| Supplementary Table 1: Gene Descriptive Table | | | | |
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| CHR1 | Gene | Gene  Name | Group | Description of Gene (ENTREZ GENE SUMMARY or NCBI gene description)\* |
| 6 | ALDH5A1 | Aldehyde dehydrogenase 5 family member A1 | Other | ALDH5A1 encodes for succinic semialdehyde dehydrogenase enzyme, which is found in mitochondria and is involved in the breakdown of gamma-amino butyric acid. Mutations in ALDH5A1 can cause succinic semialdehyde dehydrogenase deficiency which can cause developmental delay and seizures (National Library of Medicine (US) [NLM], 2013). |
| 7 | CNTNAP2 | Contactin associated protein-like 2 | Other | CNTNAP2 encodes a member of the neurexin family which functions in the nervous system as receptors and cell adhesion molecules. The protein contains laminin G domains and epidermal growth factor. The protein is localized at the juxtaparanodes of myelinated axons and mediates interactions between neurons and glia during nervous system development. It is directly bound and regulated by forkhead box protein P2, a transcription factor related to speech and language development. It has been found to be associated with schizophrenia, autism, and ADHD. (NCBI; July 2017) Both deletions and SNP variants in *CNTNAP2* have been linked to autism or phenotypic behaviors such as poor social performance and eye contact (Arking et al., 2008; Bai et al., 2020; Gregor et al., 2011; Nord et al., 2011; Stephan, 2008). |
| 4 | EGF | Epidermal growth factor (beta-urogastrone) | Inflammatory | This gene encodes a member of the epidermal growth factor superfamily. The encoded preproprotein is proteolytically processed to generate the 53-amino acid epidermal growth factor peptide. This protein acts a potent mitogenic factor that plays an important role in the growth, proliferation, and differentiation of numerous cell types. This protein acts by binding with high affinity to the cell surface receptor, epidermal growth factor receptor. Defects in this gene are the cause of hypomagnesemia type 4. Dysregulation of this gene has been associated with the growth and progression of certain cancers. Alternative splicing results in multiple transcript variants, at least one of which encodes a preproprotein that is proteolytically processed (National Center for Biotechnology Information [NCBI], 2017). |
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| 6 | GABBR1 | Gamma-aminobutyric acid (GABA) B receptor subunit 1 | Major Histocompatibility Complex Class I | This gene encodes a receptor for gamma-aminobutyric acid (GABA). GABA is the main inhibitory neurotransmitter in the mammalian central nervous system. Mutations in this gene have been found to be associated with brain disorders such as schizophrenia and epilepsy (National Center for Biotechnology Information [NCBI], 2017). |
| 10 | GLRX3 | Glutaredoxin 3 | Antioxidant  Metabolism | GLRX3 encode for are oxidoreductase enzymes, which binds to and modulated the function of protein kinase C theta. The encoded protein may play a role in cellular growth, signal transduction, and inhibit apoptosis (National Center for Biotechnology Information [NCBI], 2017). |
| 6 | HCP5 | Human Leukocyte Antigen Complex P5 | Major Histocompatibility Complex Class I | HCP5 is an human endogenous retrovirus associated with lung cancer metastasis, acquired immunodeficiency syndrome, dreg resistance and the inhibition of tumor cell apoptosis (National Center for Biotechnology Information [NCBI], 2017). |
| 6 | HLA-C\*HLA-B | Human Leukocyte Antigen, class I | Major Histocompatibility Complex Class I | HLA-C belongs to the HLA class I heavy chain paralogues. This class I molecule is a heterodimer consisting of a heavy chain and a light chain (beta-2 microglobulin). The heavy chain is anchored in the membrane. Class I molecules play a central role in the immune system by presenting peptides derived from endoplasmic reticulum lumen. They are expressed in nearly all cells. The heavy chain is approximately 45 kDa and its gene contains 8 exons. Exon one encodes the leader peptide, exons 2 and 3 encode the alpha1 and alpha2 domain, which both bind the peptide, exon 4 encodes the alpha3 domain, exon 5 encodes the transmembrane region, and exons 6 and 7 encode the cytoplasmic tail. Polymorphisms within exon 2 and exon 3 are responsible for the peptide binding specificity of each class one molecule. Typing for these polymorphisms is routinely done for bone marrow and kidney transplantation. Over one hundred HLA-C alleles have been described (National Cancer for Biotechnology Information [NCBI], 2023). |
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| 6 | HLA-F | Human Leukocyte Antigen, class I | Major Histocompatibility Complex Class I | This gene encodes a non-classical heavy chain that forms a heterodimer with a beta-2 microglobulin light chain. It is localized in the endoplasmic reticulum and Golgi apparatus, with a small amount on the surface of cells. It encodes for different isoforms and is thought to bind to a restricted set of peptides for immune presentation (National Center for Biotechnology Information [NCBI], 2017). |
| 5 | HTR1A | 5-hydroxytryptamine (serotonin) receptor1A | Serotonin | This gene encodes a G protein-coupled receptor for 5-hydroxytryptamine (serotonin) and belongs to the 5-hydroxytryptamine receptor subfamily. Serotonin has been implicated in several physiologic processes and pathologic conditions. Inactivation of this gene in mice results in behavior consistent with an increased anxiety and stress response. Mutation in the promoter of this gene has been associated with menstrual cycle-dependent periodic fevers (National Cancer for Biotechnology Information [NCBI], 2023) |
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| 6 | HTR1B | 5-hydroxytryptamine (serotonin) receptor1B | Serotonin | The protein encoded by this intronless gene is a G-protein coupled receptor for serotonin (5-hydroxytryptamine). Ligand binding activates second messengers that inhibit the activity of adenylate cyclase and manage the release of serotonin, dopamine, and acetylcholine in the brain. The encoded protein may be involved in several neuropsychiatric disorders and therefore is often a target of antidepressant and other psychotherapeutic drugs (National Cancer for Biotechnology Information [NCBI], 2023). |
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| 3 | HTR1F | 5-hydroxytryptamine (serotonin) receptor1F | Serotonin | Present in human vascular and neuronal tissue and may mediate the therapeutic effect and/or side-effects of certain drugs (National Cancer for Biotechnology Information [NCBI], 2023). |
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| 13 | HTR2A | 5-hydroxytryptamine (serotonin) receptor2A | Serotonin | This gene encodes one of the receptors for serotonin, a neurotransmitter with many roles. Mutations in this gene are associated with susceptibility to schizophrenia and obsessive-compulsive disorder and are also associated with response to the antidepressant citalopram in patients with major depressive disorder (MDD). MDD patients who also have a mutation in intron 2 of this gene show a significantly reduced response to citalopram as this antidepressant downregulates expression of this gene. Multiple transcript variants encoding different isoforms have been found for this gene (National Cancer for Biotechnology Information [NCBI], 2023). |
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| 5 | HTR4 | 5-hydroxytryptamine receptor 4 | Serotonin | This gene is in the family of serotonin receptors that stimulate cAMP production in response to serotonin (5-hydroxytryptamine). It functions in both the peripheral and central nervous system to modulate the release of various neurotransmitters (National Center for Biotechnology Information [NCBI], 2017). |
| 10 | HTR7 | 5-hydroxytryptamine (serotonin) receptor7 | Serotonin | The neurotransmitter, serotonin, is thought to play a role in various cognitive and behavioral functions. The serotonin receptor encoded by this gene belongs to the superfamily of G protein-coupled receptors and the gene is a candidate locus for involvement in autistic disorder and other neuropsychiatric disorders. Three splice variants have been identified which encode proteins that differ in the length of their carboxy terminal ends (National Cancer for Biotechnology Information [NCBI], 2023). |
| 12 | IFNG | Interferon gamma | Inflammatory | The gene encodes a soluble cytokine that is a member of the type II interferon class that is secreted by cells of both the innate and adaptive immune systems. The active protein binds to the interferon gamma receptor which triggers a cellular response to viral and microbial infections. Mutations in this gene are associated with an increased susceptibility to viral, bacterial and parasitic infections and is linked to several autoimmune diseases (National Center for Biotechnology Information [NCBI], 2017). |
| 1 | IL10 | Interleukin 10 | Inflammatory | The protein encoded by this gene is a cytokine produced primarily by monocytes and to a lesser extent by lymphocytes. This cytokine has pleiotropic effects in immunoregulation and inflammation. It down-regulates the expression of Th1 cytokines, MHC class II Ags, and costimulatory molecules on macrophages. It also enhances B cell survival, proliferation, and antibody production. This cytokine can block NF-kappa B activity and is involved in the regulation of the JAK-STAT signaling pathway. Knockout studies in mice suggested the function of this cytokine as an essential immunoregulator in the intestinal tract. Mutations in this gene are associated with an increased susceptibility to HIV-1 infection and rheumatoid arthritis (National Cancer for Biotechnology Information [NCBI], 2023). |
| 3 | IL12A | Interleukin 12A | Inflammatory | This gene encodes a subunit of a cytokine that acts on T and natural killer cells and has a broad array of biological activities. The cytokine is a disulfide-linked heterodimer composed of the 35-kD subunit encoded by this gene, and a 40-kD subunit that is a member of the cytokine receptor family. This cytokine is required for the T-cell-independent induction of interferon (IFN)-gamma and is important for the differentiation of both Th1 and Th2 cells. The responses of lymphocytes to this cytokine are mediated by the activator of transcription protein STAT4. Nitric oxide synthase 2A (NOS2A/NOS2) is found to be required for the signaling process of this cytokine in innate immunity (National Cancer for Biotechnology Information [NCBI], 2023). |
| 2 | IL1B | Interleukin 1B | Inflammatory | The protein encoded by this gene is a member of the interleukin 1 cytokine family. This cytokine is produced by activated macrophages as a proprotein, which is proteolytically processed to its active form by caspase 1 (CASP1/ICE). This cytokine is an important mediator of the inflammatory response, and is involved in a variety of cellular activities, including cell proliferation, differentiation, and apoptosis. The induction of cyclooxygenase-2 (PTGS2/COX2) by this cytokine in the central nervous system (CNS) is found to contribute to inflammatory pain hypersensitivity. This gene and eight other interleukin 1 family genes form a cytokine gene cluster on chromosome 2 (National Cancer for Biotechnology Information [NCBI], 2023). |
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| 2 | IL1RN | Interleukin 1RN | Inflammatory | The protein encoded by this gene is a member of the interleukin 1 cytokine family. This protein inhibits the activities of interleukin 1, alpha (IL1A) and interleukin 1, beta (IL1B), and modulates a variety of interleukin 1 related immune and inflammatory responses. This gene and five other closely related cytokine genes form a gene cluster spanning approximately 400 kb on chromosome 2. A polymorphism of this gene is reported to be associated with increased risk of osteoporotic fractures and gastric cancer. Several alternatively spliced transcript variants encoding distinct isoforms have been reported (National Cancer for Biotechnology Information [NCBI], 2023). |
| 8 | NAT1 | N-acetyltransferase gene 1 | Antioxidant  Metabolism | One of two arylamine N-acetyltransferae genes. The enzyme encoded by this gene helps to metabolize drugs and functions in folate catabolism (National Center for Biotechnology Information [NCBI], 2017). |
| 8 | NAT2 | N-acetyltransferase gene 2 | Antioxidant  Metabolism | This gene encodes and enzyme that activates and deactivates arylamine and hydrazine drugs and carcinogens. Polymorphisms in this gene dictate the speed of acetylation and are associated with the incidence of cancer and drug toxicity (National Center for Biotechnology Information [NCBI], 2017). |
| 7 | PON1 | Paraoxonase 1 | Antioxidant Metabolism | This gene encodes a member of the paraoxonase family of enzymes and exhibits lactonase and ester hydrolase activity. Following synthesis in the kidney and liver, the enzyme is secreted into the circulation, where it binds to high density lipoprotein (HDL) particles and hydrolyzes thiolactones and xenobiotics, including paraoxon, a metabolite of the insecticide parathion. Polymorphisms in this gene may be associated with coronary artery disease and diabetic retinopathy. The gene is found in a cluster of three related paraoxonase genes on chromosome 7 (National Center for Biotechnology Information [NCBI], 2017). |
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| 6 | PSMB9 | Proteasome B-type family | Major Histocompatibility Complex Class II | This gene encodes a member of the proteasome B-type family. It is also known as the T1B family and is in the class II region of the major histocompatibility complex. Proteasomes are distributed throughout eukaryotic cells and cleave peptides. This SNP has been found to be associated with Rett Syndrome as well as schizophrenia (National Center for Biotechnology Information [NCBI], 2017). |
| 7 | RELN | Reelin | Others | This gene encodes a large secreted extracellular matrix protein thought to control cell-cell interactions critical for cell positioning and neuronal migration during brain development. This protein may be involved in schizophrenia, autism, bipolar disorder, major depression and in migration defects associated with temporal lobe epilepsy. Mutations of this gene are associated with autosomal recessive lissencephaly with cerebellar hypoplasia. Two transcript variants encoding distinct isoforms have been identified for this gene. Other transcript variants have been described but their full-length nature has not been determined (National Center for Biotechnology Information [NCBI], 2017). |
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| 15 | RORA | RAR-related orphan receptor α | Others | The protein encoded by this gene is a member of the nuclear receptor 1 subfamily. It can bind as a monomer or as a homodimer to hormone response elements upstream of several genes to enhance the expression of those genes. The encoded protein has been shown to interact with NM23-2, a nucleoside diphosphate kinase involved in organogenesis and differentiation, as well as with NM23-1, the product of a tumor metastasis suppressor candidate gene. Also, it has been shown to aid in the transcriptional regulation of some genes involved in circadian rhythm. Four transcript variants encoding different isoforms have been described for this gene (National Center for Biotechnology Information [NCBI], 2017; Weizmann Institute of Science [WIS], 1997). |
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| 6 | SOD2 | Superoxide dismutase 2 | Antioxidant  Metabolism | This gene is a member of the iron/manganese superoxide dismutase family. It encodes a mitochondrial protein that forms a homotetramer and binds one manganese ion per subunit. This protein binds to the superoxide byproducts of oxidative phosphorylation and converts them to hydrogen peroxide and diatomic oxygen. Mutations in this gene have been associated with idiopathic cardiomyopathy (IDC), premature aging, sporadic motor neuron disease, and cancer. Alternative splicing of this gene results in multiple transcript variants. A related pseudogene has been identified on chromosome 1 (National Center for Biotechnology Information [NCBI], 2017). |
| 7 | ST7\*WNT2 | Suppression of tumorigenicity 7\*Wingless-type MMTV integration site family, member 2 | Other | ST7 is a tumor suppressor gene that has been identified as an autism-susceptibility locus. The function of this gene has yet to be determined [NCBI, Jul2008]. WNT gene family encode secreted signaling proteins. WNT genes play a role in oncogenesis, regulation of cell fate, and patterning during embryogenesis. The combination of ST7\*WNT2 is undetermined. ST7 and WNT2 cluster together in human chromosome 7q31 (National Center for Biotechnology Information [NCBI], 2017). |
|  | TAP1\*PSMB9 | Transporter associated with antigen processing type 1\*Proteasome subunit beta type 9 | Major Histocompatibility Complex Class II | TAP1 is responsible for transporting various molecules across extra- and intra-cellular membranes. Variations in this gene may play a role in insulin-dependent diabetes mellitus, or ankylosing spondylitis (National Center for Biotechnology Information [NCBI], 2017). PSMB9 encodes a member of the proteasome B-type family. It is also known as the T1B family and is located in the class II region of the major histocompatibility complex. Proteasomes are distributed throughout eukaryotic cells and cleave peptides (National Center for Biotechnology Information [NCBI], 2017). |
| 6 | TAP2 | Transporter 2, ATP binding cassette subfamily B member | Major Histocompatibility Complex Class II | The membrane-associated protein encoded by this gene is a member of the superfamily of ATP-binding cassette (ABC) transporters. ABC proteins transport various molecules across extra- and intra-cellular membranes. ABC genes are divided into seven distinct subfamilies (ABC1, MDR/TAP, MRP, ALD, OABP, GCN20, White). This protein is a member of the MDR/TAP subfamily. Members of the MDR/TAP subfamily are involved in multidrug resistance. This gene is located 7 kb telomeric to gene family member ABCB2. The protein encoded by this gene is involved in antigen presentation. This protein forms a heterodimer with ABCB2 in order to transport peptides from the cytoplasm to the endoplasmic reticulum. Mutations in this gene may be associated with ankylosing spondylitis, insulin-dependent diabetes mellitus, and celiac disease. Alternative splicing of this gene produces products which differ in peptide selectivity and level of restoration of surface expression of MHC class I molecules (National Center for Biotechnology Information [NCBI], 2017). |
| 1 | TGFβ2 | Transforming growth factor-beta | Inflammatory | TGFβ2 is a cytokine that plays a vital role during embryonic development and throughout life. It is found throughout the body and controls various cellular activities including growth and division of cells, cellular differentiation, cell motility, and apoptosis. It is involved in blood vessel formation, regulation of muscle tissue, body fat, wound healing and the immune system. It also helps regulate bone growth and the extracellular matrix (National Institutes of Health [NIH], July 16, 2019; Weizmann Institute of Science [WIS], 1997). |
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| 6 | VEGFA | Vascular endothelial growth factor A | Inflammatory | This gene is a member of the PDGF/VEGF growth factor family. It encodes a heparin-binding protein, which exists as a disulfide-linked homodimer. This growth factor induces proliferation and migration of vascular endothelial cells and is essential for both physiological and pathological angiogenesis. Disruption of this gene in mice resulted in abnormal embryonic blood vessel formation. This gene is upregulated in many known tumors and its expression is correlated with tumor stage and progression. Elevated levels of this protein are found in patients with POEMS syndrome, also known as Crow-Fukase syndrome. Allelic variants of this gene have been associated with microvascular complications of diabetes 1 (MVCD1) and atherosclerosis. Alternatively spliced transcript variants encoding different isoforms have been described. There is also evidence for alternative translation initiation from upstream non-AUG (CUG) codons resulting in additional isoforms. A recent study showed that a C-terminally extended isoform is produced by use of an alternative in-frame translation termination codon via a stop codon read through mechanism, and that this isoform is antiangiogenic. Expression of some isoforms derived from the AUG start codon is regulated by a small upstream open reading frame, which is located within an internal ribosome entry site (National Center for Biotechnology Information [NCBI], 2017). |

1. CHR = chromosome

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