

# | Genes Reflecting Emotion, Thought, and Creativity

Category	Gene	Scientific Function	Symbolic Meaning	Amino Acid Variants
Emotion	ARNTL	Transcription factor regulating circadian rhythm and biological timing. *1	The timing through which the external world is felt.	
Emotion	HTR2A	Serotonin receptor involved in emotion and cognitive processing. *2	The sensor of emotion; source of sensitivity.	
Emotion	DRD4	Dopamine receptor associated with exploratory behavior and reward pathways. *3	The impulse toward seeking and creativity.	
Emotion	SLC6A3	Dopamine transporter modulating emotional response and reward. *4	The mechanism that calms passion and organizes introspection.	
Emotion	COMT	Enzyme regulating cognitive processing and stress response. *5	The bridge that transitions emotion into thought.	
Thought	CACNA1C	Calcium ion channel involved in neural signaling and emotional regulation. *6	The threshold where external stimuli are transformed into inquiry.	
Thought	ZNF804A	Transcription factor affecting neural connectivity and brain architecture. *7	The flexible intelligence that integrates emotion and thought.	<div><div>• p.(Gln261Leu)</div><div>• p.(Cys325Phe)</div><div>• p.(Glu542Lys)</div><div>• p.(Thr697dup)</div><div>• p.(Thr707Lys)</div><div>• p.(His747Arg)</div></div>
Thought	CREB1	Transcription factor essential for learning and memory consolidation. *8	The foundation of memory formation.	
Thought	GRIN2B	NMDA receptor subunit supporting neuroplasticity and long-term memory. *9	The ground on which deep thought accumulates.	
Creativity	BDNF	Neurotrophic factor promoting growth and plasticity of neurons. *10	The restructuring of thought and emergence of new perspectives.	<div>• p.(Val66Met)</div>
Creativity	NTRK2	Receptor for BDNF involved in neuronal development and survival. *11	The origin from which creativity is received and unfolds into the world.	
Creativity	ARC	Activity-regulated protein promoting synaptic plasticity and memory formation. *12	The point where present emotion and thought crystallize into memory.	
Creativity	FOXP2	Transcription factor controlling language and speech development. *13	Expression and articulation as the external form of creation.	

**Note:**

The variant information listed in this document is based on scientific research; however, the functional effects of each variant are not interpreted in a deterministic manner.

The symbolic meanings attributed to each gene derive from an artistic perspective rather than biomedical

## | Reference Genome

Homo sapiens(GRCh38.p14)

## | Primary References

\*1

Zheng, Y., Pan, L., Wang, F., Yan, J., Wang, T., Xia, Y., Lin, Y., Deng, K., Zheng, Y., Xia, X., Su, Z., Chen, H., Lin, J., Ding, Z., Zhang, K., Zhang, M., & Chen, Y. (2023). Neural function of Bmal1: An overview. *Cell & Bioscience*, 13\*(1), Article 1.  
<https://doi.org/10.1186/s13578-022-00947-8>

\*2

Zhang, G., & Stackman, R. W. Jr. (2015). The role of serotonin 5-HT<sub>2</sub>A receptors in memory and cognition. *Frontiers in Pharmacology*, 6, 225.  
<https://doi.org/10.3389/fphar.2015.00225>

\*3

Ebstein, R. P., Novick, O., Umansky, R., Priel, B., Osher, Y., Blaine, D., Bennett, E. R., Nemanov, L., Katz, M., & Belmaker, R. H. (1996). Dopamine D4 receptor (D4DR) exon III polymorphism associated with the human personality trait of Novelty Seeking. *Nature Genetics*, 12(1), 78–80.  
<https://doi.org/10.1038/ng0196-78>

\*4

Reith, M. E. A., Kortagere, S., Wiers, C. E., Sun, H., Kurian, M. A., Galli, A., Volkow, N. D., & Lin, Z. C. (2022). The dopamine transporter gene SLC6A3: multidisease risks. *Molecular Psychiatry*, 27, 1031–1046.  
<https://doi.org/10.1038/s41380-021-01341-5>

\*5

Crum, A. J., Akinola, M., Turnwald, B. P., Kaptchuk, T. J., & Hall, K. T. (2018). Catechol-O-methyltransferase moderates effect of stress mindset on affect and cognition. *PLOS ONE*, 13(4), e0195883.  
<https://doi.org/10.1371/journal.pone.0195883>

\*6

Dedic, N., Pöhlmann, M. L., Richter, J. S., Mehta, D., Czamara, D., Metzger, M. W., ... Deussing, J. M. (2018). Cross-disorder risk gene CACNA1C differentially modulates susceptibility to psychiatric disorders during development and adulthood. *Molecular Psychiatry*, 23(3), 533–543.  
<https://doi.org/10.1038/mp.2017.133>

\*7

Dong, F., Mao, J., Chen, M., Yoon, J., & Mao, Y. (2021). Schizophrenia risk ZNF804A interacts with its associated proteins to modulate dendritic morphology and synaptic development. *Molecular Brain*, 14(1), Article 12.  
<https://doi.org/10.1186/s13041-021-00729-2>

\*8

Ortega-Martínez, S. (2015). A new perspective on the role of the CREB family of transcription factors in memory consolidation via adult hippocampal neurogenesis. *Frontiers in Molecular Neuroscience*, 8, 46.  
<https://doi.org/10.3389/fnmol.2015.00046>

\*9

Tang, Y.-P., Shimizu, E., Dube, G. R., Rampon, C., Kerchner, G. A., Zhuo, M., Liu, G., & Tsien, J. Z. (1999). Genetic enhancement of learning and memory in mice. *Nature*, 401(6758), 63–69.  
<https://doi.org/10.1038/43432>

\*10

Miranda, M., Morici, J. F., Zanoni, M. B., & Bekinschtein, P. (2019). Brain-derived neurotrophic factor: A key molecule for memory in the healthy and the pathological brain. *Frontiers in Cellular Neuroscience*, 13, 363.  
<https://doi.org/10.3389/fncel.2019.00363>

\*11

Roussel-Gervais, A., Sgroi, S., Cambet, Y., Lemeille, S., Seredenina, T., Krause, K.-H., & Jaquet, V. (2023). Genetic knockout of NTRK2 by CRISPR/Cas9 decreases neurogenesis and favors glial progenitors during differentiation of neural progenitor stem cells. *Frontiers in Cellular Neuroscience*, 17, Article 1289966.  
<https://doi.org/10.3389/fncel.2023.1289966>

\*12

Korb, E., & Finkbeiner, S. (2011). Arc in synaptic plasticity: from gene to behavior. *Trends in Neurosciences*, 34(11), 591–598.  
<https://doi.org/10.1016/j.tins.2011.08.007>

\*13

Lai, C. S. L., Fisher, S. E., Hurst, J. A., Vargha-Khadem, F., & Monaco, A. P. (2001). A forkhead-domain gene is mutated in a severe speech and language disorder. *Nature*, 413, 519–523.  
<https://doi.org/10.1038/35097076>