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BSS Plus compared to the vitreous of non-diabetics and diabetics

We thank Prof Sebag for the recent editorial¹ which provided a critical review of our paper ‘Biochemical Analysis of the Living Human Vitreous’.² Our study reported the biochemical composition of vitreous obtained during macular hole repairs and epiretinal membrane peels, from both diabetic and non-diabetic individuals. Prof Sebag suggested that it would be interesting to compare the vitreous data from both the non-diabetic and diabetic subgroups to BSS Plus Irrigating Solution (Alcon, USA).³ We have undertaken this subgroup analysis (Table 1).

It is known that BSS Plus does not contain a wide range of vitreous components, such as lactate, beta-hydroxybutyrate, copper, zinc, selenium, iron, transferrin and ferritin.²

This study indirectly assessed the composition of vitreous, using vitreous tissue extracted at the time of surgery, which was then frozen until analysis. Nevertheless, this provides the strongest evidence so far that solute concentration discrepancies of between 3.8% and 100% exist between human vitreous and the vitreous substitute BSS Plus.

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Table 1. Comparison of BSS Plus against vitreous biochemical data from non-diabetics and diabetics

Current vitreous results										
	Diabetic Unpaired	Mean vitreous i (BSS Plus: t -test in BSS Plus	$Q(i/m)$ status	Reported value ($m = 16$)	Difference concentration current data) (p-value) (Alcon)	Ratio of means between means				
Sodium (mmol/L)	Non-	147.5 = 15)	160	12.53 \pm 0.8937	1.08	<0.0001	**	1	0.00	†
	diabetic	(n		14.25 \pm 0.8539	5		*	6		
	Diabetic	145.8 = 12)	160	—0.9200 \pm 0.2644	1.09	<0.0001	**	2	0.01	†
		(n		—0.5000 \pm 0.1642	7		*	3		
Potassium (mmol/L)	Non-	5.92 ($n = 15$)	5	7.533 \pm 0.6752	0.84	0.0008	**	12	0.07	†
	diabetic			9.417 \pm 0.6450	5		*	5		
	Diabetic	5.50 ($n = 12$)	5	—0.2740 \pm 0.1310	0.90	0.003	**	14	0.08	†
				0.0550 \pm 0.1419	9			8		
Chloride (mmol/L)	Non-	122.5 = 15)	130	0.03667 \pm	1.06	<0.0001	**	3	0.01	†
	diabetic	(n		0.03919	1		*	9		
	Diabetic	120.6 = 12)	130	0.1792 \pm	1.07	<0.0001	**	4	0.02	†
		(n		0.03769	8		*	5		
Calcium (mmol/L)	Non-	1.274 = 15)	1	2.573 \pm 0.1742	0.78	0.0229	*	13	0.08	†
	diabetic	(n		1.350 \pm 0.2572	5			1		
	Diabetic	0.945 = 12)	1	—3.602 \pm 0.3144	1.05	0.351		16	0.10	
		(n		—4.433 \pm 0.2042	8			0		
Magnesium (mmol/L)	Non-	0.963 = 15)	1	14.50 \pm 1.708	1.03	0.1787		15	0.09	
	diabetic	(n		16.42 \pm 2.291	8			4		
	Diabetic	0.821 = 12)	1		1.21	<0.0001	**	5	0.03	†
		(n			8		*	1		
Glucose (mmol/L)	Non-	2.43 ($n = 15$)	5		2.05	<0.0001	**	6	0.03	†
	diabetic				8		*	8		
	Diabetic	3.65 ($n = 12$)	5		1.37	<0.0001	**	7	0.04	†
					0		*	4		

Lactate (mmol/L)	Non-diabetic	3.60 ($n = 15$)	0	0.00	<0.0001	**	8	0.05	†
	Diabetic	4.43 ($n = 12$)	0	0		*	0		
Osmolality (mOsm/kg)	Non-diabetic	290.5 ($n = 12$)	305	1.05	<0.0001	**	10	0.06	†
	Diabetic	288.6 ($n = 12$)	305	0		*	3		
				1.05	<0.0001	**	11	0.06	†
				7		*	9		

* $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$. †Statistically significant after controlling for false discovery rate. i , P value rank; m , total number of significance tests (16); n , subgroup sample size; P , P value of independent-groups t -test; Q , false discovery rate (0.1); $Q(i/m)$, Benjamini–Hochberg critical value.

Competing/conflicts of interest: None declared.

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