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**Lawrence B. Schwartz M.D., Ph.D.**

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Director of Molecular Diagnostics, Professor of Pathology

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**Clinical Specialties:** Development and Application of Nucleic Acid Probe Technology to Diagnosis and Monitoring of Human Diseases



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**Research Interest:** Pharmacogenetic mechanisms of Adverse Drug Reactions and Therapeutic Non-responder Phenotypes



**VCUHS** Department of Pathology

Client Services (p) 804-828-7284 (PATH) (p) 800-363-9234 (f) 804-628-8724

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**ASTHMA GENOTYPING**

## Announcing: Asthma Genotyping

### Quick Reference

***"inherited variations...can be used to predict whether a patient will have a good response to a drug, a bad response to a drug, or no response at all (National Center for Biotechnology Information)."***

**GOAL:** To explain a routine laboratory test that will allow physicians to identify patients with the Arg16Arg polymorphism, and enable more information for pharmacotherapy.

**WHO:** Asthma patients with poor symptom control

**WHEN:** Before initial or renewal of prescription for regular use of  $\beta$ 2-adrenergic long-acting bronchodilators (LABA) or short acting bronchodilators (SABA)

**WHY:** To optimize therapy for asthma control.

### BACKGROUND:

- The target for  $\beta$ 2-agonist asthma medications is the  $\beta$ 2-adrenergic receptor.
- The gene for the  $\beta$ 2-adrenergic receptor is ADRB2.
- Recent studies have shown that variation at one location in this gene may predict therapeutic responses to  $\beta$ 2-agonist .
- The Arg/Arg homozygous genotype at amino acid position 16 may indicate a need for a change in medications

**IMPACT:** This Arg16Arg polymorphism has been correlated with decreased lung function (PEF and FEV<sub>1</sub>) in patients with asthma who regularly use SABA or LABA.

### INCORPORATING THE NEW TEST INTO PRACTICE:

- Treat acute exacerbations according to standard protocols
- Note-this test needs to be ordered for each patient only once because it is an inherited variation

### TEST INFORMATION:

- Test Name- ADRB2 ( $\beta$ 2 Adrenergic Receptor Genotyping)
- Clinical Condition - Identify potential adverse effect of  $\beta$  agonist therapy
- Specimen Type - Peripheral blood (PB)
- Collection - 3.5 mL of PB in EDTA (purple-top) tube minimum 1 mL of PB
- Processing - refrigerate sample at 4°C until shipped
- Shipping - ship on cold packs to maintain temperature

### HOW TO ORDER:

- Contact Client Services at 804-828-7284 or 800-363-9234
- Request test requisition for ordering ADRB2 (Beta 2 Adrenergic Receptor Genotyping)
- Client Services will fax a test requisition for submission with the sample.

### TRANSLATING RESULTS INTO CARE

#### POSSIBLE RESULTS:

Arg16Arg = Uncommon; Arg16Gly or Gly16Gly = Common

#### Uncommon Result:

- Prevalence 1 in 7 Caucasians, 1 in 5 African Americans
- Consider substituting anti-cholinergic inhalers for  $\beta$ -adrenergic bronchodilators if patient is taking one or more puffs per day of SABA and/or LABA.
- The significance of the test result should be explained to patient, in that prolonged use of SABA or LABA with this test result may result in decreased lung function.
- Patient should be instructed to check peak flows at least 2x/day for the next month after medication change.
- Patient should also be told to contact physician if peak flow falls to <80% expected value.

#### Common Results:

- Patients with common test results (Arg16Gly or Gly16Gly) have not been shown to experience a decline in lung function with regular use of SABA or LABA.
- No change from standard therapy is indicated.
- Patients who use bronchodilators on a regular basis should be evaluated since regular use of a bronchodilator in *any asthma patients* could indicate the need for additional controller therapy.

### For More Information:

#### Sample Pickup or Ordering Questions:

Client Services 804-828-7284 or 800-363-9234

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See back page for faculty credentials, clinical specialties and research