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**NEUROPHYSIOLOGY OF EMOTIONS AND MECHANISM OF  
PLEASURE**

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Primary emotions are anger, fear, pleasure, sadness, and disgust. In various emotional states different brain areas reveal their activity.

Anger and fear “live” in amygdala. This structure forms the primary response “flight or fight”. Happiness and sadness are provided by the system of reward and punishment, the key “carrot and stick” in our brain. They arise in ventral tegmental area and hippocampus. Disgust is unique emotion for human beings. It originates in the anterior insula. Its main function is taste formation. That’s why disgusting stories may spoil your appetite. Pleasure occurs thanks to dopamine, the chemical factor of internal reinforcement. It serves as an important part of the reward system. Dopamine is naturally produced in large quantities during positive experience (e.g. tasty food or pleasant body sensations). Neurobiological experiments have shown that even memories of positive moments can increase dopamine levels. Dopamine receptors are GPCRs. There are 5 subtypes (D1—D5). D1 and D5, called D1-like receptors, are coupled with Gs protein, which stimulates adenylatecyclase (AC). Other receptors, D2-like receptors, are coupled with Gi protein, which inhibits AC. Such mental illnesses as schizophrenia and obsessive-compulsive disorder and Parkinsonism are caused by misbalance of dopamine. There is also an interesting mechanism, called reuptake, provided by dopamine active transporter (DAT). DAT removes dopamine from the synaptic cleft by coupling the energetically-favorable movement of Na<sup>+</sup> ions moving from high to low concentration into the cell. DAT requires sequential binding and co-transport of two Na<sup>+</sup> ions and one Cl<sup>-</sup> ion with dopamine substrate. Numerous medicines and addictive drugs, including amphetamine, opiates and cocaine affect DAT. They may block or invert the transporter, thus increasing dopamine concentration in the cleft.

So, every physiological process is based on a real biochemical substrate, our emotions are not an exception. To know the key mechanism of emotions means to know how to regulate emotional states and balance mental functions.