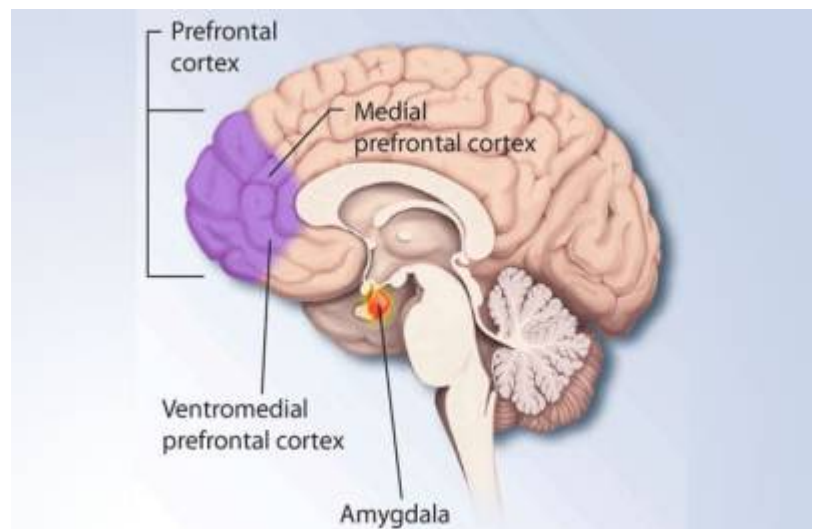


# Medial prefrontal cortex



The empirical literature on the medial [prefrontal cortex](#) (mPFC) is dominated by studies of its role in [decision-making](#), including [conflict monitoring](#) <sup>1)</sup>, [error detection](#) <sup>2)</sup>, [executive control](#) <sup>3) 4)</sup>, [reward-guided learning](#) <sup>5)</sup>, and decision making about risk and reward <sup>6)</sup>. However, the mPFC also plays a key role in [memory](#), as highlighted by its selective involvement in the retrieval of “remote” memories (i.e., items learned several weeks earlier) <sup>7)</sup> (Bontempi et al., 1999; Frankland et al., 2004; Takashima et al., 2006b). Other studies implicate mPFC in “recent” memory, learned 1–2 days earlier. For example, inactivation of mPFC impairs the recall of fear memory learned the previous day (Corcoran and Quirk, 2007). Hence, the mPFC plays a role in both recent and remote memory. Other studies have emphasized the role of mPFC in the consolidation of memories, in that interfering with mPFC immediately after learning disrupts subsequent recall in many tasks (e.g., Tronel and Sara, 2003). All of these studies implicate mPFC in what might be defined as “long-term” memory (i.e., memory spanning several hours or longer). There is also evidence that mPFC is important for “short-term” memory, spanning seconds to minutes. For example, rats with mPFC lesions have difficulty recalling place-reward associations over a 30 minute delay (Seamans et al., 1995) or waiting for a response cue over a 30 second delay (Narayanan et al., 2006). In summary, there is evidence that the mPFC plays a critical role in remote, recent and short-term memories over a broad range of tasks.

<sup>1)</sup>

Botvinick MM, Cohen JD, Carter CS. Conflict monitoring and anterior cingulate cortex: an update. *Trends Cogn Sci.* 2004 Dec;8(12):539-46. PubMed PMID: 15556023.

<sup>2)</sup>

Holroyd CB, Coles MG, Nieuwenhuis S. Medial prefrontal cortex and error potentials. *Science.* 2002 May 31;296(5573):1610-1 author reply 1610-1. PubMed PMID: 12041532.

<sup>3)</sup>

Posner MI, Rothbart MK, Sheese BE, Tang Y. The anterior cingulate gyrus and the mechanism of self-regulation. *Cogn Affect Behav Neurosci.* 2007 Dec;7(4):391-5. Review. PubMed PMID: 18189012.

<sup>4)</sup>

Ridderinkhof KR, Ullsperger M, Crone EA, Nieuwenhuis S. The role of the medial frontal cortex in cognitive control. *Science.* 2004 Oct 15;306(5695):443-7. Review. PubMed PMID: 15486290.

<sup>5)</sup>

Rushworth MF, Noonan MP, Boorman ED, Walton ME, Behrens TE. Frontal cortex and reward-guided learning and decision-making. *Neuron.* 2011 Jun 23;70(6):1054-69. doi: 10.1016/j.neuron.2011.05.014. Review. PubMed PMID: 21689594.

<sup>6)</sup>

Bechara A, Damasio AR. The somatic marker hypothesis: A neural theory of economic decision. Games and Economic Behavior. 2005;52:336-372.

<sup>7)</sup>

Bontempi B, Laurent-Demir C, Destrade C, Jaffard R. Time-dependent reorganization of brain circuitry underlying long-term memory storage. Nature. 1999 Aug 12;400(6745):671-5. PubMed PMID: 10458162.

From:

<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:

[https://neurosurgerywiki.com/wiki/doku.php?id=medial\\_prefrontal\\_cortex](https://neurosurgerywiki.com/wiki/doku.php?id=medial_prefrontal_cortex)

Last update: **2024/06/07 02:49**

