

## Target of General Anaesthesia: Brain or Soul?

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### Abstract

Mechanisms of general anaesthesia have extensively been studied from molecular to cerebral levels. A major molecular target of general anaesthetics, both inhalation and intravenous, is considered the gamma-aminobutyric acid subtype A (GABA-A) receptor that distributes extensively across neurons in the central nervous system. Anaesthetics enhance activation of the GABA-A receptor, hyperpolarize neurons, and thus inhibit activity of neurons unanimously across the central nervous system. Neuroimaging techniques have further revealed that anaesthetic-induced cerebral inhibition dominates across the thalamus and the association areas in the frontoparietal cortices. Anaesthetics suppress both thalamocortical and intercortical transmission, thus shutting down the multimodal binding process that integrates bottom-up sensory information and top-down executive function.

Then, why do some patients claim recall of intraoperative events or suffer from unexplained behavioral maladaptation after anaesthesia? It seems that both explicit and implicit memory fail to be suppressed sufficiently by an apparently sufficient depth of anaesthesia. Behavioral, electrophysiological, or end-tidal anaesthetic monitoring have been proven insufficient in preventing awareness and memory during anaesthesia. Isolated forearm technique has further revealed nearly half of anaesthetized patients show behavioral responses despite post-anaesthetic amnesia.

The author proposes that anaesthetics suppress only the behavioural part of "self" but leave the subconscious part of "self" partly unaffected. Suppression of apparent conscious behaviour does not necessarily mean suppression of the human "being" as a whole, which we had expected during general anaesthesia. We only observe unresponsiveness or disconnectedness in patients under anaesthesia, but not how the "subconscious self" exists there. We generally anaesthetize the brain but leave the soul unaffected. Here we find a clue as to how we should treat patients with souls resistant to anaesthetics – care them as if they were totally aware under general anaesthesia.