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Name:
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Genetic test result overview

Gene	Predicted Phenotype	Medication response
CYP2D6	Normal metabolizer (NM)	Normal drug metabolism and clearance.
CYP2C19	Normal metabolizer (NM)	Normal drug metabolism and clearance.
CYP2C9	Normal metabolizer (NM)	Normal drug metabolism and clearance.
VKORC1	Moderately reduced VKORC1 enzyme level	Decrease of vitamin K level results in enhanced response to warfarin.
CYP1A2	Ultrarapid metabolizer (UM)	In case you have enzyme inducer, drug clearance will be increased, result in reduced drug response.
CYP3A4	Intermediate metabolizer (IM)	Decrease drug metabolism and clearance, result in increased drug level which provided good response, however should be monitored for adverse drug reaction.
CYP3A5	Intermediate metabolizer (IM)	Decrease drug metabolism and clearance, result in increased drug level which provided good response, however should be monitored for adverse drug reaction. For drug which may required high target level since expected drug metabolism and clearance still within normal, result in decreased chance of achieving target drug concentrations.
SLCO1B1	Decrease Transporter Function	Reduce transport for lipid lowering drugs. The use of statin group will have risk of myotoxicity.
OPRM1	Higher opioid sensitivity	Higher analgesic response to opioid medications to control pain. You may have high pain-threshold and pain-tolerance.

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Personalized Medication Review

Drug-Gene testing (PGx panel – BH MedGene test)

Prediction of drug response for future drug treatment

CYP 2D6 Normal metabolizer	
Drug-gene related	Drugs that involve CYP2D6 enzyme for elimination. For example, - Antiarrhythmics; Flecainide, Propafenone - Antidepressants Amitriptyline, Doxepin, Duloxetine, Fluoxetine, Mianserine, Nortryptyline, Vortioxetine Venlafaxine - Antihistamines; Chlorpheniramine - Antipsychotics; Aripiprazole, Brexpiprazole, Chlorpromazine, Haloperidol, Risperidone - Antihypertensives (Beta-blockers); Carvedilol Metoprolol, Nebivolol, Propanolol - Antinauseants; Ondansetron.
Drug response	The metabolization and the elimination of the drug is normal.
Recommended dose/effect of dosage	A recommended starting dose at a standard dose would provide a good result.
Recommendations/Precautions	There is a low risk of side effects.
Drug-gene related	Drugs that use CYP2D6 to be changed into its active metabolite. For example, - Analgesics; Tramadol and Codeine - Hormonal therapy indicated in breast cancer; Tamoxifen.
Drug response	The metabolization and the elimination of the drug are normal.
Recommended dose/effect of dosage	It is recommended to start with a standard dose. A good effectiveness is expected.
Recommendations/Precautions	There is a low risk of side effect.

Considering together 2 genes CYP 2D6 - Normal metabolizer OPRM1 - Receptors with higher opioid sensitivity.	
Drug-gene related	Opioid painkillers, such as Codeine, Morphine, Oxycodone, Pethidine, and Tramadol.
Drug response	The use of painkillers in the group of opioids is effective and you have a higher sensitivity to opioid analgesics.
Recommended dose/effect of dosage	The recommended starting dose at a standard dose would provide a good result.
Recommendations/Precautions	Closely monitor for side effects that may occur, such as respiratory depression and constipation.

CYP 2C19 Normal metabolizer	
Drug-gene related	The drugs that use CYP2C19 enzyme for elimination. For example, - Antidepressants; Citalopram, Escitalopram. - Antacids; Lansoprazole, Dexlansoprazole, Omeprazole, Pantoprazole. - Antifungals; Voriconazole.
Drug response	The metabolization and the elimination of the drug are normal. Antacids are well eliminated from the body.
Recommended dose/effect of dosage	It is recommended to start with a standard dose. A good response is expected. For antacid, it is recommended to increase the dose if there is no response. For the treatment of H. pylori infection and the treatment of erosive esophagitis, the doctor may consider increasing the dose by 50-100% from the standard dose.
Recommendations/Precautions	There is a low risk of side effects.
Drug-gene related	**The drug using CYP2C19 to be changed into its active form such as Clopidogrel, an antiplatelet.**
Drug response	The metabolization and the elimination of the drug are normal.
Recommended dose/effect of dosage	It is recommended to start with a standard dose. It would provide a good drug effectiveness.
Recommendations/Precautions	There is a low risk of side effect.

CYP 2C9 Normal metabolizer	
Drug-gene related	The drugs that use CYP2C9 enzyme for elimination. For example, -Antiepileptic drug; Phenytoin - Nonsteroidal antiinflammatory drugs (NSAIDs); Celecoxib, Diclofenac, Ibuprofen, Meloxicam, Piroxicam, etc. - Antidiabetics; Glimepiride, Glipizide
Drug response	The metabolization and the elimination of the drug are normal.
Recommended dose/effect of dosage	It is recommended to start at standard dose. A good drug response is expected.
Recommendations/Precautions	The risk of side effects is low. Nonsteroidal anti-inflammatory drugs NSAIDs should be used under a doctor's supervision and used in a short time. Avoid the use in the elderly and people with impaired renal function.
Drug-gene related	**The drug using CYP2C9 to be changed into its active form, such as an antihypertensive drug Losartan.**
Drug response	The metabolization and the elimination of the drug are normal.
Recommended dose/effect of dosage	The drug used in standard doses may provide a good response.

Considering together 2 genes CYP 2C9 - Normal metabolizer Moderately reduced VKORC1 enzyme level.	
Drug-gene related	**Anticoagulant; Warfarin**
Drug response	The metabolization and elimination of the drug are normal. The vitamin K level that affects blood clotting is reduced. There is a sensitivity to the anticoagulant response.
Recommended dose/effect of dosage	Starting with a standard dose may be effective. It is recommended to adjust the dose based on the coagulation testing (INR).
Recommendations/Precautions	As a side effect of anticoagulants, bleeding precaution should be concerned. Consider other factors that affect drug levels, such as foods containing high vitamin K, the concomitant use of medications and dietary supplements.

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CYP 1A2 Ultrarapid metabolizer	
Drug-gene related	The drugs that use CYP1A2 enzyme for elimination. For example, - Sleep medication; Melatonin - Antipsychotic; Olanzapine.
Drug response	The drug elimination may be increased in the presence of factors, such as regular consumption of cruciferous vegetables, coffee or tea and, chargrilled meats, and also tobacco smoking. As result, a lower drug levels, a decreased effectiveness, and drug response are expected.
Recommended dose/effect of dosage	Consider increasing the dose if the treatment is not effective.
Recommendations/Precautions	A behavior modification, such as stopping coffee, stopping smoking, may result in a drug level elevation. Inform your doctor to adjust the dose accordingly.

CYP 3A4 Intermediate metabolizer	
Drug-gene related	The drugs that use CYP3A4 enzyme for elimination.
Drug response	The slow elimination of the drug results in a higher drug level. The effectiveness of the drug may increase and a good drug response is expected.
Recommended dose/effect of dosage	Consider reducing appropriately the dose along with clinical monitoring.
Recommendations/Precautions	Side effects may occur and they should be carefully monitored. In addition, the concomitant use of drugs or dietary supplements that inhibit the activity of the CYP3A4 enzyme may increase the drug levels eliminated by CYP3A4.

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Considering together 2 genes CYP 3A4 - Intermediate metabolizer SLCO1B1- Decrease Transporter Function.	
Drug-gene related	Lipid-lowering agent statin Simvastatin Atorvastatin
Drug response	The slow elimination of the drug results in higher levels of the drug. The drug's efficacy may be increased Considering together with a decrease transporter function SLCO1B1, a good efficacy is expected.
Recommended dose/effect of dosage	There is a risk of muscle pain from the drug. **Avoid Simvastatin.** For Atorvastatin, carefully monitor the side effects or consider changing to an alternative statin with fewer risks of side effects such as Fluvastatin, Pravastatin, or Rosuvastatin.
Recommendations/Precautions	Carefully monitor side effects from the drug, such as muscle pain.

CYP 3A5 Intermediate metabolizer	
Drug-gene related	**The drugs that use CYP3A5 enzyme for elimination.** For example, - Immunosuppressant; Tacrolimus.
Drug response	The drug elimination is greatly reduced, resulting in a higher drug level.
Recommended dose/effect of dosage	Some drugs required a high drug level, such as Tacrolimus(immunosuppressant agent). Therefore, to achieve the targeted effectiveness, the drug dose can be increased by 1.5 to 2 times the standard dose. However, the starting dose shouldn't exceed 0.3 mg/kg/day along with side effects and drug level monitoring.
Recommendations/Precautions	The concomitant use of drugs or dietary supplements that inhibit the activity of the CYP3A5 enzyme may increase the drug levels eliminated by CYP3A5.

Remark: The prediction is based on simply the genetic profile. Other factors such as patient's current condition, kidney and liver function, and drug-drug interaction, etc. may also be considered by the doctor if your medication treatment would be adjusted.