



# ApoE

## Key Clinical Messages

### What is the ApoE Test?

Vibrant’s ApoE Test is a genetic test that assesses the major alleles of the APOE gene, E2, E3, and E4. You can order this test as a stand-alone test by sampling either saliva or blood or as an add-on option to the Neural Zoomer Plus blood panel (not available for dried blood spot panels).

### Why Order the ApoE Test?

Apolipoprotein E is the primary cholesterol carrier that supports lipid transport and injury repair in the brain.<sup>1</sup>

Apolipoprotein E variants have been studied as risk factors for numerous conditions<sup>1</sup>, including:

- Alzheimer’s disease
- Dementia with Lewy bodies
- Cardiovascular disease
- Atherosclerosis
- Age-related hearing loss
- Age-related macular degeneration
- And age-related cognitive decline

ApoE test results can reveal valuable insights about genetic risk factors for disease and allow the opportunity for early treatment interventions.

### What Markers Are Included in the ApoE genetic test?

Vibrant tests for Apo E2, Apo E3, and Apo E4 variants.

Marker	General Information
APO E2	<p>APO E2 is associated with an increased risk of hyperlipoproteinemia type III, a rare genetic disease associated with elevated serum cholesterol and triglycerides and a predisposition to the development of premature atherosclerosis.<sup>1</sup></p> <p>The risk is predominantly found in homozygous individuals with two copies of E2.</p>
APO E3	<p>Found in more than 60% of the US population, APO E3 is the most common allele.</p>
APO E4	<p>APO E4 increases the risk of developing late onset Alzheimer’s disease and dementia with Lewy bodies.<sup>1</sup></p> <p>Heterozygous individuals—those who inherit one copy of E4—have an increased risk, whereas Homozygotes individuals—those who inherit two copies of E4—have an even greater risk of developing these diseases.</p>

### Which Patients Benefit from This Test?

Conditions and symptoms which may benefit from ApoE testing include:

- History of hypercholesterolemia, hyperlipidemia, hypertriglyceridemia, or hypertension
- History or arrhythmias
- Early signs of cardiovascular disease
- Family history of cardiovascular disease, atherosclerosis, or cardiovascular events
- Early signs of poor memory, dementia, or cognitive decline
- Family history of dementia or Alzheimer’s disease
- Everyone, to understand their genetic predisposition



## Test Prep for Saliva or Blood Tests

If a saliva test was ordered, follow instructions for saliva; if a blood test was ordered, follow instructions for blood.

	Saliva	Blood
Collection	One (1) saliva specimen tube	One (1) EDTA specimen tube
Hydration Restrictions	Rinse mouth with water to remove food residue and wait at least 10 minutes after rinsing to avoid sample dilution before collecting saliva.	None
Fasting Restrictions	Not required.	Not required.
Diet Restrictions	Avoid foods with high sugar, acidity, or caffeine content immediately before sample collection. Avoid eating a meal within 60 minutes of sample collection for the best test performance.	None
Medication Restrictions	None	None
Dietary Supplement Restrictions	None	None

## Methodology

Vibrant is a CLIA-certified and CAP-accredited lab that utilizes the most reliable, FDA-approved methodologies to measure genes for the ApoE test.

- Vibrant uses a standard extraction procedure to extract the DNA from saliva. Genetics are processed on **Real Time probe-based qPCR methodology**.
  - *Note: Compared to buccal swabs, saliva provides a larger quantity of DNA and a higher purity*
- **Real-time PCR for genetics with advantages that include:**
  - Limited likelihood of contamination compared to standard PCR
  - No need for post-PCR analysis

## Which Tests Pair Well With the ApoE Test?

- **Cardiac Health Panel:** to assess for markers associated with cholesterol and cardiac health.
- **CardiaX:** to assess for other genetic markers that may impact cardiovascular disease risk or management.
- **Neural Zoomer Plus:** to assess for neural autoimmunity and infections associated with neurological health and disease.

## Results and Interpretation of Results

**Results:** Example Results are reported below:

Assay	Result	Phenotype	Potential Risk
<b>Apolipoprotein E1</b>	E3/E4	Moderately increased risk for late onset Alzheimer's disease	APO E4 increases the risk for developing late onset Alzheimer's disease, with homozygotes having a higher risk than heterozygotes.  The APOE gene makes the protein apolipoprotein E (Apo E), which is involved in the body's production, delivery, and utilization of cholesterol. The E4 variant makes a protein characterized by faster cholesterol metabolism resulting in a higher blood cholesterol level.

## Interpretation:

ApoE interpretation is based on the College of American Pathologists (CAP) defined references.

Results	Example Phenotype Interpretation	Results	Example Phenotype Interpretation	Results	Example Phenotype Interpretation
E1/E2	No increased risk	E2/E3	No increased risk	E3/E4	Moderately increased risk for late onset Alzheimer's disease
E1/E4	Moderately increased risk for late onset Alzheimer's disease	E2/E4	Moderately increased risk for late onset Alzheimer's disease	E4/E4	Increased risk for late onset Alzheimer's disease
E2/E2	Increased risk for hyperlipoproteinemia III	E3/E3	No increased risk		

### References:

1. Liu CC, Liu CC, Kanekiyo T, Xu H, Bu G. Apolipoprotein E and Alzheimer disease: risk, mechanisms and therapy [published correction appears in Nat Rev Neurol. 2013. doi: 10.1038/nrneurol.2013.32. Liu, Chia-Chan [corrected to Liu, Chia-Chen]]. Nat Rev Neurol. 2013;9(2):106-118. doi:10.1038/nrneurol.2012.263