3D MORPHOMETRIC ANALYSIS OF GOLGI-STAINED NEURONS

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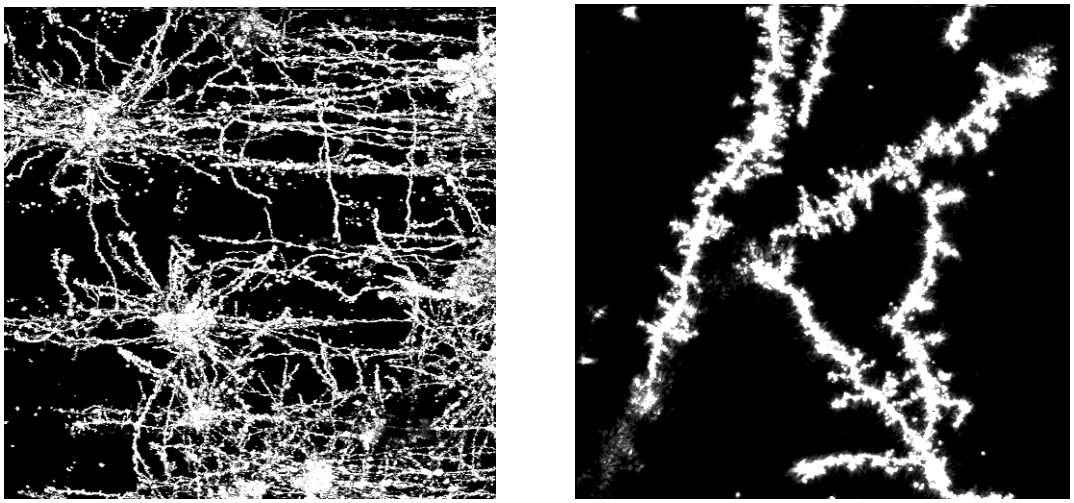
Since its introduction by Camillo Golgi and popularization by Ramon y Cajal, the silver chromate impregnation method known as Golgi staining has remained the premier technique to visualize and analyze the complexity of dendritic branching and density of dendritic spines, both considered structural correlates of cerebral function. Robust, reliable and technologically undemanding, Golgi staining competes successfully with modern methods, like single neuron filling, biolistics and fluorescent proteins expression. One drawback is the fact that, in its standard application, it does not take advantage of the tremendous progress microscopy has undergone.

The silver chromate crystals giving the *reazione nera* are powerful reflectors when imaged in a confocal microscope. Confocal, used in reflection mode, provides exquisite detail of small spines as well as the spatial orientation of dendrites. Comparison with transmitted images show the tremendous improvement in z-resolution while no detail is lost in x,y.



Projections of z-stacks images of Golgi-stained neurons in a G130 Japanese Maccaque pre-frontal cortex.

The method is applied to the analysis of the effect of maternal diet on brain development *in utero.*