Mindfulness meditation, a practice with ancient roots, has been posited to induce significant phenomenological changes in human consciousness through the modulation of complex neural interactions. This research hypothesizes that such modulations, facilitated by the intentional training of the mind, lead to alterations in the structural and functional connectivity within the brain's cognitive hierarchy. Employing advanced neuroimaging techniques, notably diffusion embedding, this thesis aims to transform functional connectivity maps into a lower-dimensional space to better understand and visualize the changes in connectivity among large-scale brain networks. The study explores whether long-term mindfulness practitioners exhibit characteristic changes in their cognitive hierarchy as compared to novices, suggesting a restructuring of neural connectivity that correlates with their enhanced capacity for emotional and cognitive regulation. In addition to the comparative analysis between long-term practitioners and novices, this research addresses the limitations of cross-sectional designs by incorporating longitudinal data from a 10-day intensive meditation retreat. This inclusion allows for the observation of dynamic changes in neural connectivity, providing a more nuanced understanding of the immediacy and progression of meditation-induced neurocognitive transformations. By examining participants before, after the retreat and 3-weeks after the retreat, the study aims to capture both the short-term and potential lasting effects of immersive mindfulness practice on the brain's functional architecture. Through a multi-faceted approach, this research seeks to elucidate the neurocognitive transformations induced by mindfulness practices and their implications on our understanding of consciousness. The overarching goal is to chart the cerebral landscape shaped by meditation and to uncover how our deepest neurological constructs interact with and are molded by our lived experiences.