Patient 7. Young woman with Down's Syndrome

**Medical Conditions**

Down’s Syndrome

Alzheimer’s Disease

**Medications**

None at Present

**Drug Interactions and Metabolism**

**Cytochrome P 450 Subtype**

**Subtype indicated describes the specific isoenzymes of the P450 System responsible for the metabolism of the specific drugs patient has in their profile – this data can be found in Facts and Comparisons, Micromedex, The Drug Information Handbook, and is available to prescribers – It will likely be most accurate from these sources, which are at a fee.**

**(graphs indicate data we need to figure out how to obtain from genetic profiling and Pharm GKB) and provide to the prescriber!)**

Patient is not on Medications at Present, however enzyme activity should be mapped

1A2



2C8



2C9



2C19



2D6



3A4 -



When agent is selected to treat Alzheimer’s or ALL, predictive pharmacogenomic data will be needed and matched to receptor variant disease

**Genetic Information – Relating to Patient’s Diagnosis**

Extra chromosome 21 - Down syndrome due to a [Robertsonian translocation](http://en.wikipedia.org/wiki/Robertsonian_translocation) in the karyotype of one of the parents.

**Acute Lymphoblastic Leukaemia**

|  |  |  |
| --- | --- | --- |
| **Cytogenetic translocation** | **Molecular genetic abnormality** | **%** |
| cryptic t(12;21) | [TEL](http://en.wikipedia.org/wiki/ETV6)-[AML1](http://en.wikipedia.org/wiki/AML1) fusion[[6]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid15837750-5) | 25.4%[[7]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid18665825-6) |
| t(1;19)(q23;p13) | [E2A](http://en.wikipedia.org/wiki/E2A)-[PBX](http://en.wikipedia.org/wiki/Pre-B-cell_leukemia_homeobox) ([PBX1](http://en.wikipedia.org/wiki/PBX1)) fusion[[8]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid10500199-7) | 4.8%[[7]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid18665825-6) |
| t(9;22)(q34;q11) | [BCR-ABL](http://en.wikipedia.org/wiki/BCR-ABL) fusion(P185)[[9]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid16080957-8) | 1.6%[[7]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid18665825-6) |
| t(4;11)(q21;q23) | [MLL](http://en.wikipedia.org/wiki/MLL_%28gene%29)-[AF4](http://en.wikipedia.org/wiki/AF4) fusion[[10]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid14990976-9) | 1.6%[[7]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid18665825-6) |
| t(8;14)(q24;q32) | [IGH](http://en.wikipedia.org/wiki/IGH)-[MYC](http://en.wikipedia.org/wiki/MYC) fusion[[11]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid15852472-10) |  |
| t(11;14)(p13;q11) | [TCR](http://en.wikipedia.org/wiki/TCR)-[RBTN2](http://en.wikipedia.org/wiki/RBTN2) fusion [[12]](http://en.wikipedia.org/wiki/Acute_lymphoblastic_leukemia#cite_note-pmid7497440-11) |  |

**Implicated Biomarkers In Alzheimer’s Disease**

T – Tau Absence

P –Tau Absence

AB42 Absence

APOE B4 Presence

**ALL**

|  |  |
| --- | --- |
| **Cytogenetic change** | **Risk category** |
| [Philadelphia chromosome](http://en.wikipedia.org/wiki/Philadelphia_chromosome) | Poor prognosis |
| t(4;11)(q21;q23) | Poor prognosis |
| t(8;14)(q24.1;q32) | Poor prognosis |
| Complex [karyotype](http://en.wikipedia.org/wiki/Karyotype) (more than four abnormalities) | Poor prognosis |
| Low [hypodiploidy](http://en.wikipedia.org/w/index.php?title=Hypodiploidy&action=edit&redlink=1) or near [triploidy](http://en.wikipedia.org/wiki/Triploidy) | Poor prognosis |
| High [hyperdiploidy](http://en.wikipedia.org/w/index.php?title=Hyperdiploidy&action=edit&redlink=1) (specifically, trisomy 4, 10, 17) | Good prognosis |
| del(9p) | Good prognosis |

**This Patient is in this category – Highlighted in Red**

**Correlation of prognosis with bone marrow cytogenetic finding in acute lymphoblastic leukemia**

|  |  |
| --- | --- |
| **Prognosis** | **Cytogenetic findings** |
| Favorable | Hyperdiploidy > 50 ; t (12;21) |
| Intermediate | Hyperdioloidy 47 -50; Normal(diploidy); del (6q); Rearrangements of 8q24 |
| Unfavorable | Hypodiploidy-near haploidy; Near tetraploidy; del (17p); t (9;22); t (11q23) |

**Immunophenotypic categories of acute lymphoblastic leukemia (ALL)**

The use of a TdT assay and a panel of monoclonal antibodies (MoAbs) to T cell and B cell associated antigens will identify almost all cases of ALL.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Types** | **FAB Class** | **Tdt** | **T cell associate antigen** | **B cell associate antigen** | **c Ig** | **s Ig** |
| Precursor B | L1,L2 | + | - | + | -/+ | - |
| Precursor T | L1,L2 | + | + | - | - | - |
| B-cell | L3 | - | - | + | - | + |



**Blood Film of Patient**

**Should Include all films and dates they were performed**

**This Fake Patient’s Values are in the Far Right Column**

**Electrolytes and Metabolytess**

|  |  |  |
| --- | --- | --- |
| **Test** | **Range** | **Comments** |
| [Sodium](http://july.fixedreference.org/en/20040724/wikipedia/Sodium) (Na) | 130 - 145 mmol/L | 133 |
| [Potassium](http://july.fixedreference.org/en/20040724/wikipedia/Potassium) (K) | 3.5 - 5.0 mmol/L | 4 |
| [Urea](http://july.fixedreference.org/en/20040724/wikipedia/Urea) | 2.6 - 6.8 mmol/L | 5 |
| [Creatinine](http://july.fixedreference.org/en/20040724/wikipedia/Creatinine) | 50 - 110 μmol/L | 111 |
| [Glucose](http://july.fixedreference.org/en/20040724/wikipedia/Glucose) (fasting) | 4.2 - 6.1 mmol/L | 7 |

**Liver function tests**

|  |  |  |
| --- | --- | --- |
| Total Protein | 60 - 80 g/L | 62 |
| [Albumin](http://july.fixedreference.org/en/20040724/wikipedia/Albumin) | 30 - 50 g/L | 39 |
| Total [Bilirubin](http://july.fixedreference.org/en/20040724/wikipedia/Bilirubin) | 2 - 14 μmol/L | 20 |
| Direct Bilirubin | 0 - 4 μmol/L | 2 |
| [Alanine transaminase](http://july.fixedreference.org/en/20040724/wikipedia/Alanine_transaminase) (ALT) | 8 - 40 U/L | 22 |
| Alkaline phosphatase (ALP) | 40 - 130 U/L | 122 |
| Gamma glutamyl transferase | < 50 U/L | 242 |

**Other enzymes and proteins**

|  |  |  |
| --- | --- | --- |
| [Creatine kinase](http://july.fixedreference.org/en/20040724/wikipedia/Creatine_kinase) (CK) | 22 - 198 U/L | 66 |
| Aspartate transaminase (AST) | 8 - 35 U/L | 88 |
| [Lactate dehydrogenase](http://july.fixedreference.org/en/20040724/wikipedia/Lactate_dehydrogenase) (LDH) | 85 - 285 U/L | 222 |
| [Amylase](http://july.fixedreference.org/en/20040724/wikipedia/Amylase) | 25 - 125 U/L | 144 |
| [C-reactive protein](http://july.fixedreference.org/en/20040724/wikipedia/C-reactive_protein) (CRP) | <8 mg/L | 66 |

**Other ions and trace metals**

|  |  |  |
| --- | --- | --- |
| Ionised [calcium](http://july.fixedreference.org/en/20040724/wikipedia/Calcium) (Ca) | 1.15 - 1.29 mmol/L | 1.01 |
| Total calcium (Ca) | 2.05 - 2.55 mmol/L | 2.23 |
| [Copper](http://july.fixedreference.org/en/20040724/wikipedia/Copper) (Cu) | 11 - 26 μmol/L |  |
| [Zinc](http://july.fixedreference.org/en/20040724/wikipedia/Zinc) (Zn) | 10 - 17 μmol/L |  |

**Lipids**

|  |  |  |
| --- | --- | --- |
| [Triglycerides](http://july.fixedreference.org/en/20040724/wikipedia/Triglyceride) | 0.4 - 2.0 mmol/L | 2.6 |
| Total [cholesterol](http://july.fixedreference.org/en/20040724/wikipedia/Cholesterol) | 3.0 - 5.5 mmol/L | 5 |
| [HDL cholesterol](http://july.fixedreference.org/en/20040724/wikipedia/High_density_lipoprotein) (male) | 0.7 - 1.9 mmol/L | 1 |
| (female) | 0.9 - 2.4 mmol/L |  |
| [LDL cholesterol](http://july.fixedreference.org/en/20040724/wikipedia/Low_density_lipoprotein) | 2.4 - 4.0 mmol/l | 4 |

**Tumour markers**

|  |  |  |
| --- | --- | --- |
| [Alpha-fetoprotein](http://july.fixedreference.org/en/20040724/wikipedia/Alpha-fetoprotein) (AFP) | 1-15 kIU/L |  |
| CA-125 | <65 kU/L |  |
| [Prostate specific antigen](http://july.fixedreference.org/en/20040724/wikipedia/Prostate_specific_antigen) (total PSA) | <2.0 μg/L |  |

**Hormones**

|  |  |  |
| --- | --- | --- |
| [Thyroid stimulating hormone](http://july.fixedreference.org/en/20040724/wikipedia/Thyroid-stimulating_hormone) (TSH) | 0.5 - 4.7 mIU/L | 2 |
| Free [thyroxine](http://july.fixedreference.org/en/20040724/wikipedia/Thyroid_hormone) (FT4) | 9.0 - 24 pmol/L | 17 |
| Free [triiodothyronine](http://july.fixedreference.org/en/20040724/wikipedia/Thyroid_hormone) (FT3) | 2.5 - 5.3 pmol/L | 5 |
| [Adrenocorticotropic hormone](http://july.fixedreference.org/en/20040724/wikipedia/Adrenocorticotropic_hormone) (ACTH) | 1.3 - 15 pmol/L | 3 |
| [Cortisol](http://july.fixedreference.org/en/20040724/wikipedia/Cortisol) (0830 h) | 250 - 850 nmol/L | 522 |
| Cortisol (1630 h) | 110 - 390 nmol/L |  |
| [Prolactin](http://july.fixedreference.org/en/20040724/wikipedia/Prolactin) (male) | <450 mIU/L |  |
| (female) | <580 mIU/L |  |
| [Testosterone](http://july.fixedreference.org/en/20040724/wikipedia/Testosterone) (male) | 8 - 38 nmol/L |  |
| (male prepuberty) | 0.1 - 0.5 nmol/L |  |
| (female) | 0.3 - 2.5 nmol/L |  |

**Haematology**

**Red blood cells**

|  |  |  |
| --- | --- | --- |
| [Haemoglobin](http://july.fixedreference.org/en/20040724/wikipedia/Hemoglobin) (Hb) (male) | 130 - 180 g/L |  |
| (female) | 115 - 160 g/L | 133 |
| [Haematocrit](http://july.fixedreference.org/en/20040724/wikipedia/Hematocrit) (Hct) (male) | 0.38 - 0.52 |  |
| (female) | 0.35 - 0.47 |  |
| Mean cell volume (MCV) | 80 - 98 fL | 92 |
| Mean cell haemoglobin (MCH) | 26 - 34 pg | 30 |
| Red cell count (male) | 4.5 - 6.5 x1012/L | 6 |
| (female) | 3.8 - 5.8 x1012/L |  |
| Reticulocytes | 10 - 100 x109/L | 20 |
| [Erythrocyte](http://july.fixedreference.org/en/20040724/wikipedia/Erythrocyte_sedimentation_rate) [sedimentation rate](http://july.fixedreference.org/en/20040724/wikipedia/Erythrocyte_sedimentation_rate) (ESR) |  | 22 |

**White blood cells**

|  |  |  |
| --- | --- | --- |
| Total white blood cells | 4.0 - 11.0 x109/L | 12 |
| Neutrophil granulocytes | 2.0 - 7.5 x109/L | 9 |
| [Lymphocytes](http://july.fixedreference.org/en/20040724/wikipedia/Lymphocyte) | 1.0 - 4.0 x109/L | 7 |
| Monocytes | 0.0 - 0.8 x109/L | 0.4 |
| Eosinophil granulocytes | 0.0 - 0.5 x109/L | 0.4 |
| Basophil granulocytes | 0.0 - 0.2 x109/L | 0.1 |

**Coagulation**

|  |  |  |
| --- | --- | --- |
| [Prothrombin time](http://july.fixedreference.org/en/20040724/wikipedia/International_normalized_ratio) (PT) | 7 - 10 s | 11 |
| [INR](http://july.fixedreference.org/en/20040724/wikipedia/International_normalized_ratio) | 0.8 - 1.2 | 1.1 |
| Activated partial thromboplastin time (APTT) | 29 - 41 s |  |
| Thrombin clotting time (TCT) | 11 - 18 s |  |
| [Fibrinogen](http://july.fixedreference.org/en/20040724/wikipedia/Fibrin) | 1.8 - 4.0 g/L | 3 |
| [Bleeding time](http://july.fixedreference.org/en/20040724/wikipedia/Bleeding_time) | 2 - 8 minutes | 6 |