Table S1: Resonance assignment in the ^{1}H NMR spectra of polar testicular extracts (s: singlet, d: doublet, dd: doublet of doublets, t: triplet, m: multiplet).

	Compound	δ ^{1}H ppm (multiplicity, assignment)
1	acetate[a]	1.92 (s, αCH_3)
2	adenine	8.18 (s, C8H ring), 8.22 (s, C2H ring)
3	adenosine	3.83 (m, ribose), 3.91 (m, ribose), 4.28 (m, ribose), 4.44 (m, ribose), 4.79 (m, ribose), 6.10 (d, C1'H ribose), 8.23 (s, C8H ring), 8.35 (s, C2H ring)
4	alanine	1.48 (d, βCH_3), 3.78 (t, αCH)
5	aspartate	2.66 (dd, βCH), 2.81 (dd, $'$CH), 3.86 (m, αCH)
6	betaine	3.26 (s, CH_3), 3.90 (s, αCH_2)
7	choline	3.20 (s, CH_3), 3.51 (m, NCH_2), 4.06 (m, OCH_2)
8	citrate	2.49 (d, α,γCH), 2.69 (d, α',γ'CH)
9	creatine	3.03 (s, CH_3), 3.93 (s, CH_2)
10	dimethylglycine	2.91 (s, αCH), 3.72 (s, CH_3)
11	ethanolamine	3.14 (m, NCH_2), 3.82 (m, CH_2)
12	formate	8.46 (s, CH)
13	glutamate	2.07 (m, βCH), 2.14 (m, β'CH), 2.35 (m, γCH_2), 3.76 (m, αCH)
14	glutamine	2.13 (m, βCH_2), 2.45 (m, γCH_2), 3.75 (m, αCH)
15	glutathione	2.16 (q, βCH_2 Gl), 2.56 (m, γCH_2 Glu), 2.95 (m, βCH_2 Cys), 3.79 (m, αCH Gly), 4.59 (m, CH_2 Cys)
16	glycerol	3.56 (dd, $C1H_2$), 3.65 (dd, $C3H_2$), 3.79 (m, C2H)
17	glycerophosphocholine	3.23 (s, CH_3), 3.68 (m, NCH_2), 3.88 (m, αCH_2), 4.33 (m, OCH_2)
18	glycine	3.55 (s, CH_2)
19	3-hydroxybutyrate	1.20 (d, γCH_3), 2.42 (dd, αCH), 4.15 (m, βCH)
20	hypoxanthine	8.19 (s, C2H), 8.21 (s, C8H)
21	IMP/AMP	3.75 (ribose), 4.03 (ribose), 4.36 (ribose), 4.5 (ribose), 6.14 (d, C1'H ribose), 8.26 (s, C8H ring), 8.59 (s, C2H ring)
22	isoleucine	0.94 (t, δCH_3), 1.01 (d, $\beta' CH_3$), 1.26 (m, γCH), 1.49 (m, γ'CH), 1.98 (m, βCH), 3.67 (m, αCH)
23	lactate	1.33 (d, βCH_3), 4.11 (q, αCH)
24	leucine	0.96 (t, δCH_3), 1.73 (m, $\beta\gamma CH_2$), 3.73 (m, αCH)
25	lysine	1.72 (m, δCH_2), 1.92 (m, βCH_2), 3.01 (m, εCH_2), 3.76 (m, αCH)
26	*myo*-inositol	3.26 (t, C5H), 3.52 (dd, C1H, C3H), 3.62 (m, C4H, C6H), 4.06 (t, C2H)
27	phosphocholine	3.22 (s, CH_3), 3.59 (m, NCH_2), 4.17 (m, OCH_2)
28	phosphoethanolamine	3.21 (M, NCH_2), 3.97 (m, OCH_2)
29	scyllo-inositole	3.35 (s, CH)
30	succinate	2.40 (s, CH_2)
31	taurine	3.26 (t, NCH_2), 3.43 (t, SCH_2)
32	tyrosine	6.87 (d, C3H, C5H ring), 7.18 (d, C2H, C6H ring)
33	uridine	4.33 (m, C2'H ribose), 5.89 (d, C1'H ribose), 5.91 (d, C5H ring), 7.87 (d, C6H ring)
34	valine	0.99 (d, γCH_3), 1.04 (d, $\gamma' CH_3$), 2.26 (m, βCH), 3.62 (m, αCH)

[a] all metabolites are putatively annotated (level 2 of identification according to Chemical Analysis Working Group (CAWG) Metabolomics Standards Initiative recommendations)