**Supplementary Figure 1: Astrocyte morphology as a function of location within the μmotion device confocal stacks.** The images were analyzed to determine if there were any variations in astrocyte area or perimeter in the z plane (top) or in the x-y plane (bottom). No significant differences in reactivity were between any of the groups investigated in this study within the field of view around the device.
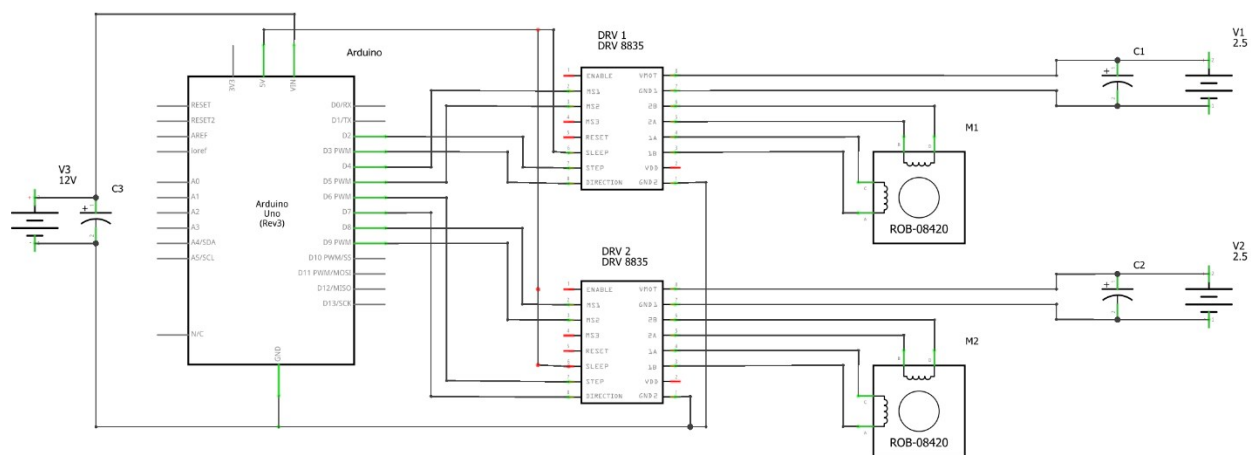
Supplementary Material 2: Electrical schematic diagram for the micromotion setup. Two high precision linear actuators (Haydon Kirk 21H4U-2.5-907) are driven by an Arduino Uno microcontroller board and TI DRV8834 stepper motor drivers.

```
// Shows how to multiple simultaneous steppers
// Runs one stepper forwards and backwards, accelerating and decelerating at the limits. Runs other
steppers at the same time
// Copyright (C) 2009 Mike McCauley
// $Id: MultiStepper.pde,v 1.1 2011/01/05 01:51:01 mikem Exp mikem $

#include <AccelStepper.h>

// Define some steppers and the pins the will use

AccelStepper stepper1(AccelStepper::DRIVER, 2, 3);
AccelStepper stepper2(AccelStepper::DRIVER, 6, 7);
// Micro-Step Resolution Pins

int m0x=4;  // Pin 4, M0X
int m1x=5;  // Pin 5, M1X
int m0y=8;  // Pin 8, M0Y
int m1y=9;  // Pin 9, M1Y
void setup()
{
   stepper1.setMaxSpeed(10000.0);
   stepper1.setMinPulseWidth(20);
   stepper1.setAcceleration(10000.0);
   stepper1.moveTo(0);

   stepper2.setMaxSpeed(8000.0);
   stepper2.setMinPulseWidth(20);
   stepper2.setAcceleration(10000.0);
   stepper2.moveTo(-5);

   ////////STEP RESOLUTIONS

   digitalWrite(m0x,LOW);  //full: low, low; half: high, low; quarter: float, low; eigth: low, high; sixteenth:
high, high; thirty-second: float, high
   digitalWrite(m1x,LOW);
   //--------------------
   digitalWrite(m0y,LOW);
   digitalWrite(m1y,LOW);
}
```

```
void loop()
{
  // Change direction at the limits
  if (stepper1.distanceToGo() == 0)
        stepper1.moveTo(-stepper1.currentPosition());
  if (stepper2.distanceToGo() == 0)
    {delay(2000);
        stepper2.moveTo(-stepper2.currentPosition());
    }
  stepper1.run();
  stepper2.run();
}
```

Supplementary Material 3: Arduino code used to drive the high precision linear actuators. The distance travelled is controlled by the programmed number of steps. The frequency is controlled by the programmed delay (in milliseconds).