ARE THERE ANY SILENT PARTS IN THE HUMAN BRAIN? YES

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For many years, it was believed that the brain only uses a fraction of its “neuronal power” while large parts of the human brain remained “unused”, i.e. “silent”.
However, with the advent of the modern methodologies of molecular neuroscience and functional neuroimaging, it has become evident that “activity” can be demonstrated in all brain areas, even in those which previously were believed to be “inactive”. So-called “resting state” fMRI reveals indeed that BOLD signals can be obtained throughout the brain. Therefore, the presently prevailing notion is that “everything in the brain is always active” and that there is no such thing as “silent” areas.
However, there is a risk that this popular opinion becomes a dogma which cannot be reconciled with the following important scientific observations:
1) Molecular genetic processes such as signalling and subsequent gene expression is not only driven by “active” phosphorylated transcription factors. So-called silencer-repressor interaction can antagonise the effect of transcription factors, thereby downregulating gene expression processes. Furthermore, transcription factors themselves are in a delicate “balance system” of activation and de-activation within the interplay of kinases and phosphatases. Thus, downregulation, silencing and de-activation of gene expression processes are important and integral physiological phenomena. Constant “activity” of these fundamental molecular processes would be pathological and can be observed, for example, in some tumours.
2) Neurotransmitter/receptor systems can be dichotomised according to their excitatory or inhibitory properties. One major criticism of fMRI studies showing alterations of “activity” is actually the fact that it is impossible to decide whether these changes in activity affect excitatory or inhibitory circuits. Increased activity of inhibitory neurons would actually mean that the result is an increased inhibition, i.e. a silencing effect.
3) On a functional level, it is well known that certain brain areas such as the thalamus exercise an important “filter and gatekeeper function” with the ability to “silence” and “block out” a plethora of sensory signals and information. Again, this silencing process is a crucial physiological feature of the human brain, and disturbances in this “silencing function” have been associated with neuropsychiatric disorders such as schizophrenia.
In summary, we suggest that the concept of “silent parts in the human brain” needs to be reconsidered to undergo a modern re-interpretation. While the simplistic old idea of “100% passive and unused” parts in the brain might not be defensible, it is essential to understand that, according to latest scientific research, neural silencing processes on the molecular, biochemical, cellular and functional level are frequent, significant and vital neurophysiological phenomena. With this in mind, we would argue that, yes, there are silent parts in the human brain, whereby “silence” does not necessarily represent an idle, passive state, but is rather achieved via quite exciting active processes.