



COMPARISON OF METABOLITE LEVELS IN SERUM AND TEARS: IMPLICATIONS FOR THE DILUTION OF AUTOLOGOUS-SERUM-EYE-DROPS

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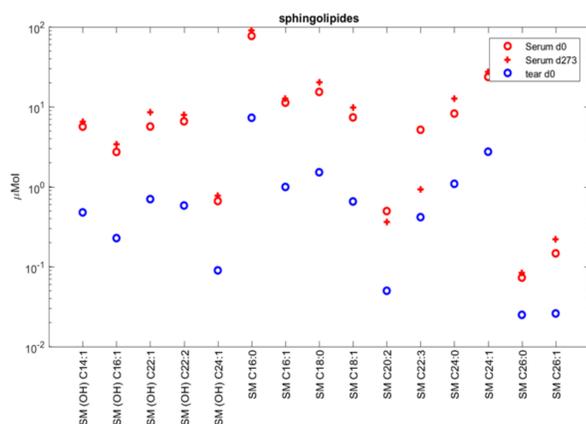
Background No general standards exist for the optimal dilution factor of autologous serum eye drops (ASED) to treat dry eye syndrome (DES) [1, 2]. While dilution reduces patient burden, simplifies logistics and potentially decreases anti-proliferative effects from TGF- β , better epithelial healing with non-diluted ASED in Sjögren-Syndrome, but not in non-Sjögren DES has been reported [2].

Objectives The ratio of serum to tear concentration for a range of metabolites in ASED after prolonged storage time was determined to define dilution that maintains metabolite concentration equal or above those in tears.

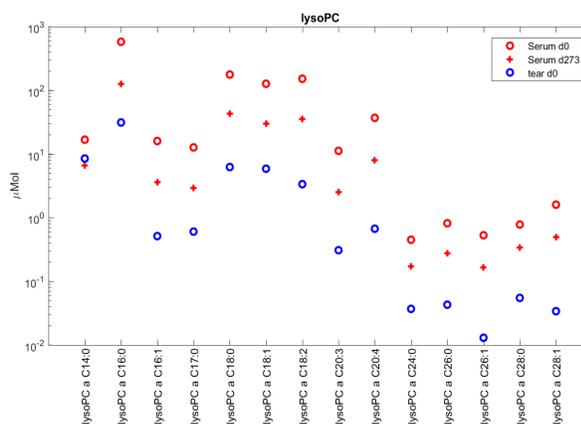
Methods After autologous whole blood donation, unit dose ASED were prepared and stored at -20°C for 9 months. Concentration changes of 14 sphingomyelins (SM), 14 lysophosphatidylcholines (LPC) and 76 phosphatidylcholines (PC) were determined in ASED on days (d) 0 and 273 by LC-MS/MS using the Absolute/DQ®-p180-Kit (Biocrates Life Sciences) and compared to those in tears of the same person.

Results The concentrations of all SM in ASED increased by 30% to 80% within 9 months. Compared to tears, the concentrations were 10-fold (d0) to 14-fold (d273) higher. The concentrations of all LPC decreased by 50%-75%, with 20- and 5- times higher levels on d0 and d273 in ASED compared to tears. Most PC showed a less than 2-fold increase while PC ae C30:1/C38:1/C38:2 increased by 5-6- fold. "ae" denotes that one of the moieties is a fatty alcohol and bound via an ether bond. In the sum, all PC-concentrations were about 16-19- fold higher in ASED (d0-d273) than in tears.

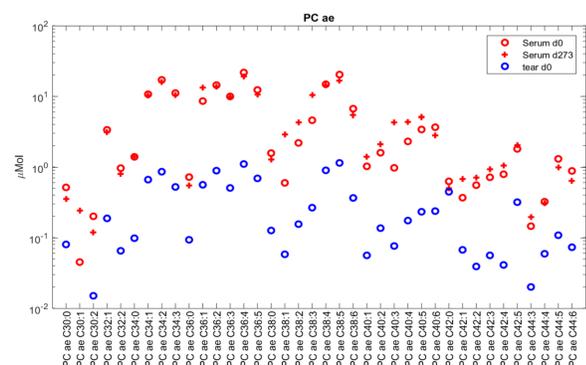
Concentrations of SM in serum at d0, d273 and in tears



Concentrations of LPC in serum at d0, d273 and in tears



Concentrations of PC ae in serum at d0, d273 and in tears



Conclusions We observed an increase in SM probably through the release of sphingosine-1-phosphate from platelets during blood clotting. The decrease in LPC may be linked to a shift from LPC to PC through the presence of LPC-acyltransferases. After 9 months at -20°C, the LPC levels still exceeded those in tears by 5-fold. These data support a dilution up to 5-fold as suggested by others [reviewed in 2].

	Serum d0	Serum d273	Träne d0	Faktor (d0/Träne)	Faktor (d273/Träne)
Σ SM	165 µmol/l	235 µmol/l	16.9 µmol/l	10	14
Σ LPC	1133 µmol/l	312 µmol/l	57.5 µmol/l	20	5
Σ PC ae	184 µmol/l	224 µmol/l	11.5 µmol/l	16	19

Because certain patient populations may benefit from less diluted ASED, an individual approach seems indicated until more clinical information stratified by cause and severity of DES is available.

Acknowledgements

Ines Maria Hartmann¹, Jasmin Leweke²

1. Drew VJ et al. *Front Med (Lausanne)*. (2018) 5:33.

2. The Royal College of Ophthalmologists guidelines on serum eye drops for the treatment of severe ocular surface disease. (2017).