



Metabolomic Profiling of Aqueous Humor in Glaucoma Points to Taurine and Spermine Deficiency: Findings from the Eye-D Study

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Auteur	Buisset, Adrien [1], Gohier, Philippe [2], Leruez, Stéphanie [3], Muller, Jeanne [4], Amati-Bonneau, Patrizia [5], Lenaers, Guy [6], Bonneau, Dominique [7], Simard, Gilles [8], Procaccio, Vincent [9], Annweiler, Cédric [10], Milea, Dan [11], Reynier, Pascal [12], Chao de La Barca, Juan Manuel [13]
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Mots-clés	aqueous humor [14], glaucoma [15], Lipidomics [16], Metabolomics [17], primary open-angle glaucoma [18]
Résumé en anglais	<p>We compared the metabolomic profile of aqueous humor from patients with primary open-angle glaucoma (POAG; n = 26) with that of a group of age- and sex-matched non-POAG controls (n = 26), all participants undergoing cataract surgery. Supervised paired partial least-squares discriminant analysis showed good predictive performance for test sets with a median area under the receiver operating characteristic of 0.89 and a p-value of 0.0087. Twenty-three metabolites allowed discrimination between the two groups. Univariate analysis after the Benjamini-Hochberg correction showed significant differences for 13 of these metabolites. The POAG metabolomic signature indicated reduced concentrations of taurine and spermine and increased concentrations of creatinine, carnitine, three short-chain acylcarnitines, 7 amino acids (glutamine, glycine, alanine, leucine, isoleucine, hydroxyl-proline, and acetyl-ornithine), 7 phosphatidylcholines, one lysophosphatidylcholine, and one sphingomyelin. This suggests an alteration of metabolites involved in osmoprotection (taurine and creatinine), neuroprotection (spermine, taurine, and carnitine), amino acid metabolism (7 amino acids and three acylcarnitines), and the remodeling of cell membranes drained by the aqueous humor (hydroxyproline and phospholipids). Five of these metabolic alterations, already reported in POAG plasma, concern spermine, C3 and C4 acylcarnitines, PC aa 34:2, and PC aa 36:4, thus highlighting their importance in the pathogenesis of glaucoma.</p>

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