

RELATIONSHIP BETWEEN NITRIC OXIDE IN FOLLICULAR FLUID AND OVARIAN RESPONSE AMONG OOCYTE DONORS



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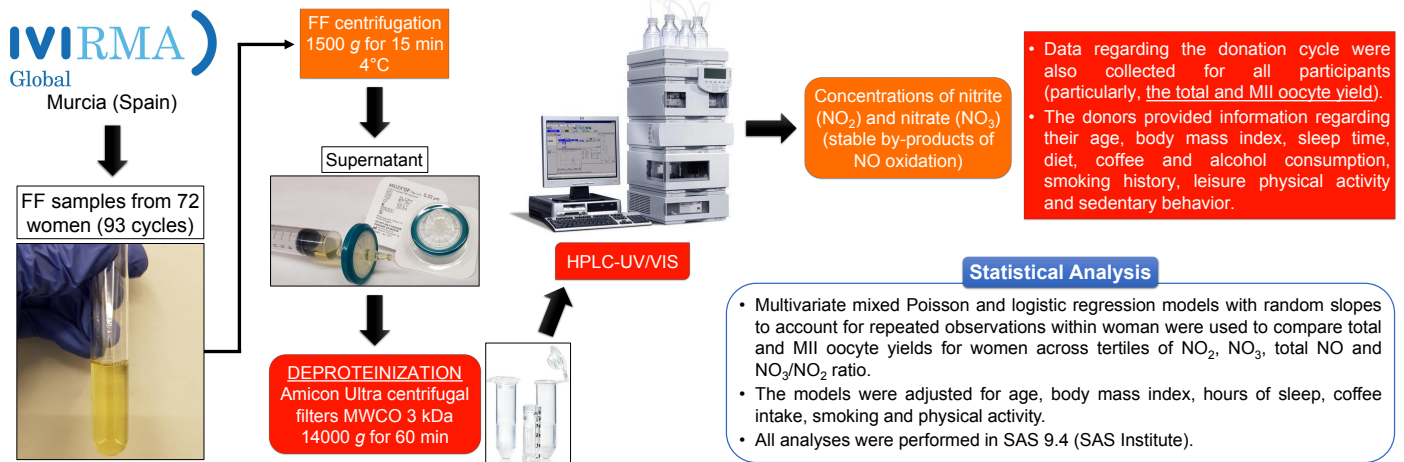
INTRODUCTION

The synthesis of Nitric Oxide (NO) is catalyzed by three isoforms of the enzyme Nitric Oxide Synthase. Their presence has been described in the oviduct, oocytes and cumulus cells of several species, including in humans. The involvement of NO in the regulation of granulosa cell function, follicular maturation and ovulation, has also been reported.

OBJECTIVE

The aim of this study was to determine if the NO levels in human follicular fluid (FF) correlate with the number of total and MII oocytes retrieved from donors.

MATERIALS AND METHODS



RESULTS

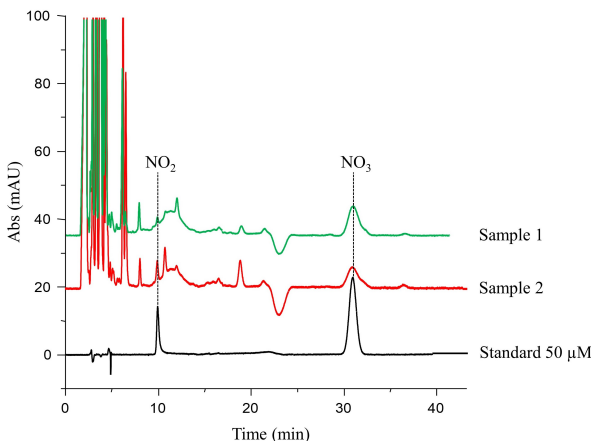


Figure 1. HPLC-UV/VIS chromatogram recorded at 206 nm.

Table 1. Follicular fluid levels of NO₂, NO₃, total NO and NO₃/NO₂ ratio and Pearson correlation coefficients between these parameters.

	MIN	MAX	MEAN (SD)	r			
				NO ₂	NO ₃	TOTAL NO	NO ₃ /NO ₂ RATIO
NO ₂	0.7	96.1	14.7 (12.3)	1.00	-0.01	0.89	-0.40
NO ₃	4.9	39.7	17.3 (6.3)		1.00	0.45	0.14
TOTAL NO	5.6	109.5	31.9 (13.7)			1.00	-0.29
NO ₃ /NO ₂ RATIO	0.1	31.5	2.6 (4.4)				1.00

Minimum, maximum and mean (standard deviation) concentrations of NO₂, NO₃ and total NO are expressed as μM. The values are representative of 93 follicular fluid samples.

Table 2. Association between NO-related parameters and the adjusted oocyte yield, number and proportion of MII oocytes in women donors.

	N cycles / N donors	Oocyte yield, N ¹	MI I oocytes, N ¹	MI I oocyte proportion (%) ²
NO₂	93 / 72			
1 st tertile	31 / 25	18.2 (15.0, 22.1)	12.4 (10.2, 15.1)	68 (58, 77)
2 nd tertile	31 / 23	18.5 (15.1, 22.6)	14.0 (11.4, 17.1)	78 (69, 85)
3 rd tertile	31 / 24	18.3 (15.1, 22.1)	13.2 (10.9, 16.0)	79 (70, 85)
P, linear trend ³		0.94	0.38	0.02
NO₃	93 / 72			
1 st tertile	30 / 24	18.5 (15.4, 22.4)	14.1 (11.7, 17.1)	79 (70, 85)
2 nd tertile	32 / 24	18.1 (15.0, 21.9)	13.2 (10.9, 16.1)	78 (70, 85)
3 rd tertile	31 / 24	18.3 (15.0, 22.5)	12.2 (9.9, 15.0)	68 (57, 77)
P, linear trend ³		0.88	0.14	0.03
Total NO	93 / 72			
1 st tertile	30 / 26	19.2 (16.0, 23.1)	13.7 (11.4, 16.5)	74 (65, 81)
2 nd tertile	31 / 20	21.2 (17.3, 25.8)	15.2 (12.4, 18.6)	77 (68, 84)
3 rd tertile	32 / 26	16.4 (13.7, 19.7)	12.2 (10.1, 14.6)	77 (69, 84)
P, linear trend ³		0.14	0.31	0.41
NO₃/NO₂ ratio	93 / 72			
1 st tertile	31 / 23	21.7 (16.7, 28.1)	14.1 (10.7, 18.6)	68 (52, 80)
2 nd tertile	31 / 23	16.8 (13.8, 20.6)	12.9 (10.4, 15.9)	82 (73, 88)
3 rd tertile	31 / 26	17.2 (13.4, 22.2)	12.6 (9.6, 16.5)	74 (61, 84)
P, linear trend ³		0.18	0.54	0.42

Models were run using ¹Poisson regression with log link and ²binomial regression with logit link. All data are presented as least square means (95% CI), adjusted for age, body mass index, sleep time, coffee intake, smoking history and leisure physical activity.

³P, linear trend was calculated by modeling the tertiles of each metabolite, using the median analyte concentration values in each tertile as a continuous linear term.

CONCLUSIONS

- NO₂ and NO₃ concentrations were unrelated to each other.
- NO and its metabolites did not predict the number of mature oocytes retrieved from donors in stimulated cycles. However, the proportion of MII oocytes increased with increasing FF NO₂ levels, but decreased with increasing NO₃ levels.
- The NO₂/NO₃-mediated pathway might not be associated with the ovarian reserve, but it may make it more likely that any one egg will be mature and become fertilizable or recruited for ovulation.
- The fertilization rate, embryo quality and pregnancy rates should be analyzed in patients who received these oocytes to determine any correlations with NO levels in FF.