

Table S1

| Muscle Name | Anatomic Region | Function | Antigravity vs Non-antigravity | Joint Crossings | Titin (kDa) | Collagen ($\mu\text{g}/\text{mg}$ muscle) | %MHC-1 | %MHC-2A | %MHC-2X |
|--------------------------------|-----------------|------------------|--------------------------------|-----------------|---------------|--|-----------------|----------------|----------------|
| Abductor digiti minimi | Hand | Abductor | Anti-Gravity | Single | 3757 \pm 16 | 17.8 \pm 2.3 | 61.2 \pm 10.6 | 31.7 \pm 8.3 | 7.1 \pm 4.5 |
| Abductor pollicis brevis | Hand | Abductor | Anti-Gravity | Single | 3768 \pm 16 | 22.8 \pm 2.1 | 69 \pm 8 | 19.9 \pm 6.7 | 11.1 \pm 5.5 |
| Abductor pollicis longus | Antebrachium | Abductor | Anti-Gravity | Single | 3763 \pm 22 | 17.9 \pm 5 | 56.4 \pm 6.9 | 27.7 \pm 5.3 | 15.9 \pm 6.2 |
| Adductor brevis | Thigh | Adductor | Non | Single | 3626 \pm 17 | 7.4 \pm 0.7 | 69.4 \pm 6.5 | 16.5 \pm 2.4 | 14.1 \pm 4.3 |
| Adductor longus | Thigh | Adductor | Non | Single | 3631 \pm 21 | 7.4 \pm 1.4 | 61.7 \pm 6.8 | 18.7 \pm 3.4 | 19.6 \pm 5 |
| Adductor magnus | Thigh | Adductor | Non | Single | 3640 \pm 21 | 8.1 \pm 1.7 | 76.1 \pm 5.5 | 10.5 \pm 2.2 | 13.4 \pm 4 |
| Adductor pollicis | Hand | Adductor | Non | Single | 3708 \pm 12 | 16 \pm 4.7 | 77.3 \pm 7.4 | 17.9 \pm 5.4 | 4.8 \pm 3.3 |
| Anconeus | Antebrachium | Extensor | Anti-Gravity | Single | 3691 \pm 18 | 17.9 \pm 1.9 | 62.8 \pm 7.3 | 29.6 \pm 7 | 7.7 \pm 3.8 |
| Biceps brachii (long) | Brachium | Flexor | Non | Multi | 3679 \pm 18 | 13.2 \pm 3.2 | 55 \pm 8.1 | 25.3 \pm 6.1 | 19.7 \pm 5.4 |
| Biceps brachii (short) | Brachium | Flexor | Non | Multi | 3649 \pm 25 | 10 \pm 2.6 | 56.1 \pm 9.5 | 25.7 \pm 5.5 | 18.2 \pm 5 |
| Biceps femoris (long) | Thigh | Extensor | Anti-Gravity | Multi | 3709 \pm 13 | 12.7 \pm 3.1 | 83 \pm 8.3 | 6 \pm 3.4 | 11 \pm 5.6 |
| Biceps femoris (short) | Thigh | Flexor | Non | Single | 3663 \pm 14 | 9.6 \pm 1.7 | 68.7 \pm 10.1 | 17.2 \pm 5.6 | 14.1 \pm 4.7 |
| Brachialis | Brachium | Flexor | Non | Single | 3693 \pm 34 | 11.7 \pm 1.4 | 65.9 \pm 7.3 | 20.1 \pm 4.2 | 13.9 \pm 3.6 |
| Brachioradialis | Antebrachium | Flexor | Non | Single | 3656 \pm 18 | 15.4 \pm 3.8 | 45.5 \pm 6.4 | 32 \pm 3.8 | 22.5 \pm 4.6 |
| Coracobrachialis | Brachium | Flexor | Non | Single | 3690 \pm 16 | 12.1 \pm 1.7 | 49.8 \pm 7.6 | 31.5 \pm 4.4 | 18.8 \pm 3.9 |
| Deltoid | Shoulder | Abductor | Anti-Gravity | Single | 3677 \pm 22 | 12.9 \pm 1.6 | 64.3 \pm 7.2 | 20.8 \pm 4.6 | 14.9 \pm 3.8 |
| Extensor carpi radialis brevis | Antebrachium | Extensor | Anti-Gravity | Multi | 3709 \pm 26 | 10.9 \pm 2.9 | 56.4 \pm 5.1 | 29.7 \pm 3.5 | 13.9 \pm 3 |
| Extensor carpi radialis longus | Antebrachium | Extensor | Anti-Gravity | Multi | 3718 \pm 15 | 11.2 \pm 2.2 | 56.6 \pm 5.9 | 31.3 \pm 3.2 | 12.1 \pm 3.9 |
| Extensor carpi ulnaris | Antebrachium | Extensor | Anti-Gravity | Multi | 3749 \pm 16 | 15.1 \pm 2.9 | 55.4 \pm 7.9 | 31.2 \pm 6.7 | 13.3 \pm 3.7 |
| Extensor digiti quinti | Antebrachium | Extensor | Anti-Gravity | Multi | 3759 \pm 16 | 16.5 \pm 3.2 | 54.9 \pm 5.3 | 30.1 \pm 4.1 | 15 \pm 3.6 |
| Extensor digitorum comunis | Antebrachium | Extensor | Anti-Gravity | Multi | 3789 \pm 13 | 14.4 \pm 3.5 | 78.2 \pm 6.3 | 18.3 \pm 4.6 | 3.4 \pm 3.4 |
| Extensor digitorum longus | Leg | Extensor | Anti-Gravity | Multi | 3719 \pm 32 | 11.4 \pm 1.5 | 54.9 \pm 6.7 | 32.7 \pm 3.1 | 12.3 \pm 5.3 |
| Extensor hallucis longus | Leg | Extensor | Non | Multi | 3702 \pm 15 | 12.9 \pm 1.6 | 83 \pm 5.4 | 15 \pm 4.7 | 2 \pm 2 |
| Extensor indicis proprius | Antebrachium | Extensor | Anti-Gravity | Multi | 3750 \pm 26 | 11.4 \pm 1.7 | 57.7 \pm 6.1 | 32.2 \pm 4.4 | 10.1 \pm 4 |
| Extensor pollicis brevis | Antebrachium | Extensor | Anti-Gravity | Multi | 3747 \pm 23 | 13.3 \pm 2.2 | 57.8 \pm 6.9 | 30.4 \pm 5.6 | 11.8 \pm 5.4 |
| Extensor pollicis longus | Antebrachium | Extensor | Anti-Gravity | Multi | 3733 \pm 10 | 12.2 \pm 2.1 | 50.4 \pm 6.7 | 38.3 \pm 5 | 11.3 \pm 4.4 |
| Fibularis brevis | Leg | Extensor | Anti-Gravity | Multi | 3720 \pm 14 | 16 \pm 1.5 | 61.9 \pm 3 | 27.9 \pm 2.5 | 10.2 \pm 3.8 |
| Fibularis longus | Leg | Extensor | Anti-Gravity | Multi | 3716 \pm 33 | 15.5 \pm 1.5 | 55.6 \pm 7.5 | 23.7 \pm 3.1 | 20.7 \pm 5.8 |
| Flexor carpi radialis | Antebrachium | Flexor | Non | Multi | 3709 \pm 13 | 11.9 \pm 3 | 45 \pm 6.1 | 31 \pm 4.3 | 24 \pm 3.3 |
| Flexor carpi ulnaris | Antebrachium | Flexor | Non | Multi | 3730 \pm 34 | 14 \pm 3.1 | 50.9 \pm 8.7 | 29.1 \pm 3.9 | 20 \pm 5.3 |
| Flexor digiti minimi brevis | Hand | Flexor | Non | Single | 3747 \pm 23 | 16.7 \pm 3 | 68.2 \pm 9 | 23.5 \pm 6 | 8.3 \pm 4.7 |
| Flexor digitorum longus | Leg | Flexor | Non | Multi | 3716 \pm 27 | 11.8 \pm 2.5 | 54.6 \pm 7.8 | 23.3 \pm 3.1 | 22.1 \pm 5.5 |
| Flexor digitorum profundus | Antebrachium | Flexor | Non | Multi | 3748 \pm 19 | 11.2 \pm 2.5 | 35.5 \pm 4.8 | 37.2 \pm 2.9 | 27.3 \pm 4.1 |
| Flexor digitorum superficialis | Antebrachium | Flexor | Non | Multi | 3726 \pm 16 | 12.4 \pm 2.9 | 46.3 \pm 5.5 | 29.3 \pm 3.4 | 24.5 \pm 5.6 |
| Flexor hallucis longus | Leg | Flexor | Anti-Gravity | Multi | 3726 \pm 16 | 12.7 \pm 1.9 | 54.3 \pm 5.7 | 22.9 \pm 3.3 | 22.8 \pm 3.1 |
| Flexor pollicis brevis | Hand | Flexor | Non | Single | 3775 \pm 19 | 15.1 \pm 0.8 | 76.7 \pm 5.8 | 17.3 \pm 4.3 | 6 \pm 2.8 |
| Flexor pollicis longus | Antebrachium | Flexor | Non | Multi | 3773 \pm 15 | 10 \pm 2.3 | 44.1 \pm 3.6 | 34.8 \pm 2.2 | 21.1 \pm 3.6 |
| Gastroc (lateral head) | Leg | Extensor | Anti-Gravity | Multi | 3700 \pm 15 | 16 \pm 3.7 | 65.4 \pm 12 | 15 \pm 4.2 | 19.6 \pm 8.2 |
| Gastroc (medial head) | Leg | Extensor | Anti-Gravity | Multi | 3663 \pm 21 | 13.4 \pm 2.1 | 57.9 \pm 6.5 | 16.9 \pm 1.1 | 25.1 \pm 6.1 |
| Gemellus – Inferior | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3604 \pm 11 | 12.9 \pm 1.7 | 74.5 \pm 6.3 | 19.2 \pm 4.8 | 5.2 \pm 3.3 |
| Gemellus – Superior | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3638 \pm 37 | 12.9 \pm 2 | 78.9 \pm 7.3 | 14.6 \pm 4.7 | 6.5 \pm 3.1 |
| Gluteus maximus | Pelvic/Gluteal | Extensor | Anti-Gravity | Single | 3648 \pm 18 | 12.8 \pm 1.6 | 75.2 \pm 6.6 | 14.5 \pm 3.3 | 10.3 \pm 3.8 |
| Gluteus medius | Pelvic/Gluteal | Abductor | Anti-Gravity | Single | 3659 \pm 27 | 9.3 \pm 1.2 | 86 \pm 6.8 | 6.1 \pm 2.8 | 7.9 \pm 4.2 |
| Gracilis | Thigh | Adductor | Non | Multi | 3620 \pm 14 | 12 \pm 2 | 65.5 \pm 8.5 | 19 \pm 4.9 | 15.6 \pm 4.2 |
| Iliacus | Pelvic/Gluteal | Flexor | Non | Single | 3616 \pm 27 | 5 \pm 0.6 | 76.7 \pm 5.6 | 14.7 \pm 2.9 | 8.5 \pm 2.9 |
| Iliocostalis lumborum | Axial | Extensor | Anti-Gravity | Multi | 3649 \pm 55 | 10 \pm 2 | 89.5 \pm 4.9 | 6.1 \pm 2.8 | 4.4 \pm 2.1 |
| Infraspinatus | Shoulder | External Rotator | Anti-Gravity | Single | 3724 \pm 33 | 9.3 \pm 2.6 | 61.5 \pm 6 | 19.2 \pm 2.5 | 19.3 \pm 4 |
| Interosseus – Dorsal (1st) | Hand | Abductor | Non | Single | 3745 \pm 9 | 13.2 \pm 2.3 | 67.6 \pm 7.9 | 21.5 \pm 5.5 | 10.9 \pm 3 |
| Interosseus – Dorsal (4th) | Hand | Abductor | Non | Single | 3784 \pm 13 | 14.7 \pm 1.6 | 55.4 \pm 9.9 | 27.8 \pm 5.7 | 16.9 \pm 5.2 |
| Interosseus – Palmar (1st) | Hand | Adductor | Non | Single | 3753 \pm 23 | 16.3 \pm 3.2 | 60.6 \pm 8.1 | 26.1 \pm 5.6 | 13.3 \pm 3.3 |
| Interosseus – Palmar (3rd) | Hand | Adductor | Non | Single | 3743 \pm 9 | 20 \pm 4.8 | 46.9 \pm 11.9 | 34.8 \pm 7.6 | 18.4 \pm 5 |
| Latissimus dorsi | Shoulder | Adductor | Non | Multi | 3765 \pm 64 | 27.7 \pm 4.8 | 48.6 \pm 9.4 | 29.6 \pm 5.2 | 21.8 \pm 4.8 |
| Longissimus | Axial | Extensor | Anti-Gravity | Multi | 3621 \pm 15 | 11.9 \pm 1.3 | 85.7 \pm 7 | 9 \pm 3.8 | 5.3 \pm 3.3 |
| Lumbrical (1st) | Hand | Flexor | Non | Multi | 3737 \pm 31 | 22.2 \pm 3.4 | 82.7 \pm 4.6 | 14.8 \pm 4.5 | 2.5 \pm 1.1 |
| Lumbrical (4th) | Hand | Flexor | Non | Multi | 3770 \pm 19 | 21 \pm 2.6 | 86.3 \pm 6.1 | 11.7 \pm 4.4 | 2 \pm 2 |
| Multifidus | Axial | Extensor | Anti-Gravity | Multi | 3588 \pm 30 | 16.4 \pm 2.6 | 94.1 \pm 2.7 | 3.1 \pm 1.5 | 2.8 \pm 1.3 |
| Oblique – External | Axial | Flexor | Non | Multi | 3729 \pm 34 | 14.3 \pm 2.6 | 64.5 \pm 6.6 | 22.9 \pm 3.8 | 12.6 \pm 4.2 |
| Oblique – Internal | Axial | Flexor | Non | Multi | 3635 \pm 23 | 12.2 \pm 2.4 | 64.9 \pm 4.7 | 24.7 \pm 5.2 | 10.4 \pm 3.7 |
| Obturator externus | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3632 \pm 16 | 8.1 \pm 0.6 | 68.9 \pm 6.6 | 20.7 \pm 5.1 | 10.4 \pm 4.1 |
| Obturator internus | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3629 \pm 27 | 8.3 \pm 1.4 | 67.3 \pm 7.3 | 19.2 \pm 4 | 13.5 \pm 4.2 |
| Opponens digiti minimi | Hand | Internal Rotator | Non | Single | 3728 \pm 19 | 14 \pm 2.9 | 82.9 \pm 3.8 | 13.6 \pm 3.3 | 3.4 \pm 2.3 |

| | | | | | | | | | |
|------------------------|----------------|------------------|--------------|--------|---------|----------|-----------|----------|----------|
| Opponens pollicis | Hand | Internal Rotator | Non | Single | 3735±4 | 15.8±2.4 | 74.7±8.2 | 19.9±5.7 | 5.4±4.1 |
| Palmaris longus | Antebrachium | Flexor | Non | Multi | 3702±15 | 12.2±2.6 | 70.1±7.1 | 20±4.1 | 10±3.3 |
| Pectineus | Thigh | Adductor | Non | Single | 3628±11 | 6.3±0.8 | 63.2±9.9 | 19.8±5.2 | 17±4.7 |
| Pectoralis major | Shoulder | Adductor | Non | Multi | 3667±11 | 14.4±3.1 | 54.4±9.3 | 26.2±5.5 | 19.3±4.1 |
| Pectoralis minor | Shoulder | Adductor | Non | Single | 3659±19 | 11±2.3 | 76.7±5.9 | 18.4±4.7 | 4.8±2.8 |
| Piriformis | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3617±18 | 8.7±1.7 | 84.3±5.2 | 11.6±4.7 | 4.1±1.9 |
| Plantaris | Leg | Extensor | Anti-Gravity | Multi | 3676±20 | 13.8±3 | 77±6.8 | 12±3.7 | 11±3.3 |
| Popliteus | Leg | Flexor | Non | Single | 3701±23 | 16.2±4.2 | 89.1±5.2 | 7±3.2 | 3.9±2 |
| Pronator quadratus | Antebrachium | Internal Rotator | Non | Single | 3798±21 | 8.2±1.2 | 64.6±8 | 23.8±4.2 | 11.5±4.2 |
| Pronator teres | Antebrachium | Internal Rotator | Non | Single | 3712±9 | 10.6±2 | 50.5±8.7 | 26.4±4.5 | 23.2±4.8 |
| Psoas | Pelvic/Gluteal | Flexor | Non | Multi | 3629±8 | 6.6±0.8 | 64.2±7 | 20.7±3.6 | 15±4 |
| Quadratus femoris | Pelvic/Gluteal | External Rotator | Anti-Gravity | Single | 3631±7 | 10.7±1 | 92.5±4.2 | 6.6±3.5 | 0.9±0.9 |
| Quadratus lumborum | Axial | Extensor | Anti-Gravity | Multi | 3631±15 | 10±1.8 | 82.4±9.1 | 8.8±3.8 | 8.8±5.7 |
| Rectus abdominus | Axial | Flexor | Non | Multi | 3660±20 | 10.9±2.4 | 49.9±4.9 | 35.7±3.5 | 14.4±3.2 |
| Rectus femoris | Thigh | Flexor | Non | Multi | 3668±16 | 15.5±4.1 | 49.7±10.2 | 26.9±5.1 | 23.4±5.4 |
| Rhomboid major | Shoulder | Adductor | Anti-Gravity | Single | 3645±12 | 14.5±1.4 | 65.1±7.6 | 23.3±5.7 | 11.6±3.4 |
| Rhomboid minor | Shoulder | Adductor | Anti-Gravity | Single | 3655±15 | 14.4±3.2 | 68±7.1 | 19.3±4.3 | 12.7±3.8 |
| Sartorius | Thigh | Flexor | Non | Multi | 3597±12 | 11.5±1.7 | 67.4±6.8 | 19.3±4.4 | 13.3±2.8 |
| Semimembranosus | Thigh | Extensor | Anti-Gravity | Multi | 3684±15 | 13.2±2.7 | 78.6±6.9 | 11.6±3.8 | 9.8±3.2 |
| Semitendinosus | Thigh | Extensor | Anti-Gravity | Multi | 3681±20 | 15.3±3.6 | 60.5±9.3 | 20.2±4.3 | 19.3±5.4 |
| Serratus anterior | Shoulder | Abductor | Non | Single | 3684±22 | 12.4±2.2 | 64±8 | 22.1±5 | 13.9±3.3 |
| Soleus | Leg | Extensor | Anti-Gravity | Single | 3713±13 | 12.5±1.3 | 68.1±8.9 | 20.1±5.5 | 11.8±4.3 |
| Spinalis thoracis | Axial | Extensor | Anti-Gravity | Multi | 3622±19 | 28.4±6.4 | 91.4±7 | 4.9±3.8 | 3.7±3.2 |
| Subscapularis | Shoulder | Internal Rotator | Non | Single | 3655±14 | 9.8±1.4 | 58±7.8 | 22.1±3.5 | 19.9±5.1 |
| Supinator | Antebrachium | Internal Rotator | Non | Single | 3753±24 | 14.4±1.9 | 61.5±3.1 | 30.4±2.9 | 8.1±3.4 |
| Supraspinatus | Shoulder | Abductor | Anti-Gravity | Single | 3683±22 | 10.8±2.9 | 69.2±6.3 | 19.5±3.4 | 11.2±4.3 |
| Tensor fascia lata | Thigh | Flexor | Non | Multi | 3607±23 | 9±1.1 | 62.8±8.6 | 21.5±4.7 | 15.7±4.7 |
| Teres major | Shoulder | Internal Rotator | Non | Single | 3641±19 | 16.4±3.7 | 58.4±6.7 | 23.3±3 | 18.3±4.3 |
| Teres minor | Shoulder | External Rotator | Anti-Gravity | Single | 3670±13 | 11.8±2 | 61.6±9.4 | 21.5±3.5 | 17±6.7 |
| Tibialis anterior | Leg | Extensor | Non | Single | 3665±7 | 10.7±1.2 | 79.4±4.8 | 15.4±3.4 | 5.1±2.5 |
| Tibialis posterior | Leg | Flexor | Anti-Gravity | Single | 3691±15 | 9.2±2.2 | 80±9.7 | 10.2±3.8 | 9.8±6.7 |
| Transverse abdominus | Axial | Flexor | Non | Multi | 3700±24 | 14.8±2.9 | 64.6±7.3 | 22.1±4 | 13.3±4.1 |
| Trapezius | Shoulder | Extensor | Anti-Gravity | Multi | 3704±17 | 15.7±2.7 | 72.1±6.2 | 22.3±5 | 5.6±2.9 |
| Triceps (lateral head) | Brachium | Extensor | Anti-Gravity | Single | 3691±16 | 12±2.9 | 45.4±10.5 | 32.3±6.2 | 22.3±5.5 |
| Triceps (long head) | Brachium | Extensor | Anti-Gravity | Multi | 3712±9 | 11.9±2.7 | 48.1±7.1 | 30±4.5 | 22±5.1 |
| Triceps (medial head) | Brachium | Extensor | Anti-Gravity | Single | 3705±10 | 12.7±2.4 | 42.4±3.6 | 39.6±2.5 | 18±2.7 |
| Vastus intermedius | Thigh | Extensor | Anti-Gravity | Single | 3623±20 | 9.2±1.4 | 63±10 | 25.3±6.5 | 11.7±4.7 |
| Vastus lateralis | Thigh | Extensor | Anti-Gravity | Single | 3662±19 | 13.2±2.2 | 48.3±9.5 | 37.5±7.1 | 14.2±2.9 |
| Vastus medialis | Thigh | Extensor | Anti-Gravity | Single | 3671±20 | 13.3±2.8 | 52.8±9.7 | 33.7±6.6 | 13.5±3.5 |

Table S2. Stepwise DFA of non-antigravity and antigravity muscles

| Step | Variable Entered | Wilks' Lambda | F-statistic |
|------|------------------|---------------|-------------|
| 1 | %MHC-2X | 0.989 | 6.3 |

Table S3. Stepwise DFA of muscles that cross single and multiple joints

| Step | Variable Entered | Wilks' Lambda | F-statistic |
|------|------------------|---------------|-------------|
| 1 | Collagen Content | 0.992 | 4.5 |
| 2 | %MHC-2X | 0.978 | 6.4 |

Table S4. Standardized canonical discriminant function coefficients as determined by stepwise DFA

| Grouping Factor: Anatomic Region | | Function | | | |
|---|----------|----------|--------|--------|--|
| | 1 | 2 | 3 | 4 | |
| Titin molecular mass | 0.862 | 0.211 | -0.184 | 0.468 | |
| Collagen | 0.343 | 0.135 | 0.836 | -0.547 | |
| %MHC-1 | -0.593 | 0.877 | 0.705 | 1.251 | |
| %MHC-2X | -0.463 | -0.101 | 1.259 | 1.178 | |
| Grouping Factor: Muscle Function | | | | | |
| | Function | | | | |
| Titin molecular mass | 1.000 | | | | |
| Grouping Factor: Antigravity vs Non-antigravity muscles | | | | | |
| | Function | | | | |
| %MHC-2X | 1.000 | | | | |
| Grouping Factor: Joint Crossings | | | | | |
| | Function | | | | |
| Collagen Content | 0.870 | | | | |
| %MHC-2X | 0.853 | | | | |