Optimizing Chemotherapy with

PGx
Oncology

Using NGS

Employing the genetic information to guide chemotherapy

- Reduces events of drug-toxicity
- Maximises the efficacy of chemotherapeutic regimen
- Provides specific drug dosing recommendations, based on guidelines

  - CPIC (Clinical Pharmacogenetics Implementation Consortium)
  - NCCN (National Comprehensive Cancer Network)
  - DPWG (Dutch Pharmacogenetics Working Group)

Why OncoPGx is required?

>21% of hospitalization to an oncology service are Adverse Drug Reaction (ADR)-related[1]

60% ADRs may be preventable[1]

Improved prescription of supportive care medication[2]

Who should get tested?

CANCER PATIENTS

- Likely to be enrolled for / on chemotherapy
- With history of adverse reactions to cancer medications
- With a family history of medication sensitivity
- With other comorbidities like diabetes or cardiovascular disease

Report highlights

Drugs to be 'avoided', Drugs to be 'used with caution' & Drugs to be 'used as directed'	The genetic variants that impact the drugs	The dosing recommendations based on guidelines: CPIC, NCCN, DPWG

Medications covered by OncoPGx panel

Drug Class	Genes
Oncology Fluoropyrimidines, Thiopurines, Irinotecan, Tamoxifen	DPYD, NUDT15, RYR1, TPMT, UGT1A1, G6PD, CACNA1S, CYP2C9, CYP2D6, CYP3A5
Pain Management Nonsteroidal Anti-inflammatory Drugs (NSAIDs), Opioids, Analgesics	
Gastroenterology Proton-Pump Inhibitors (PPIs)	
Immunology Immunosuppressants	
Others Antinauseants, Anesthetics	

Relevance of pharmacogenomics

Drug	Gene	Impact
Thiopurines	TPMT, NUDT15	Loss-of-function variations can cause higher risk of toxicity and life-threatening myelosuppression with conventional dose of thiopurines like azathiopurine/ mercaptopurine/ thioguanine.[3]
Fluoropyrimidines	DPYD	Patients with variants can experience significant toxicity when treated with fluoropyrimidines (e.g., 5-FU, capecitabine).[4]
Tamoxifen	CYP2D6	Loss-of-function variations can produce lower levels of endoxifen thus less inhibition of cancer cell growth.[5]
Irinotecan	UGT1A1	Dosing of drugs like irinotecan can be tailored based on UGT1A1 genotype to reduce the risk of neutropenia.[6]
Opioids	CYP2C9, CYP2D6	Can influence palliative care depending on how a patient metabolizes opioids like codeine, tramadol, and morphine.[7]

Benefits of OncoPGx

Optimizes chemotherapeutic regimes

Aids in informed clinical decision on chemotherapeutic regimens

Reduces trial and error of medications

Assess risk for drug selection and dose adjustments

Reduces drug toxicity and adverse effects

Optimizes pain management along with chemotherapy

Improves supportive care

Improves quality of life

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