potentially dangerous. In interpreting apparent versatility it remains important to recognize that in some instances it may be due to the heterogeneity of donor cell populations. While precise information is being accumulated about stem cell plasticity, attempts to develop stem cell replacement therapy will no doubt continue and include attempts to use bone marrow derived cells to replace or modify deficient or defective cells in the myocardium, the liver, the nervous system and elsewhere as well as in the bone marrow itself. These attempts can reasonably be encouraged - provided that their use is carefully monitored and rigorously evaluated.

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Layer V/VI spiny inverted neurons

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In this paper, we present an account of past and current research being carried out on spiny inverted neurons — alternatively also known as "inverted pyramidal neurons" — in rats, rabbits and cats. In our laboratory, we have studied these cells with a battery of techniques suited for light and electron microscopy, including Nissl-staining, Golgi-impregnation, dye intracellular-filling and axon retrograde-track-tracing. Our results show that spiny inverted neurons make up less than 8.5% and 5.5% of all cortical neurons in the primary and secondary rabbit visual cortex, respectively. Infragranular spiny inverted neurons constitute 15% and 8.5% of infragranular neurons in the said animal and areas. Spiny inverted neurons congregate at layers V-VI in all studied species.

Studies have also revealed that spiny inverted neurons are excitatory neurons which furnish axons for all sorts of cortico-cortical, cortico-claustral and cortico-striatal projections, but not for non-telencephalic centres such as the lateral and medial geniculate nuclei, the colliculi or the pons. As a group, each subset of inverted cells contributing to a given projection is located below the pyramidal neurons whose axons furnish the same centre. Spiny inverted neurons are particularly conspicuous as a source of the backward cortico-cortical projection to primary visual cortex and from this to the claustrum. Indeed, they constitute up to 82% of the infragranular cells that furnish these projections.

Spiny inverted neurons may be classified into three subtypes according to the point of origin of the axon on the cell: the somatic basal pole which faces the cortical outer surface, the somatic flank and the reverse apical dendrite. As seen with electron microscopy, the axon initial segments of these subtypes are distinct from one another, not only in length and thickness, but also in the number of received synaptic boutons.

All of these anatomical features together may support a synaptic-input integration which is peculiar to spiny inverted neurons. In this way, two differently qualified streams of axonal output may coexist in a projection which arises from a particular infragranular point within a given cortical area; one stream would be furnished by the typical pyramidal neurons, whereas spiny inverted neurons would constitute the other source of distinct information flow.

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