What is the soul, but a humble pineal gland

Is the seat of the soul in the brain?

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PERHAPS René Descartes was right when he argued in 1649 that the pineal gland is the seat of the soul. Brain scans suggest that the area surrounding the gland is activated when people meditate.

"There is no definition of 'soul' in the scientific field," says Jyh-Horng Chen of the National Taiwan University in Taipei, co-leader of the study. "However, our results demonstrate a correlation between pineal activation and religious meditation which might have profound implications in the physiological understanding of mind, spirit and soul."

Chen and his colleagues took fMRI scans of the brains of 11 men and 9 women as they practised a meditation technique called Chinese original quiet sitting. Their pineal areas were most active in the first phase, when practitioners silently recite religious mantras and try to get themselves into the right frame of mind prior to a prolonged relaxation phase.

The gland's main function is to secrete melatonin, a hormone which regulates the biological clock. Chen speculates that it may also play a role in the "intrinsic awareness" of spirituality.

Not everyone is convinced. "I am sceptical, given the complete lack of evidence for any function of the pineal gland other than melatonin secretion," says Bruce O'Hara of the University of Kentucky in Lexington, whose 2005 study showed that meditation improved alertness (hieronder weergegeven).

The scans were reported online at Nature Precedings (zie verderop), a site run by the journal *Nature* which invites unpublished but intriguing studies.

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Meditation builds up the brain

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Alison Motluk

Meditating does more than just feel good and calm you down, it makes you perform better – and alters the structure of your brain, researchers have found.

People who meditate say the practice restores their energy, and some claim they need less sleep as a result. Many studies have reported that the brain works differently during meditation – brainwave patterns change and neuronal firing patterns synchronise. But whether meditation actually brings any of the restorative benefits of sleep has remained largely unexplored.

So Bruce O'Hara and colleagues at the University of Kentucky in Lexington, US, decided to investigate. They used a well-established "psychomotor vigilance task", which has long been used to quantify the effects of sleepiness on mental acuity. The test involves staring at an LCD screen and pressing a button as soon as an image pops up. Typically, people take 200 to 300 milliseconds to respond, but sleep-deprived people take much longer, and sometimes miss the stimulus altogether.

Ten volunteers were tested before and after 40 minutes of either sleep, meditation, reading or light conversation, with all subjects trying all conditions. The 40-minute nap was known to improve performance (after an hour or so to recover from grogginess). But what astonished the researchers was that meditation was the only intervention that immediately led to superior performance, despite none of the volunteers being experienced at meditation.

“Every single subject showed improvement,” says O’Hara. The improvement was even more dramatic after a night without sleep. But, he admits: “Why it improves performance, we do not know.” The team is now studying experienced meditators, who spend several hours each day in practice.

Brain builder

What effect meditating has on the structure of the brain has also been a matter of some debate. Now Sara Lazar at the Massachusetts General Hospital in Boston, US, and colleagues have used MRI to compare 15 meditators, with experience ranging from 1 to 30 years, and 15 non-meditators.

They found that meditating actually increases the thickness of the cortex in areas involved in attention and sensory processing, such as the prefrontal cortex and the right anterior insula.

“You are exercising it while you meditate, and it gets bigger,” she says. The finding is in line with studies showing that accomplished musicians, athletes and linguists all have thickening in relevant areas of the cortex. It is further evidence, says Lazar, that yogis “aren’t just sitting there doing nothing".

The growth of the cortex is not due to the growth of new neurons, she points out, but results from wider blood vessels, more supporting structures such as glia and astrocytes, and increased branching and connections.

The new studies were presented at the Society for Neuroscience annual meeting, in Washington DC, US.

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Correlation between Pineal Activation and Religious Meditation Observed by Functional Magnetic Resonance Imaging

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Abstract:

The human brain possesses plenty of functions but little is known about its scientific relationship with mind and spirit. Conferences[1,2] focused on the connection between science and religion were held very recently in which neuroscientists, Buddhist scholars and Dalai Lama discussed attention, mental imagery, emotion, mind, brain functions and meditation, suggesting religious meditation offers an effective means to investigate the mystery of mind and spirit. In the past decade, scientists struggled to obtain brain mappings for various meditation styles using different brain imaging techniques and stimulating results have been observed[3-17]. In this letter we report that, together with other brain regions, pineal body exhibit significant activation during meditation process, supporting the long lasting speculation that pineal plays an important role in the intrinsic awareness which might concern spirit or soul. Pineal is known as an endocrine organ which produces substrates including melatonin and has been ascribed numerous even mysterious functions but its activation during meditation

has never been observed by brain imaging technique. In seventeenth century, based on anatomic observation, Descartes ventured to suggest that pineal serves as the principal seat of the soul[18-20]. Inspired by its geometric center in the brain, physiologists, psychologists, philosophers and religionists have been speculating for centuries about pineal's function relevant to spirit and soul. In this study, we chose Chinese Original Quiet Sitting, one style of meditation, to explore this long lasting speculation by functional magnetic resonance imaging technique. Our results demonstrate a correlation between pineal activation and religious meditation which might have profound implications in physiological understanding of the intrinsic awareness.