

**Supplemental files for**

**The effect of heat treatment on colostral and newborn calf redox status and oxylipid biomarkers**

Sabine Mann<sup>1\*</sup>, Jeff Gandy<sup>2</sup>, Giulio Curone<sup>3</sup>, Angel Abuelo<sup>2</sup>

<sup>1</sup>Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853,

<sup>2</sup>Department of Large Animal Clinical Sciences, College of Veterinary Medicine, Michigan State University, East Lansing, MI 48824,

and

<sup>3</sup>Department of Veterinary Medicine and Animal Sciences (DIVAS), University of Milan, 26900 Lodi, Italy

\*Corresponding author: [sm682@cornell.edu](mailto:sm682@cornell.edu)

**Supplemental Table 1.** Distribution of analytes (median [range]) detected in colostrum (n=37).

Analyte (nM)	Heat (n=11)	Raw (n=11)
<i>Prostaglandins</i> <sup>1</sup>		
PGF2- $\alpha$	0.6 (0.1 - 1.5)	0.5 (0.2 - 0.9)
8-12-iso-iPF2- $\alpha$ -VI	1.1 (0.6 - 2.1)	1.2 (0.8 - 1.9)
5-iPF2 $\alpha$ -VI	0.2 (0.1 - 0.3)	0.2 (0.1 - 0.3)
8-iso-PGA2	0.10 (0.001 - 0.20)	0.10 (0.001 - 0.20)
6-keto-PGF1- $\alpha$	0.2 (0.1 - 8.0)	0.4 (0.1 - 0.7)
8-iso-15-keto-PGE2	<b>Not detected</b>	
<i>Fatty acids</i> <sup>2</sup>		
DHA	279 (18 - 498)	54 (20 - 612)
Dihomo-ALA	370 (64 - 1260)	123 (54 - 1304)
AA	1267 (818 - 8208)	1104 (301 - 7936)
EPA	51 (35 - 72)	51 (43 - 66)
LA	192 (152 - 265)	184 (160 - 290)
ALA	387 (82 - 959)	105 (55 - 1103)
DPA	1303 (389 - 4774)	622 (348 - 5617)
<i>Oxylipids</i> <sup>3</sup>		
TXB2	0.10 (0.01 - 2.60)	0.20 (0.01 - 2.30)
Resolvin D2	<b>Not detected</b>	
LTB4	<b>Not detected</b>	
20-HETE	2.3 (0.8 - 5.3)	2.3 (0.9 - 4.2)
19, 20-EpDPE	49 (3 - 1716)	83 (4 - 208)
19, 20-DiHDPA	0.80 (0.01 - 2.50)	0.05 (0.01 - 8.20)
17-HDoHE	6.40 (0.01 - 46.10)	8.70 (0.01 - 42.0)
15-HETE	16.8 (12.4 - 60.9)	26.9 (12.6 - 43.0)
14,15-EET	4.2 (2.2 - 13.9)	4.2 (2.1 - 7.1)

14,15-DiHETE	13.7 (1.6 - 52.0)	16.5 (12.1 - 31.7)
14,15-DHET	3.9 (0.5 - 6.6)	3.9 (1.5 - 6.7)
13-oxoODE	88 (9 - 301)	107 (12 - 221)
13-HODE	815 (167 - 2453)	899 (129 - 2316)
12-HHTrE	9.0 (3.5 - 23.5)	10.5 (4.5 - 13.0)
12,13-EpOME	206 (42 - 722)	248 (34 - 290)
12,13-DiHOME	46 (13 - 55)	48 (19 - 68)
11-HETE	10.4 (0.6 - 21.1)	11.1 (6.2 - 23.2)
11,12-DHET	7.6 (4.4 - 21.5)	8.6 (4.2 - 13.5)
11,12-EET	10.2 (5.8- 29.2)	11.5 (7.2 - 23.4)
9-oxoODE	87.6 (25.6 - 180.4)	81.7 (28.9 - 144.7)
9-HODE	578 (200 - 2259)	607 (109 - 1715)
9,10-EOME	170 (4 - 252)	190 (20 - 268)
9,10-DiHOME	77 (27 - 129)	88 (27 - 160)
8,9 DHET	1.5 (0.1 - 3.5)	2.0 (0.9 - 3.2)
17,18-DiHETE	11.8 (0.01 - 24.0)	17.4 (8.4 - 57.4)
5-HETE	254 (98 - 513)	211 (190 - 420)
8,9-EET	13.3 (5.7 - 21.8)	10.1 (5.1 - 18.5)

<sup>1</sup>Prostaglandins: PGF2- $\alpha$  = prostaglandin F 2alpha, 8,12-iso-iPF $\alpha$ -VI = 8,12-iso-iPF2alpha-VI isoprostane, 5-iPF2 $\alpha$ -VI = 5-iso-iPF2alpha-VI isoprostane, 8-iso-PGA2 = 8-iso prostaglandin A2, 6-keto-PGF1 $\alpha$  = 6-keto-prostaglandin F1alpha, 8-iso-15-keto-PGE2 = 8-iso-15-keto prostaglandin E2

<sup>2</sup>Fatty acids: DHA = docosahexaenoic acid, Dihomo-ALA = dihomo- $\gamma$ -linolenic acid, AA = arachidonic acid, EPA= eicosapentaenoic acid, LA = linoleic acid, ALA = alpha-linolenic acid, DPA = docosapentaenoic acid

<sup>3</sup>Oxylipids: TXB2 = thromboxane B2, LTB4 = leukotriene B4, HETE= hydroxyeicosatetraenoic acid, EpDPE = epoxydocosapentaenoic acid, DiHDPA= dihydroxydocosapentaenoic acid, HDHE = hydroxydocosahexaenoic acid, EET = epoxyeicosatrienoic acid, DiHETE= dihydroxyeicosatetraenoic acid, DHET = dihydroxyeicosatrienoic acid, oxoODE = oxooctadecadienoic acid, HODE = hydroxy-octadecadienoic acid, HHTrE = hydroxyheptadecatrenoic acid, EpOME = epoxyoctadecenoic acid, DiHOME = dihydroxyoctadecenoic acid

**Supplemental Table 2.** Distribution (median [range]) of analytes detected in plasma (n=39).

Analyte (nM)	Heat (n=11)			Raw (n=11)		
	0 h	4 h	8 h	0 h	4 h	8 h
<i>Prostaglandins<sup>1</sup></i>						
PGF2- $\alpha$	<b>Not detected</b>					
8-12-iso-iPF2- $\alpha$ -VI	0.7 (0.3 - 1.2)	1.3 (0.8 - 1.7)	0.4 (0.3 - 0.6)	0.5 (0.3 - 0.9)	0.9 (0.7 - 1.5)	0.4 (0.2 - 0.5)
5-iPF2 $\alpha$ -VI	0 (0 - 0.2)	0.1 (0 - 0.3)	0.3 (0.1 - 0.4)	0.1 (0 - 0.1)	0.1 (0 - 0.3)	0.2 (0.1 - 0.4)
8-iso-PGA2	0.9 (0.5 - 1.5)	1.0 (0.5 - 1.9)	1.5 (0.8 - 3.2)	0.7 (0.4 - 1.1)	0.7 (0.2 - 1.3)	1.0 (0.5 - 1.6)
6-keto-PGF1- $\alpha$	6.5 (2.6 - 14.6)	2.1 (1.5 - 5.2)	0.9 (0.3 - 2.1)	5.1 (0 - 7.2)	1.6 (0.9 - 3.1)	0.7 (0.2 - 1.6)
8-iso-15-keto-PGE2	1.5 (1.1 - 2.3)	1.2 (0.7 - 2.7)	0.2 (0.1 - 2.1)	1.5 (1.1 - 3)	1.1 (0.5 - 2.0)	0.3 (0.01 - 6.7)
<i>Fatty acids<sup>2</sup></i>						
DHA	9.3 (3.1 - 73.7)	20.4 (7.6 - 34.6)	23.6 (10.7 - 34.5)	14.8 (0.7 - 42.0)	15.6 (6.9 - 46.4)	25.2 (12.2 - 46.7)
Dihomo-ALA	1.0 (0.3 - 6.0)	2.6 (1.3 - 4.8)	16.5 (12.5 - 30.0)	2.2 (0.1 - 8.0)	2.4 (0.9 - 7.5)	26.3 (11.1 - 32.3)
AA	9.1 (3.8 - 60.0)	17.5 (10.6 - 68.7)	10.3 (7.1 - 15.0)	13.0 (0.9 - 46.6)	15.7 (7.4 - 46.8)	14.5 (7.9 - 18.9)
EPA	1.4 (0.7 - 7.4)	6.7 (2.6 - 13.3)	10.0 (2.4 - 14.8)	1.9 (0.2 - 6.0)	3.3 (1.3 - 11.9)	9.1 (3.1 - 15.6)
LA	29 (4 - 137)	72 (45 - 99)	1738 (897 - 2680)	54 (3 - 146)	44 (27 - 141)	1446 (831 - 3348)
ALA	9.1 (1.9 - 68.8)	38.0 (20.0 - 63.2)	104.0 (51.0 - 154.0)	15.9 (0.6 - 92.0)	20.4 (9.3 - 105.0)	103.0 (58.0 - 185.0)
DPA	9.4 (4.7 - 37.1)	22.9 (13.5 - 40.0)	2.4 (1.2 - 3.8)	11.2 (0.9 - 35.1)	15.7 (11.1 - 42.0)	2.5 (1.3 - 4.4)

*Oxylipids*<sup>3</sup>

TXB2	1.3 (0.6 - 4.1)	2.4 (1.2 - 6.2)	2.3 (1.2 - 10.1)	0.8 (0.2 - 2.8)	0.7 (0.4 - 7.8)	1.2 (0.6 - 4.8)
Resolvin D2	0 (0 - 1.6)	0 (0 - 0.2)	0.01 (0.01 - 0.2)	0.1 (0 - 3.0)	0.1(0 - 0.2)	0.1 (0.01 - 1.9)
LTB4	0 (0 - 0.2)	0.2 (0 - 0.8)	0.01 (0.01 - 0.3)	0 (0 - 0.1)	0.2 (0 - 1.4)	0.01 (0.01 - 0.4)
20-HETE	15.4 (6.7 - 40.8)	22.0 (7.2 - 31.4)	11.1 (2.7 - 17.6)	12.9 (2.1 - 29.9)	20.7 (8.7 - 86.3)	16.6 (7.3 - 39.0)
19, 20-EpDPE	7.0 (1.6 - 32.9)	26.5 (11.4 - 48.8)	12.5 (8.5 - 18.0)	5.5 (2.8 - 119.8)	11.2 (5.7 - 32.6)	12.5 (9.0 - 29.0)
19, 20-DiHDPA	29.3 (22.1 - 45.5)	35.4 (19.2 - 60.4)	19.0 (9.4 - 42.1)	27.8 (12.3 - 39.9)	31.6 (15.5 - 58.2)	20.1 (11.5 - 38.6)
17-HDoHE	3.8 (1.6 - 9.5)	4.1 (3.0 - 8.2)	0.6 (0.1 - 2.8)	3.3 (2.0 - 14.7)	3.5 (0.9 - 8.3)	0.8 (0 - 22.8)
15-HETE	7.0 (5.1 - 9.6)	5.3 (2.4 - 34.9)	1.4 (1.3 - 2.6)	7.4 (0.9 - 11.1)	4.1 (1.7 - 8.2)	1.5 (0.2 - 5.7)
14,15-EET	0.2 (0.1 - 0.6)	0.5 (0.2 - 2.1)	0.3 (0.1 - 1.0)	0.3 (0.1 - 1.6)	0.4 (0.1 - 0.6)	0.3 (0.1 - 0.4)
14,15-DiHETE	26.3 (13.8 - 45.8)	31.8 (13.6 - 61.0)	15.8 (3.7 - 20.8)	23.0 (3.7 - 39.7)	20.5 (13.6 - 56.4)	13.1 (6.2 - 45.5)
14,15-DHET	9.0 (5.8 - 22.5)	17.3 (7.1 - 28.5)	8.4 (2.6 - 11.8)	11.3 (4.1 - 13.3)	12.8 (7.0 - 44.5)	7.7 (4.1 - 13.8)
13-oxoODE	25.5 (5.7 - 76.9)	10.9 (6.9 - 21.7)	6.0 (3.2 - 17.1)	29.7 (3.4 - 95.8)	8.6 (6.1 - 21.7)	10.7 (5.4 - 28.8)
13-HODE	40 (30 - 69)	44 (20 - 92)	22 (15 - 36)	35 (11 - 61)	28.5 (18 - 49)	18 (9 - 55)
12-HHTrE	1.0 (0 - 3.0)	1.3 (0 - 2.5)	1.5 (0.5 - 9.5)	0.5 (0 - 4.5)	0.5 (0 - 3.0)	1.0 (0.05 - 3.0)
12,13-EpOME	0 (0 - 2)	2 (0 - 4)	2 (0.2 - 6)	2 (0 - 2)	2 (0 - 2)	2 (0.2 - 6)
12,13-DiHOME	0 (0 - 4)	0 (0 - 2)	0.1 (0.1 - 1.0)	0 (0 - 5)	0 (0 - 1)	0.1 (0.1 - 10)
11-HETE	7.8 (5.4 - 11.8)	5.7 (2.4 - 34.0)	2.0 (1.6 - 3.1)	9.4 (0.4 - 11.8)	3.7 (2.6 - 7.0)	2.0 (0.3 - 3.8)
11,12-DHET	3.2 (2.0 - 7.6)	7.0 (4.1 - 10.0)	4.6 (1.6 - 5.4)	3.8 (1.8 - 7.9)	8.5 (4.3 - 12.3)	5.3 (2.2 - 9.4)
11,12-EET	1.5 (0.1 - 15.8)	2.3 (0.5 - 3.2)	0.1 (0.01 - 0.4)	2.0 (0 - 9.1)	1.2 (0.6 - 5.0)	0.1 (0.01 - 1.0)

9-oxoODE	4.3 (2.9 - 7.8)	4.5 (2.6 - 6.0)	1.7 (1.0 - 2.6)	3.3 (0.9 - 9.2)	3.9 (1.6 - 6.0)	1.8 (0.9 - 9.1)
9-HODE	22 (16 - 56)	23 (13 - 36)	13 (9 - 18)	21 (13 - 50)	16 (9 - 33)	13 (9 - 29)
9,10-EpOME	0 (0 - 2)	2 (2 - 6)	4 (2 - 10)	2 (0 - 2)	2 (0 - 4)	4 (2 - 10)
9,10-DiHOME	2 (1 - 5)	6 (5 - 8)	3 (2 - 4)	2 (1 - 3)	4 (3 - 14)	3 (2 - 7)
8,9-DHET	1.5 (0.9 - 4.1)	3.3 (1.1 - 11.1)	1.9 (0.5 - 2.4)	1.2 (0.8 - 3.5)	2.7 (1.3 - 4.6)	1.3 (0.8 - 2.8)
17,18-DiHETE	543 (312 - 693)	591 (228 - 853)	278 (80 - 474)	453 (248 - 641)	459 (203 - 638)	229 (112 - 371)
5-HETE	2.1 (0.7 - 12.2)	2.9 (1.1 - 5.9)	0.9 (0.01 - 1.3)	3.5 (0.5 - 11.4)	1.9 (0.8 - 5.5)	0.9 (0.01 - 1.4)
8,9-EET	0.1 (0 - 0.5)	0.5 (0.1 - 2.7)	0.2 (0.1 - 0.9)	0.3 (0 - 0.7)	0.3 (0 - 0.7)	0.2 (0 - 0.4)

<sup>1</sup>Prostaglandins: PGF2- $\alpha$  = prostaglandin F 2alpha, 8,12-isoIPF $\alpha$ -VI = 8,12-iso-iPF2alpha-VI isoprostane, 5-iPF2 $\alpha$ -VI = 5-iso-iPF2alpha-VI isoprostane, 8-iso-PGA2 = 8-iso prostaglandin A2, 6-keto-PGF1 $\alpha$  = 6-keto-prostaglandin F1alpha, 8-iso-15-keto-PGE2 = 8-iso-15-keto prostaglandin E2

<sup>2</sup>Fatty acids: DHA = docosahexaenoic acid, Dihomo-ALA = dihomo- $\gamma$ -linolenic acid, AA = arachidonic acid, EPA= eicosapentaenoic acid, LA = linoleic acid, ALA = alpha-linolenic acid, DPA = docosapentaenoic acid

<sup>3</sup>Oxylipids: TXB2 = thromboxane B2, LTB4 = leukotriene B4, HETE= hydroxyeicosatetraenoic acid, EpDPE = epoxydocosapentaenoic acid, DiHDPa= dihydroxydocosapentaenoic acid, HDoHE = hydroxydocosahexaenoic acid, EET = epoxyeicosatrienoic acid, DiHETE= dihydroxyeicosatetraenoic acid, DHET = dihydroxyeicosatrienoic acid, oxoODE = oxooctadecadienoic acid, HODE = hydroxy-octadecadienoic acid, HHTrE = hydroxyheptadecatrenoic acid, EpOME = epoxyoctadecenoic acid, DiHOME = dihydroxyoctadecenoic acid