Very Long-Chain and Branched-Chain Fatty Acids Profile

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X-linked adrenoleukodystrophy (X-ALD) is a rare X-linked metabolic disorder caused by variants in the *ABCD1* gene that cause a deficiency in adrenoleukodystrophy protein (ALDP) and subsequent accumulation of very long-chain fatty acids (VLCFAs). VLCFA accumulation occurs in plasma and all tissue types, but primarily affects the adrenal cortex and white matter of the brain and spinal cord, resulting in a range of clinical outcomes.

Adrenal insufficiency may be the initial presentation of X-ALD, and 21-hydroxylase antibody testing may confirm or exclude an autoimmune etiology. In X-ALD, 21-hydroxylase antibody testing results will be normal; therefore, males with adrenal insufficiency and normal 21-hydroxylase antibody testing should be tested for X-ALD (VLCFA profile).

For additional information on the testing strategy for X-ALD, refer to the ARUP Consult X-Linked Adrenoleukodystrophy topic.

Featured ARUP Testing

Very Long-Chain and Branched-Chain Fatty Acids Profile 2004250

Method: Liquid Chromatography-Tandem Mass Spectrometry

- Biochemical test to measure concentration of very long-chain fatty acids (VLCFAs) C22-C26, pristanic acid, and phytanic acid
- Initial test to screen for disorders of peroxisomal biogenesis and/or function, including X-ALD and Zellweger syndrome
- Confirmatory test for abnormal newborn screening suggestive of X-ALD

If a familial sequence variant has been previously identified, targeted sequencing for that variant may be appropriate; refer to the Laboratory Test Directory for additional information.

Disease Overview

Incidence

1/14,700 live births[1]

Penetrance

Neurologic symptoms are present in nearly 100% of males with the disease by adulthood.

Inheritance

X-linked

Test Interpretation

Biochemical testing (VLCFAs and BCFAs)

- Males: Elevated VLCFAs
- Females: Elevated VLCFAs in approximately 85% of heterozygous carriers[2]

References

1. Huffnagel IC, Dijkgraaf MGW, Janssens GE, et al. Disease progression in women with X-linked adrenoleukodystrophy is slow. *Orphanet J Rare Dis*. 2019;14(1):30.

2. Wiesinger C, Eichler FS, Berger J. The genetic landscape of X-linked adrenoleukodystrophy: inheritance, mutations, modifier genes, and diagnosis. *Appl Clin Genet*. 2015;8:109-121.

Related Information

X-Linked Adrenoleukodystrophy