

# OLTÁSBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

## Referenciák:

- 001 <http://www.tenyek-tevhitek.hu/az-mmr-oltas-megis-autizmust-okozhat.htm>  
[1] <https://worldmercuryproject.org/robert-f-kennedy-jr-announces-world-mercury-projects-100000-challenge-goal-stopping-use-highly-toxic-mercury-vaccines/#sthash.QyUVDJh9.dpuf> [2]  
<https://www.cdc.gov/vaccines/schedules/images/schedule1983s.jpg> [3]  
<https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html> [4]  
<http://www.foxnews.com/health/2015/07/30/autism-costs-may-reach-1-trillion-by-2025-surpassing-diabetes-care-study.html> [5]  
<https://www.cdc.gov/vaccines/hcp/conversations/downloads/vacsafe-understand-color-office.pdf> [6] Coffman RL, Sher A, Seder RA. Vaccine adjuvants: putting innate immunity to work. *Immunity*. 2010;33(4):492-503.  
[7] The Blood-Brain Barrier in Health and Disease, Volume One: Morphology, Biology and Immune Function, CRC Press (June 23, 2015) [8] Ransohoff RM, El khoury J. Microglia in Health and Disease. *Cold Spring Harb Perspect Biol*. 2015;8(1):a020560. [9] Azevedo FA, Carvalho LR, Grinberg LT, et al. Equal numbers of neuronal and nonneuronal cells make the human brain an isometrically scaled-up primate brain. *J Comp Neurol*. 2009;513(5):532-41.  
[10] Glial Physiology and Pathophysiology, Wiley-Blackwell; 1 edition (April 15, 2013) [11] Cherry JD, Olschowka JA, O'banion MK. Neuroinflammation and M2 microglia: the good, the bad, and the inflamed. *J Neuroinflammation*. 2014;11:98. [12]Ransohoff RM, El khoury J. Microglia in Health and Disease. *Cold Spring Harb Perspect Biol*. 2015;8(1):a020560 [13]Zariri A, Pupo E, Van riet E, Van putten JP, Van der ley P. Modulating endotoxin activity by combinatorial bioengineering of meningococcal lipopolysaccharide. *Sci Rep*. 2016;6:36575. [14] Coffman RL, Sher A, Seder RA. Vaccine adjuvants: putting innate immunity to work. *Immunity*. 2010;33(4):492-503. [15] Singh VK, Lin SX, Newell E, Nelson C. Abnormal measles-mumps-rubella antibodies and CNS autoimmunity in children with autism. *J Biomed Sci*. 2002;9(4):359-64.  
[16] Bieback K, Lien E, Klagge IM, et al. Hemagglutinin protein of wild-type measles virus activates toll-like receptor 2 signaling. *J Virol*. 2002;76(17):8729-36. [17]  
<https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf> [18]  
<https://www.ncbi.nlm.nih.gov/pubmed/?term=vaccine+adjuvant> [19] Podda A. The adjuvanted influenza vaccines with novel adjuvants: experience with the MF59-adjuvanted vaccine. *Vaccine*. 2001;19(17-19):2673-80. [20] Beran J. Safety and immunogenicity of a new hepatitis B vaccine for the protection of patients with renal insufficiency including pre-haemodialysis and

# OLTÁSBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

haemodialysis patients. Expert Opin Biol Ther. 2008;8(2):235-47. [21] [https://report.nih.gov/categorical\\_spending.aspx](https://report.nih.gov/categorical_spending.aspx) [22] De gregorio E, Caproni E, Ulmer JB. Vaccine adjuvants: mode of action. Front Immunol. 2013;4:214. [23] Exley C, Siesjö P, Eriksson H. The immunobiology of aluminium adjuvants: how do they really work?. Trends Immunol. 2010;31(3):103-9. [24] Cancer and Inflammation Mechanisms: Chemical, Biological, and Clinical Aspects 1st Edition (March 31, 2014) [25] Gertig U, Hanisch UK. Microglial diversity by responses and responders. Front Cell Neurosci. 2014;8:101. [26] Guloksuz SA, Abali O, Aktas cetin E, et al. Elevated plasma concentrations of S100 calcium-binding protein B and tumor necrosis factor alpha in children with autism spectrum disorders. Rev Bras Psiquiatr. 2017; [27] Kroner A, Greenhalgh AD, Zarruk JG, Passos dos santos R, Gaestel M, David S. TNF and increased intracellular iron alter macrophage polarization to a detrimental M1 phenotype in the injured spinal cord. Neuron. 2014;83(5):1098-116. [28] Mosser CA, Baptista S, Arnoux I, Audinat E. Microglia in CNS development: Shaping the brain for the future. Prog Neurobiol. 2017; [29] Macleod MK, McKee AS, David A, et al. Vaccine adjuvants aluminum and monophosphoryl lipid A provide distinct signals to generate protective cytotoxic memory CD8 T cells. Proc Natl Acad Sci USA. 2011;108(19):7914-9. [30] Tuchman R. Autism and epilepsy: what has regression got to do with it?. Epilepsy Curr. 2006;6(4):107-11. [31] [http://ccr.coriell.org/Sections/Search/Sample\\_Detail.aspx?Ref=AG05965-C&PgId=166](http://ccr.coriell.org/Sections/Search/Sample_Detail.aspx?Ref=AG05965-C&PgId=166) [32] [http://ccr.coriell.org/Sections/Search/Sample\\_Detail.aspx?Ref=AG06814-I&PgId=166](http://ccr.coriell.org/Sections/Search/Sample_Detail.aspx?Ref=AG06814-I&PgId=166) [33] [http://en.wikipedia.org/wiki/HEK\\_cell#Origins\\_of\\_HEK\\_293\\_Cells](http://en.wikipedia.org/wiki/HEK_cell#Origins_of_HEK_293_Cells) [34] Ge Y, Mansell A, Ussher JE, et al. Rotavirus NSP4 Triggers Secretion of Proinflammatory Cytokines from Macrophages via Toll-Like Receptor 2. J Virol. 2013;87(20):11160-7. [35] <http://drbogner.com/glyphosate-autism/> [36] <http://drbogner.com/glyphosate-vs-brain/> [37] <http://drbogner.com/autismfile/> [38] Benbrook CM. Trends in glyphosate herbicide use in the United States and globally. Environ Sci Eur. 2016;28(1):3. [39] Samsel A, Seneff S. Glyphosate, pathways to modern diseases III: Manganese, neurological diseases, and associated pathologies. Surg Neurol Int. 2015;6:45. [40] [http://www.momsacrossamerica.com/glyphosate\\_in\\_childhood\\_vaccines](http://www.momsacrossamerica.com/glyphosate_in_childhood_vaccines) [41] Samsel A, Seneff S. Glyphosate's Suppression of Cytochrome P450 Enzymes and Amino Acid Biosynthesis by the Gut Microbiome: Pathways to Modern Diseases. Entropy 2013, 15(4), 1416-1463 [42] Christakos S, Dhawan P, Verstuyf A, Verlinden L, Carmeliet G. Vitamin D: Metabolism, Molecular Mechanism of Action, and Pleiotropic Effects. Physiol Rev. 2016;96(1):365-408. [43] Thyer L, Ward E, Smith R, et al. A novel role for a major component

# OLTÁSOKBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

of the vitamin D axis: vitamin D binding protein-derived macrophage activating factor induces human breast cancer cell apoptosis through stimulation of macrophages. *Nutrients.* 2013;5(7):2577-89. [44] <https://www.ncbi.nlm.nih.gov/gene?Db=gene&Cmd>ShowDetailView&TermToSearch=120227> [45] <http://www.fooddemocracynow.org/blog/2016/nov/14> [46] National Toxicology Data Network, Glyphosate. <https://toxnet.nlm.nih.gov/cgi-bin/sis/search/a?dbs+hsdb:@term+@DOCNO+3432> [47] World Health Organization WHO/ International Programme on Chemical Safety; Environmental Health Criteria 159, Glyphosate, (1994) [48] Cassano T, Calcagnini S, Pace L, De marco F, Romano A, Gaetani S. Cannabinoid Receptor 2 Signaling in Neurodegenerative Disorders: From Pathogenesis to a Promising Therapeutic Target. *Front Neurosci.* 2017;11:30. [49] Fernández-trapero M, Espejo-porras F, Rodríguez-cueto C, et al. Up-regulation of CB2 receptors in reactive astrocytes in canine degenerative myelopathy, a disease model of amyotrophic lateral sclerosis. *Dis Model Mech.* 2017; [50] Navarro G, Morales P, Rodríguez-cueto C, Fernández-ruiz J, Jagerovic N, Franco R. Targeting Cannabinoid CB2 Receptors in the Central Nervous System. Medicinal Chemistry Approaches with Focus on Neurodegenerative Disorders. *Front Neurosci.* 2016;10:406. [51] Javed H, Azimullah S, Haque ME, Ojha SK. Cannabinoid Type 2 (CB2) Receptors Activation Protects against Oxidative Stress and Neuroinflammation Associated Dopaminergic Neurodegeneration in Rotenone Model of Parkinson’s Disease. *Front Neurosci.* 2016;10:321. [52] Xie J, Xiao D, Xu Y, et al. Up-regulation of immunomodulatory effects of mouse bone-marrow derived mesenchymal stem cells by tetrahydrocannabinol pre-treatment involving cannabinoid receptor CB2. *Oncotarget.* 2016;7(6):6436-47. [53] US patent 6630507, Cannabinoids as antioxidants and neuroprotectants, <https://docs.google.com/viewer?url=patentimages.storage.googleapis.com/pdfs/US6630507.pdf> [54] Fernández-Ruiz JJ, Gonzalez S, Romero J, Ramos JA. Cannabinoids in neurodegeneration and neuroprotection. *Cannabinoids as Therapeutics* 2005, Birkhäuser Verlag: Switzerland; 79–109. 109 In: Mechoulam R (ed) [55] Walsh SK, Hepburn CY, Keown O, et al. Pharmacological profiling of the hemodynamic effects of cannabinoid ligands: a combined in vitro and in vivo approach. *Pharmacol Res Perspect.* 2015;3(3):e00143. [56] Carlisle SJ, Marciano-Cabral F, Staab A, Ludwick C, Cabral GA (2002). Differential expression of the CB2 cannabinoid receptor by rodent macrophages and macrophage-like cells in relation to cell activation. *Int Immunopharmacol* 2: 69–82 [57] Benito C, Tolón RM, Pazos MR, Núñez E, Castillo AI, Romero J. Cannabinoid CB2 receptors in human brain inflammation. *Br J Pharmacol.* 2008;153(2):277-85. [58] Molina-Holgado F, Lledo A, Guaza C. Anandamide suppresses nitric oxide and TNF-alpha responses to Theiler’s virus or endotoxin in astrocytes. *Neuroreport.* 1997;8:1929–1933. [59] Walter L,

# OLTÁSBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

Franklin A, Witting A, Wade C, Xie Y, Kunos G et al. (2003). Nonpsychotropic cannabinoid receptors regulate microglial cell migration. *J Neurosci* 23: 1398–1405. [60] Molina-Holgado F, Molina-Holgado E, Guaza C. The endogenous cannabinoid anandamide potentiates interleukin-6 production by astrocytes infected with Theiler's murine encephalomyelitis virus by a receptor-mediated pathway. *FEBS Lett.* 1998;433:139–142. [61] Puffenbarger RA, Boothe AC, Cabral GA. Cannabinoids inhibit LPS-inducible cytokine mRNA expression in rat microglial cells. *Glia*. 2000;29:58–69. [62] Walter L, Franklin A, Witting A, Wade C, Xie Y, Kunos G et al. (2003). Nonpsychotropic cannabinoid receptors regulate microglial cell migration. *J Neurosci* 23: 1398–1405. [63] Klein TW, Lane B, Newton CA, Friedman H. The cannabinoid system and cytokine network. *Proc Soc Exp Biol Med*. 2000;225:1–8. [64] Franklin A, Stella N (2003). Arachidonylcyclopropylamide increases microglial cell migration through cannabinoid CB<sub>2</sub> and abnormal cannabidiol-sensitive receptors. *Eur J Pharmacol* 474: 195–198. [65] Carrier EJ, Kearn CS, Barkmeier AJ, Breese NM, Yang W, Nithipatikom K et al. (2004). Cultured rat microglial cells synthesize the endocannabinoid 2-arachidonylglycerol, which increases proliferation via a CB<sub>2</sub> receptor-dependent mechanism. *Mol Pharmacol* 65: 999–1007. [66] Kreutz S, Koch M, Ghadban C, Korf HW, Dehghani F (2007). Cannabinoids and neuronal damage: differential effects of THC, AEA and 2-AG on activated microglial cells and degenerating neurons in excitotoxically lesioned rat organotypic hippocampal slice cultures. *Exp Neurol* 203: 246–257. [67] <https://goo.gl/LVgj8q> [68] Glial Physiology and Pathophysiology, Wiley-Blackwell; 1 edition (April 15, 2013) [69] <http://cogforlife.org/SCPIIMFARHR.pdf> [70] <http://bit.ly/glyphosateFood> [71] <https://goo.gl/KIKjT8> [72] <http://www.essentialchemicalindustry.org/chemicals/phosphorus.html> [73] [https://en.wikipedia.org/wiki/Fallujah\\_The\\_Hidden\\_Massacre](https://en.wikipedia.org/wiki/Fallujah_The_Hidden_Massacre) [74] <https://pubchem.ncbi.nlm.nih.gov/compound/glyphosate> [75] Onaivi ES, Ishiguro H, Gu S, Liu QR. CNS effects of CB<sub>2</sub> cannabinoid receptors: beyond neuro-immuno-cannabinoid activity. *J Psychopharmacol* (Oxford). 2012;26(1):92–103. [76] Snider NT, Sikora MJ, Sridar C, Feuerstein TJ, Rae JM, Hollenberg PF. The endocannabinoid anandamide is a substrate for the human polymorphic cytochrome P450 2D6. *J Pharmacol Exp Ther*. 2008;327(2):538–45. [77] <https://people.csail.mit.edu/seneff/> [78] <http://vaxedthemovie.com/download-the-cdc-autism-mmr-files-released-by-dr-william-thompson/> [79] [http://www.nccp.org/media/releases/release\\_34.html](http://www.nccp.org/media/releases/release_34.html) [80] <http://vaxedthemovie.com/> [81] [http://www.momsacrossamerica.com/more\\_roundup\\_found\\_in\\_usa\\_moms\\_breast\\_milk](http://www.momsacrossamerica.com/more_roundup_found_in_usa_moms_breast_milk) [82] Samsel A, Seneff S. Glyphosate, pathways to modern diseases III: Manganese, neurological diseases, and associated pathologies. *Surg Neurol*

# OLTÁSOKBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

Int. 2015;6:45. [83] <http://www.drugfree.org/news-service/who-report-smoking-and-drinking-cause-millions-of-deaths-worldwide/> [84] <http://www.marchagainstmonsanto.com> [85] <http://www.worldmercuryproject.org> [86] <https://goo.gl/x8r17z> [87] <https://goo.gl/5w081b> [88] <https://goo.gl/gBkdqX> [89] <https://goo.gl/AbXYiB> [90] <https://goo.gl/ok8mMY> [91] <https://goo.gl/9l4PeS> [92] <https://goo.gl/cZPtzU> [93] <https://goo.gl/DZWFCj> [94] <https://goo.gl/21Kmlt> [95] <http://drbogner.com/endocannabinoid-system-autism-cannabis-part-1/> [96] <http://drbogner.com/role-phytocannabinoids-autism-therapy-part-2/> [97] <http://drbogner.com/practical-approach-to-cannabis-based-asd-therapies-part-3/> [98] <http://drbogner.com/glyphosate-autism/> [99] <http://drbogner.com/glyphosate-vs-brain/> [100] <http://medcraveonline.com/IJVV/IJVV-04-00072.pdf> [101] <http://www.ecowatch.com/kennedy-metal-debris-vaccines-2276687112.html> [102] <https://en.wikipedia.org/wiki/Neuroplasticity> [103] Handbook of the Cerebellum and Cerebellar Disorders, Manto, 2013 [Springer] [104] Aarum J, Sandberg K, Haeberlein SLB, Persson MAA (2003) Migration and differentiation of neural precursor cells can be directed by microglia. Proc Natl Acad Sci USA 100:15983–15988 [105] Morgan SC, Taylor DL, Pocock JM (2004) Microglia release activators of neuronal proliferation mediated by activation of mitogen-activated protein kinase, phosphatidylinositol-3-kinase/Akt and delta-Notch signalling cascades. J Neurochem 90:89–101 [106] Battista D, Ferrari CC, Gage FH, Pitossi FJ (2006) Neurogenic niche modulation by activated microglia: transforming growth factor  $\beta$  increases neurogenesis in the adult dentate gyrus. Eur J Neurosci 23:83–93 [107] Butovsky O, Ziv Y, Schwartz A, Landa G, Talpalar AE, Pluchino S et al (2006) Microglia activated by IL-4 or IFN- $\gamma$  differentially induce neurogenesis and oligodendrogenesis from adult stem/ progenitor cells. Mol Cell Neurosci 31:149–160 [108] Ziv Y, Ron N, Butovsky O, Landa G, Sudai E, Greenberg N et al (2006) Immune cells contribute to the maintenance of neurogenesis and spatial learning abilities in adulthood. Nat Neurosci 9:268–275 [109] Vukovic J, Colditz MJ, Blackmore DG, Ruitenberg MJ, Bartlett PF (2012) Microglia modulate hippocampal neural precursor activity in response to exercise and aging. J Neurosci 32: 6435–6443 [110] The Neurochemical Basis of Autism, Springer; 2010 edition (March 10, 2010) [111] Charleston JS, Bolender RP, Mottet NK, Body RL, Vahter ME, Burbacher TM. (1994) Increases in the number of reactive glia in the visual cortex of Macaca fascicularis following subclinical long-term methyl mercury exposure. Toxicol Appl Pharmacol 129:196–206. [112] Charleston JS, Body RL, Mottet NK, Vahter ME, Burbacher TM. (1995) Autometallographic determination of inorganic mercury distribution in the cortex of the calcarine sulcus of the monkey Macaca fascicularis following long-term subclinical exposure to ethylmercury and

# OLTÁSBAN HASZNÁLT HATÁSFOKOZÓK SZEREPE ÉS HATÁSMECHANIZMUSA KÖZPONTI IDEGRENDSZERI GYULLADÁSOKNÁL – ASD

mercuric chloride. *Toxicol Appl Pharmacol* 132:325–333. [113] <http://education.jlab.org/itselemental/ele013.html> [114] Baudouin, S. J., Gaudias, J., Gerharz, S., Hatstatt, L., Zhou, K., Punnakkal, P., et al. (2012). Shared synaptic pathophysiology in syndromic and nonsyndromic rodent models of autism. *Science*, 338(6103), 128–132. [115] Schmahmann, J. D. (2010). The role of the cerebellum in cognition and emotion: personal reflections since 1982 on the dysmetria of thought hypothesis, and its historical evolution from theory to therapy. *Neuropsychology review*, 20(3), 236–260. [116] Tsai, P. T., Hull, C., Chu, Y., Greene-Colozzi, E., Sadowski, A. R., Leech, J. M., et al. (2012). Autistic-like behaviour and cerebellar dysfunction in Purkinje cell Tsc1 mutant mice. *Nature*, 488(7413), 647–651. [117] Carrier EJ, Kearn CS, Barkmeier AJ, Breese NM, Yang W, Nithipatikom K, Pfister SL, Campbell WB, Hillard CJ (2004) Cultured rat microglial cells synthesize the endocannabinoid 2-arachidonylglycerol, which increases proliferation via a CB2 receptor-dependent mechanism. *Mol Pharmacol* 65:999–1007 [118] Gong JP, Onaivi ES, Ishiguro H, Liu QR, Tagliaferro PA, Brusco A, Uhl GR (2006) Cannabinoid CB2 receptors: immunohistochemical localization in rat brain. *Brain Res* 1071:10–23 [119] Vargas DL, Nascimbene C, Krishnan C et al (2005) Neuroglial activation and neuroinflammation in the brain of patients with autism. *Ann Neurol* 57:67–81 [120] Chaste P, Leboyer M: Autism risk factors: Genes, environment, and gene-environment interactions. *Dialogues Clin Neurosci* 14:281–292, 2012. [121] Jyonouchi H, Sun S, Le H: Proinflammatory and regulatory cytokine production associated with innate and adaptive immune responses in children with autism spectrum disorders and developmental regression. *J Neuroimmunol* 120:170–179, 2001. [122] Ashwood P, Krakowiak P, Hertz-Pannier I, Hansen R, Pessah I, Van de Water J: Elevated plasma cytokines in autism spectrum disorders provide evidence of immune dysfunction and are associated with impaired behavioral outcome. *Brain Behav Immun* 25:40–45, 2011. [123] McAlonan GM, Cheung V, Cheung C et al (2005) Mapping the brain in autism: a voxel-based MRI study of volumetric differences and intercorrelations in autism. *Brain* 128:268–276 [124] Rojas DC, Peterson E, Winterrowd E et al (2006) Regional gray matter volumetric changes in autism associated with social and repetitive behavior symptoms. *BMC Psychiatry* 6:56 [125] Toal F, Bloemen OJ, Deeley Q et al (2009) Psychosis and autism: magnetic resonance imaging study of brain anatomy. *Br J Psychiatry* 194:418–425 [126] Morgan JT, Chana G, Pardo CA, Achim C, Semendeferi K, Buckwalter J, Courchesne E, Everall IP. Microglial activation and increased microglial density observed in the dorsolateral prefrontal cortex in autism. *Biol. Psychiatry* (2010) 68:368–376. [127] Pardo CA, Vargas DL, Zimmerman AW. Immunity, neuroglia and neuroinflammation in autism. *Int. Rev. Psychiatry* (2005) 17:485–495. [128] Blaylock RL. Chronic Microglial Activation and Excitotoxicity Secondary to Excessive Immune Stimulation: Possible Factors in Gulf War Syndrome and Autism. *J. Am.*

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GYULLADÁSOKNÁL – ASD

Phys.Surg. (2004) 9:46–51. [129] Tiemeier H, Lenroot RK, Greenstein DK et al (2010) Cerebellum development during childhood and adolescence: a longitudinal morphometric MRI study. Neuroimage 49(1):63–70 [130] Perez-pouchoulen M, Vanryzin JW, McCarthy MM. Morphological and Phagocytic Profile of microglia in the Developing Rat Cerebellum(1,2,3). eNeuro. 2015;2(4) [131] Fatemi SH, Stary JM, Halt AR, Realmuto G (2001) Dysregulation of Reelin and Bcl-2 proteins in autistic cerebellum. J Autism Dev Disord 6:529–535 [132] Fatemi SH, Halt AR, Realmuto G, Earle J, Kist DA, Thuras P, Merz A (2002a) Purkinje cell size is reduced in cerebellum of patients with autism. Cell Mol Neurobiol 22:171–175 [133] Fatemi SH, Halt AR, Stary JM, Kanodia R, Schulz SC, Realmuto GR (2002b) Glutamic acid decarboxylase 65 and 67 kDa proteins are reduced in autistic parietal and cerebellar cortices. Biol Psychiatry 52:805–810 [134] Fatemi SH, Snow AV, Stary JM, Araghi-Niknam M, Reutiman TJ, Lee S, Brooks AI, Pearce DA (2005) Reelin signaling is impaired in autism. Biol Psychiatry 57:777–787 [135] Fatemi SH, Reutiman TJ, Folsom TD, Thuras PD (2009a) GABA(A) receptor downregulation in brains of subjects with autism. J Autism Dev Disord 39:223–230 [136] Fatemi SH, Folsom TD, Reutiman TJ, Thuras PD (2009b) Expression of GABA(B) receptors is altered in brains of Subjects with autism. Cerebellum 8:64–69 [137] Fatemi SH, Reutiman TJ, Folsom TD, Rooney RJ, Patel DH, Thuras PD (2010) mRNA and protein levels for GABA(A) alpha 4, alpha 5, beta 1, and GABA(B)R1 receptors are altered in brains from subjects with autism. J Autism Dev Disord 40:743–750 [138] Fatemi SH, Folsom TD, Kneeland RE, Liesch SB (2011) Metabotropic glutamate receptor 5 upregulation in children with autism is associated with underexpression of both Fragile X mental retardation protein and GABA(A) receptor beta 3 in adults with autism. Anat Rec 294:1635–1645 [139] Fatemi SH, Aldinger KA, Ashwood P, Bauman ML, Blaha CD, Blatt GJ, Chauhan A, Chauhan V, Dager SR, Dickson PE, Estes AM, Goldowitz D, Heck DH, Kemper TL, King BH, Martin LA, Millen KJ, Mittleman G, Mosconi MW, Persico AM, Sweeney JA, Webb SJ, Welsh JP (2012) Consensus paper: pathological role of the cerebellum in autism. Cerebellum 11:777–807 [140] Available at: <http://www.sciencedirect.com/science/article/pii/S2210762211000052>. Accessed March 14, 2017. [141] <https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf>