DEMO REPORT01

BIOGENIQ

Sample number		**Report date**	2019-03-05
Date of birth	1990-01-01	**Specimen**	Saliva
Sex	Male		
Pharma Profile(s)	Mental Health		

Pharmacogenomic report

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The Pharma profile is a clinical decision support tool aimed at reducing ris[illegible] adverse drugs reactions and therapeutic failure. The Pharma profile does not replace existing prescriptio[illegible] guides. Re[illegible]se [illegible]dication can be influenced by factors not evaluated in this report. Response to treatment may l[illegible]t than [illegible]dicte[illegible] his report. The Pharma profile does not diagnose any disorder, condition or disease. Do not cha[illegible]ation[illegible]hout p[illegible]pproval from your treating clinician.

Antipsychotic

- (!) **Haloperidol** (HALDOL®)
- (!) **Perphenazine** (TRILAFON®)
- (!) **Pimozide** (ORAP®)
- (!) **Zuclopenthixol**

[illegible]ical Antipsychotic

- (!) **Aripiprazole** (ABILIFY®)
- (!) **Brexpiprazole** (REXULTI®)
- (⚠) **Clozapine** (CLOZARILL®)
- (!) **Lurasidone** (LATUDA®)
- (⚠) **Olanzapine** (ZYPREXA®)
- (!) **Quetiapine** (SEROQUEL®)
- (!) **Risperidone** (RISPERDAL®)
- (!) **Ziprasidone** (ZELDOX®)

Atypical antidepressant

- **Bupropion** (WELLBUTRIN®, ZYBAN®)
- (!) **Mirtazapine** (REMERON®)
- (!) **Trazodone** (DESYREL®)
- (!) **Vilazodone** (VIIBRYD®)
- (!) **Vortioxetine** (TRINTELLIX®)

Atypical antidepressant (SNRI)

- (!) **Duloxetine** (CYMBALTA®)
- (!) **Levomilnacipran** (FETZIMA®)
- (!) **Venlafaxine** (EFFEXOR XR®)

Legend: (!) Increased risk of adverse drug reactions (⚠) Increased risk of therapeutic failure

Benzodiazepine

- (!) **Alprazolam** (XANAX®)
- **Clobazam** (FRISIUM®)
- (!) **Clonazepam** (RIVOTRIL®)
- **Diazepam** (DIASTAT®, VALIUM®)
- (!) **Midazolam** (VERSED®)

Hypnotic

- (!) **Zolpidem** (SUBLINOX®)
- **Zopiclone** (IMOVANE®)

SSRI antidepressant

- **Citalopram** (CELEXA®)
- **Escitalopram** (CIPRALEX®)
- (!) **Fluoxetine** (PROZAC®)
- (!) **Fluvoxamine** (LUVOX®)
- (!) **Paroxetine** (PAXIL®)
- **Sertraline** (ZOLOFT®)

Tricyclic antidepressant

- (!) **Amitriptyline** (FLAVIL®)
- (!) **Clomipra** ®)
- (!) **Desip** **ne** (NORPRAM
- (!) **Doxe** SINEQUAN®)
- (!) **Imipra** **e** (TOFRANIL®)
- **lortrip** AVENTYL®
- **pramin** L®)

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

PHARMACOGENOMIC RECOMMENDATIONS

(!) Alprazolam (XANAX®)

GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of alprazolam

Your body may metabolize and eliminate alprazolam at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., confusion, dizziness, drowsiness, irritability).
- Consult your healthcare provider to optimize your therapy.

(!) Amitriptyline (ELAVIL®)

GENES: ***CYP2C19, CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of amitriptyline

Your body may metabolize and eliminate amitriptyline at a slower rate than expected.

- Be alert to adverse drug reactions (e.g. dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) Aripiprazole (ABILIFY®)

GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of aripiprazole

Your body may metabolize and eliminate aripiprazole slowly than expected.

- Be alert to adverse drug reactions (e.g., lightheadedness, memory loss, sedation).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) Brexpiprazole (REXULTI®)

GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of brexpiprazole

Your body may metabolize and eliminate brexpiprazole at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., nausea, headache, dizziness, restlessness).
- Consult your healthcare provider to optimize your therapy.

Bupropion (WELLBUTRIN®, ZYBAN®)

GENES: ***CYP2B6, POR*** LEVEL OF EVIDENCE: **3**

No genetic variation identified that would prompt changes to bupropion therapy

Your body should metabolize and eliminate bupropion normally. Therefore, your genetic results do not suggest any change to bupropion therapy.

- No change to the recommended dose.

Citalopram (CELEXA®)

GENE: ***CYP2C19*** LEVEL OF EVIDENCE: **1**

No genetic variation identified that would prompt changes to citalopram therapy

Your body should metabolize and eliminate citalopram normally. Therefore, your genetic results do not suggest any change to citalopram therapy.

- No change to the recommended dose.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

Clobazam (FRISIUM®) — GENE: ***CYP2C19*** — LEVEL OF EVIDENCE: **1**

No genetic variation identified that would prompt changes to clobazam therapy

Your body should metabolize and eliminate clobazam normally. Therefore, your genetic results do not suggest any change to clobazam therapy.

- No change to the recommended dose.

(!) **Clomipramine** (ANAFRANIL®) — GENES: ***CYP2C19, CYP2D6*** — LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of clomipramine

Your body may metabolize and eliminate clomipramine at a slower rate than expected.

- Be alert to adverse drug reactions (e.g. dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) **Clonazepam** (RIVOTRIL®) — GENE: ***CYP3A4*** — LEVEL OF EVIDENCE: **3**

Increased risk of adverse drug reactions with standard dosing of clonazepam

Your body may metabolize and eliminate clonazepam at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., confustion, hypotension, dizziness, drowsiness, headache).
- Consult your healthcare provider to optimize your therapy.

⚠ **Clozapine** (CLOZARILL®) — GENE: [illegible] — LEVEL OF EVIDENCE: **3**

Increased probability of treatment failure with standard dosing of clozapine

Your body may metabolize and eliminate clozapine at a faster rate than expected. Please note that tobacco smoke and high caffeine intake may increase clozapine metabolism and the risk of therapeutic failure.

- Be alert to insufficient respon[illegible]
- Consult your healthcare provider to optimize your therapy.

(!) **Desipramine** ([illegible]) — GENE: ***CYP2D6*** — LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of desipramine

Your body may metabolize and eliminate desipramine at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

Diazepam (DIASTAT®, VALIUM®) — GENE: ***CYP2C19*** — LEVEL OF EVIDENCE: **3**

No genetic variation identified that would prompt changes to diazepam therapy

Your body may metabolize and eliminate diazepam normally. Therefore, your genetic results do not suggest any change to diazepam therapy.

- No change to the recommended dose.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

(!) **Doxepin** (SINEQUAN®) GENES: ***CYP2C19, CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of doxepin

Your body may metabolize and eliminate doxepin at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) **Duloxetine** (CYMBALTA®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of duloxetine

Your body may metabolize and eliminate duloxetine at a slower rate than expect

- Be alert to adverse drug reactions (e.g., nausea, dry mouth, constipatio rhea, fa somnia, difficulty sleeping, loss of appetite).
- Consult your healthcare provider to optimize your therapy.

Escitalopram (CIPRALEX®) GE 2C19 EL OF EVIDENCE: **1**

No genetic variation identified that would prompt changes to therap

Your body should metabolize and eliminate escitalopram normal our genetic results do not suggest any change to escitalopram therapy.

- No change to the recommended dose.

(!) **Fluoxetine** (PROZAC®) E: CY LEVEL OF EVIDENCE: **3**

Increased risk of adverse drug reacti with stan d dosing xetine

Your body may metabolize and te fluox at a slower ra than expected.

- Be aware of adverse drug rea owsiness. iness, dry mouth, constipation, increased appetite).
- Consult your healthcare provider mize your py.

(!) **Fluvoxam** LUVOX®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk erse drug reacti ith standard dosing of fluvoxamine

Your body may m ze and elimin luvoxamine at a slower rate than expected.

- Be alert to adve g reacti e.g., severe allergic reactions, dry mouth, constipation, confusion, insomnia, headaches, abdom in mal involuntary movements, increased heart rhythm, weight gain).
- The use of an alternat ication or a dose adjustment could improve treatment efficacy.
- Consult your healthcare provider to optimize your therapy.

(!) **Haloperidol** (HALDOL®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of haloperidol

Your body may metabolize and eliminate haloperidol at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., dry mouth, dizziness, hyperactivity, tiredness, insomnia, involuntary movements).
- The use of an alternative medication or a dose adjustment could improve treatment efficacy.
- Consult your healthcare provider to optimize your therapy.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

(!) **Imipramine** (TOFRANIL®) GENES: ***CYP2C19, CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of imipramine

Your body may metabolize and eliminate imipramine at a slower rate than expected.

- Be alert to adverse drug reactions (e.g. dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) **Levomilnacipran** (FETZIMA®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of levomilnacipran

Your body may metabolize and eliminate levomilnacipran at a slower rate than e

- Be alert to adverse drug reactions (e.g., nausea, constipation, heart pal ns).
- Consult your healthcare provider to optimize your therapy.

(!) **Lurasidone** (LATUDA®) GENE: ***CYP3A4*** L OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing one

Your body may metabolize and eliminate lurasidone at a slower pected.

- Be alert to adverse drug reactions (e.g., tremors ausea, dr es lessness).
- Consult your healthcare provider to optimiz py.

(!) **Midazolam** (VERSED®) ENE: LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactio th standard dosin idazolam

Your body may metabolize and eli e midaz t a slower han expected.

- Be alert to adverse drug rea (e.g. ness, drowsiness, confusion, amnesia).
- Consult your healthcare provid ize your th y.

(!) **Mirtazapin** GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **2**

Increased risk verse drug reac with standard dosing of mirtazapine

Your body may lize and elimin irtazapine at a slower rate than expected.

- Be aware of a drug reacti (e.g., drowsiness, dizziness, dry mouth, constipation, increased appetite)
- Consult your hea pro o optimize your therapy.

(!) **Nortriptyline** (AVENT ®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of nortriptyline

Your body may metabolize and eliminate nortriptyline at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., dry mouth, constipation, confusion, abnormal involuntary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

⚠ **Olanzapine** (ZYPREXA®) GENE: ***CYP1A2*** LEVEL OF EVIDENCE: **3**

Increased probability of treatment failure with standard dosing of olanzapine

Your body may metabolize and eliminate olanzapine at a faster rate than expected. Please note that smoking or high coffee consumption may further increases metabolism of olanzapine and therefore the probability of treatment failure.

- Be alert to insufficient response.
- Consult your healthcare provider to optimize your therapy.

(!) **Paroxetine** (PAXIL®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of paroxetine

Your body may metabolize and eliminate paroxetine at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., confusion, chest pain, skin rash, na… …ia, dizziness, irregular heartbeat, muscle pain).
- The use of an alternative medication could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

(!) **Perphenazine** (TRILAFON®) GE… …2D6 …EL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing … …zine

Your body may metabolize and eliminate perphenazine at a slow… …pected.

- Be alert to adverse drug reactions (e.g., spasm… …restles… …s, m… …r rigidity, tremor, irregular or jerky movements).
- Consult your healthcare provider to op…mize yo… …rap…

(!) **Pimozide** (ORAP®) …YP2D6 LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug r… …s with s… …rd dosing of p… …ozide

Your body may metabolize and elim… …de at a slo… …rate than expected.

- Be alert to adverse drug reaction… …heart arrh… …a).
- A dose adjustm… …rove yo… …tm…
- Consult you… …thcare p… …to opt… …ur therapy.

(!) **Quetiap…** …ROQUEL®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adv… …ug react… …with standard dosing of quetiapine

Your body may metaboli… …ate quetiapine at a slower rate than expected.

- Be alert to adverse dru… …tions (e.g., nausea, headache, dizziness, drowsiness, tremors).
- Consult your healthcare provider to optimize your therapy.

(!) **Risperidone** (RISPERDAL®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of risperidone

Your body may metabolize and eliminate risperidone at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., spasms, motor restlessness, muscular rigidity, tremor, irregular or jerky movements, hypersalivation).
- A dose adjustment or the use of an alternative medication could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

Sertraline (ZOLOFT®) GENE: ***CYP2C19*** LEVEL OF EVIDENCE: **1**

No genetic variation identified that would prompt changes to sertraline therapy

Your body should metabolize and eliminate sertraline normally. Therefore, your genetic results do not suggest any change to sertraline therapy.

- No change to the recommended dose.

(!) **Trazodone** (DESYREL®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of trazodone

Your body may metabolize and eliminate trazodone at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., nausea, constipation, dizziness, drowsiness).
- Consult your healthcare provider to optimize your therapy.

(!) **Trimipramine** (SURMONTIL®) GENES: ***CYP2C1 YP2D6*** L OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of trimipram

Your body may metabolize and eliminate trimipramine at a slow te than ted.

- Be alert to adverse drug reactions (e.g. dry mouth, cons nfusio mal itary movements, weight gain, increased heart rate).
- The use of an alternative medication or a dose adjustment d i your treatment.
- Consult your healthcare provider to optimize rapy.

(!) **Venlafaxine** (EFFEXOR XR®) GENE: LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactio standard dosi nlafaxi e

Your body may metabolize and eli venlafa t a slowe than expected.

- Be alert to adverse drug re (e.g., a, vomiting and diarrhea).
- A dose adjustment or the use tive medic could improve your treatment.
- Consult your healthcare provider mize you apy.

(!) **Vilazodo** IBRYD®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk rse drug reacti ith standard dosing of vilazodone

Your body may me e and elimi ilazodone at a slower rate than expected.

- Be alert to adve g reac (e.g., nausea, insomnia, diarrhea, dizziness).
- Consult your health r to optimize your therapy.

(!) **Vortioxetine** (TRINTELLIX®) GENE: ***CYP2D6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions with standard dosing of vortioxetine

Your body may metabolize and eliminate vortioxetine at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., nausea, dry mouth, diarrhea, headache, dizziness, drowsiness and cold symptoms).
- A dose adjustment could improve your treatment.
- Consult your healthcare provider to optimize your therapy.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

(!) **Ziprasidone** (ZELDOX®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of ziprasidone

Your body may metabolize and eliminate ziprasidone at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., nausea, drowsiness, headache, tremors).
- Consult your healthcare provider to optimize your therapy.

(!) **Zolpidem** (SUBLINOX®) GENE: ***CYP3A4*** LEVEL OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of zolpidem

Your body may metabolize and eliminate zolpidem at a slower rate than expected.

- Be alert to adverse drug reactions (e.g., nausea, drowsiness, headache).
- Consult your healthcare provider to optimize your therapy.

Zopiclone (IMOVANE®) GENE: ***CYP3A4*** L OF EVIDENCE: **4**

Increased risk of adverse drug reactions with standard dosing of zopiclone

Your body may metabolize and eliminate zopiclone at a slower r han exp

- Be alert to adverse drug reactions (e.g., confusion, dizzi f consc ess).
- Consult your healthcare provider to optimize your therapy

(!) **Zuclopenthixol** (CLOPIXOL®) E: ***C 6*** LEVEL OF EVIDENCE: **1**

Increased risk of adverse drug reactions wit tandar g o ixol

Your body may metabolize and eliminate penthixol a wer ra expected.

- Be alert to adverse drug reacti g., a nee to be in nt motion, tiredness, dry mouth, tremors).
- A dose adjustment or the u n alterna edication improve your treatment.
- Consult your healthcare pro o on e your ther py.

Legend: (!) Increased risk of adverse drug reactions ⚠ Increased risk of therapeutic failure

RESULTS

GENES	PHENOTYPES	GENOTYPES	TESTED ALLELES
CYP1A2	Inducible	*1F/*1F	*1C, *1F, *1K
CYP2B6	Normal metabolizer	*1/*1	*4, *6, *18
CYP2C19	Normal metabolizer	*1/*1	*2, *3, *4, *5, *6, *7, *8, *17
CYP2D6	Poor metabolizer	*4/*4	*2, *3, *4, *5, *6, *7, *8, *9, *10, *11, *12, *14, *15, *17, *19, *41, *69, CNV
CYP3A4	Poor metabolizer	*17/*17	*2, *17, *22
POR	Normal metabolizer	GG	rs28681

CYP1A2: Cytochrome P450 1A2; CYP2B6: Cytochrome P450 2B6; CYP2C19: Cytochrome P45 9; CYP2D6: Cytochr 450 2D6; CYP3A4: Cytochrome P450 3A4; POR: Cytochrome P450 oxidoreductase

Levels of evidence

1 - Recommendation based on pharmacogenetic information on the drug lab y Healt e US Food and Drug Administration (FDA). A level 1 will also be attributed if the recommendatic m a clini e published by the Clinical Pharmacogenetics Implementation Consortium (CPIC) or the Dutch Pharmac om king Group (DPWG).

2 - Recommendation based on the results of multiple studies sh tatistica ifica t of a genetic variant on drug response.

3 - Recommendation based on the results of a single study sh ally sig nt e genetic variant on drug response and/or drug pharmacokinetics.

4 - Recommendation based only on knowledge of the p cipal me g e in vivo or in vitro data demonstrating the impact that genetic variability has on drug response or pharm etics.

Aproved by: Jérome Maheux
PhD, Chemist 2016-081

Date: 2019-03-05