

Critique of ???equal
numbers of neuronal
and nonneuronal
cells ??|???



In the research article entitled, ??? Equal Numbers of Neuronal and Nonneuronal Cells Make the Human Brain an Isometrically Scaled-Up Primate Brain??? conducted by Frederico A. C.

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Grinberg, et al., the authors look at whether or not the human brain, contains ten times more glial cells than its approximation of 100 billion neurons. They hypothesize that, ???with regard to brain cellular composition, humans are just scaled-up, large primates??? (Azevedo, et al. 2009: 533). The authors, Azevedo et al.

, state that to their knowledge the numbers on the cellular composition of the human brain have never been supported by experimental studies, which leaves a gap to be filled. They are determined to fill this gap by using the same methods, Isotropic fractionator and NeuN labeling, used in the rodent and primates studies to evaluate the actual composition of the human brain with the expected composition of a primate brain of its size. Using four brains obtained from male??'s ages, 50, 51, 54, and 71, with similar number of cells and neurons from the Brain Bank of the Brazilian Aging Brain Study Group, they determined the total number of cells within each brain. The isotropic fractionator method as they stated, ??? consists of a chemomechanical dissociation of fixed biological tissue in a saline detergent solution (1% Triton X-100, 40 mM sodium citrate) using 40??' 200-ml glass tissue grinders, followed by intense agitation of the suspension containing all nuclei in the original structure, in order to achieve isotropy??? (Azevedo et al., 2009: 533). The authors then estimated the neuronal fraction in each

sample by counting the stained nuclei, leading them to be able to calculate the total number of neuronal and nonneuronal nuclei. The authors, Azevedo et al., found that there are not ten times more glial cells than neurons, and in fact there are actual fewer glial cells than neurons in the brain.

This finding adds to their concept that the human brain is a linearly scaled-up primate brain, which does not follow the traditional concept of humans having a brain that is seven times larger than expected for its body mass. In light of this finding, a new view point can emerge; primates such as great apes or even orangutans have bodies that are bigger than expected for their brain size. Azevedo et al. state, "the rules that apply to scaling brains are more conserved than those that apply to scaling the body" (2009: 539). Scaling the body in regards to brain size should be looked at less and scaling the brain in regards to body size should be looked at more, being that it has been found that orangutans and great apes are the true outliers, for their brains only making up 1% of their total body mass. I greatly believe that future findings on this matter will continue to show that body size is not a great factor when it comes to brain size, only its cognitive abilities.