing | 0 | - |
| | Untreated | Leg - Stabbing | 8 | Ongoing | 18 | - |
| 114 | Treated | Thigh Pain - Shooting | 8 | Change in Severity | 1 | 32 |
| | Treated | Thigh Pain - Shooting | 9 | Change in Severity | 32 | 58 |
| | Treated | Thigh Pain - Shooting | 8 | Change in Severity | 58 | 94 |
| | Treated | Thigh Pain - Shooting | 3 | Change in Severity | 94 | 208 |
| | Treated | Thigh Pain - Shooting | 7 | Ongoing | 208 | - |
| | Treated | Leg Pain - Aching | 9 | Ongoing | 185 | - |
| | Treated | Thigh Itching | Moderate | Ongoing | 2 | - |
| | Treated | Thigh Hyperesthesia | Moderate | Change in Severity | 2 | 58 |
| | Treated | Thigh Hyperesthesia | Mild | Ongoing | 58 | - |
| | Bilateral | Leg - Decreased pin sensation | Mild | Ongoing | 33 | - |
| 115 | Treated | Leg Pain - Burning | 7 | Resolved | 0 | 504 |
| 116 | Untreated | Leg Pain - Aching | 2 | Resolved | 0 | 2 |
| | Treated | Leg - Decreased pin sensation | Mild | Resolved | 40 | 61 |
| 118 | Treated | Foot Pain (intermittent)-Burning/Tingling | 1 | Resolved | 1 | 99 |

*Resolved = Resolved without sequela(e), Ongoing = Condition still present as of last contact.

9/18 participants had lower extremity pain on the treated side lasting longer than 6 months, of which 5 had pain ≥ 5 in severity

Supp Table 1. Detailed sensory changes reported by participants throughout the study.

| Subject | Gabapentin Dose | Start (Post-op Day) | End (Post-op Day) |
|---------|-----------------|---------------------|-------------------|
| 101 | - | - | - |
| 102 | 300mg | 5 | 91 |
| 103 | 600mg | -1274 | 0 |
| | 1800mg | 0 | 1 |
| | 1200mg | 1 | Ongoing |
| 104 | 900mg | 0 | 33 |
| | 300mg | 62 | 450 |
| 105 | 900mg | 1 | 5 |
| | 300mg | 180 | 182 |
| | 600mg | 182 | 184 |
| | 900mg | 184 | 195 |
| 106 | 300mg | 0 | 5 |
| 107 | 900mg | 1 | 5 |
| | 300mg | 63 | 82 |
| | 300mg | 263 | Ongoing |
| 108 | 600mg* | 0 | 0 |
| 109 | 900mg | 1 | 21 |
| | 900mg | 43 | Ongoing |
| 110 | 600mg | 1 | 5 |
| | 600mg | 43 | Ongoing |
| 111 | - | - | - |
| 112 | 100mg | 331 | Ongoing |
| 113 | 600mg | 0 | 5 |
| | 600mg | 11 | Ongoing |
| 114 | 1200mg | 63 | Ongoing |
| 115 | 1200mg | 0 | . |
| 116 | 600mg* | 0 | 0 |
| 117 | - | - | - |
| 118 | 800mg* | 0 | 0 |
| | 600mg | 2 | 5 |

*Single Dose

Supp Table 2. Dosage and duration of Gabapentin use by participants in the trial.

Primary antibodies for dose ranging and pig studies

| Antibody ¹ | Dilution Rats | Dilution Pigs | Company | Catalogue # |
|---------------------------|---------------|---------------|---------------|-------------|
| Human nuclei (Stem101) | 1:200 | Not used | Takara | Y40400 |
| Human cytoplasm (Stem121) | 1:2000 | 1:750 | Takara | Y40410 |
| Human nestin | 1:15,000 | 1:8000 | EMD Millipore | ABD69 |
| GFAP | 1:500 | Not used | Dako | Z0334 |
| Human GFAP (Stem 123) | Not used | 1:1500 | Takara | Y40420 |
| ChAT | 1:200 | Not used | EMD Millipore | AB144P |
| GDNF | 1:250 | 1:200 | R&D Systems | BAF212 |
| AQP4 | 1:100 | Not used | Sigma | HPA014784 |
| Glast | 1:20 | Not used | R&D Systems | AF6048 |

¹Incubated overnight at room temperature

Primary antibodies for human spinal cord

| Primary Antibody ¹ | Dilution | Duration | Company | Catalog # |
|-------------------------------|----------|-------------|-------------------|-----------------|
| Human GDNF (biotinylated) | 1:50 | 24 hours | R&D Systems | BAF212 |
| Human-specific ChAT | 1:200 | 48–72 hours | R&D Systems | AF3447 |
| IBA1 | 1:250 | Overnight | Novus Bio | NB100-1028 |
| Human-specific Nestin | 1:2000 | Overnight | EMD Millipore | ABD69 |
| GFAP | 1:500 | Overnight | Dako | Z0334 |
| Ki-67 | 1:200 | Overnight | Thermo Scientific | RM-9106-S |
| CD34 | 1:500 | Overnight | Abnova | PAB18289 |
| Collagen IV | 1:150 | Overnight | Rockland | 600-401-106-0.1 |
| S100b | 1:100 | Overnight | Sigma-Aldrich | HPA015768 |
| Human-specific NF-H | 1:4000 | Overnight | R&D Systems | AF3108 |

¹Incubated at 4°C, except GDNF at room temperature

Supp Table 3. Antibody details