

Supplementary Table S5. Proteomics welfare studies in Fish and Seaclams

Condition	Sample	Technique	Main identified proteins/Cellular processes	Ref
FISH				
High stoking densities	Liver	2DE LC-MS/MS	Heat shock cognate protein 70 Fatty acid binding protein	89
Handling	Liver	2DE LC-MS/MS MALDI-TOF-TOF	40S ribosomal protein S12 Cathepsin B Disulfide-isomerase A3 precursor Phenylalanine hydroxylase 40S ribosomal protein SA Aldehyde dehydrogenase 4A1 family Fatty acid-binding protein Transferrin 3-oxo-5- β -steroid 4-dehydrogenase Hypoxanthine Phosphoribosyltransferase	89, 91
Pre-slaughter stress	Muscle	2DE MALDI-TOF-TOF	Triosephosphate isomerase Enolase Pyruvate dehydrogenase Desmin Cap-Z Myosin heavy chain fragmen Energy Homeostasis Cellular Stress Detoxification Proteasome/Ubiquitin	92, 93
Hypoxia	Hepatopancreas	2DE LC-ESI-MS/MS	Energy production, Metabolism-related proteins, Immune-related proteins, Antioxidant proteins, Chaperones, Cytoskeleton proteins	94
Anoxia	Cell line	2DE MALDI-TOF-TOF	Peroxiredoxin 6 Caspase 3	96

			Keratins	
	Brain	2DE LC-MS/MS	Creatine kinase Fructose biphosphate aldolase Glyceraldehyde-3-phosphate Triosephosphate isomerase Lactate dehydrogenase Pre-proependymin Gefiltin Dihydropyrimidinase-like protein-3	97
	Embryos	2D-DIGE Nano-LC-FTMS/MS	Cofilin 2 Oxidative phosphorylation, Antioxidant defense, Transcription Translation	98
Hyperoxygenation	Gill	2DE MALDI-TOF-TOF	Beta-tubulin Beta-actin Light myosin chain Alpha-tropomyosin Calmodulin Raf kinase inhibitor protein Beta-globin FABPs DCXR GNMT C3	99
Osmotic Changes	Rectal gland and Gill	2DE MALDI-TOF-TOF	Amino acid metabolism Inositol metabolism Energy Transcription, Translation, Degradation	100

	Gill	2DE MALDI-TOF-TOF	Vinculin Echinoderm microtubule-associated protein like protein 1 Pyruvate kinase Betaine-homocysteine methyltransferase Transaldolase Glyceraldehyde 3-phosphate dehydrogenase Heat shock protein 70 Cofilin	102
	Embryos	Nano-LC-coupled- MS	Ion transport RNA spicing Ubiquitin	103
Temperature Changes	Liver	2DE MALDI-TOF-TOF LC-MS/MS	Betaine-homocysteine-methyl transferase Glutathione-S-transferase Catalase Peroxiredoxin Thioredoxin Lysozyme Aldehyde dehydrogenase Adenosin-methionine synthetase Proteasome activator protein Trypsinogen-like protein Elongation factor-1alpha Tubulin Raf-kinase inhibitor protein	104
	Muscle	2DE MALDI-TOF-TOF LC-MS/MS	Creatine kinase Parvalbumins Troponins Wap65 Protection Oxidative stress	105, 106

			Proteasome/Ubiquitin	
Viral diseases	Spleen	2DE MALDI-TOF-TOF	Cytoskeletal protein, Stress response, Lipoprotein metabolism, Ubiquitin/proteasome Carbohydrate metabolism, Signal transduction, Proteolysis, ion binding, transport, Metabolic process, Catabolic process, Biosynthesis, Oxidation reduction	148
	Cell line	2DE MALDI-TOF-TOF	Calreticulin-like protein Hsp90 Tropomyosin 3 Translationally controlled Tumor protein α -tubulin Proteasome 26S subunit Ribosomal protein SA Transaldolase 1 Wu:fi33g05	151
Bacterial diseases	Kidney	2DE MALDI-TOF-TOF NanoHPLC- nanoESI-Q-TOF- MS/MS	Mitochondrial alanine aminotransferase, Mitochondrial aldehyde dehydrogenase, Mitochondrial dihydrodipicolinate synthase, Mitochondrial methylmalonate Semialdehyde dehydrogenase, Mitochondrial ATP synthase beta subunit, Mitochondrial Acyl-CoA-dehydrogenase, S-adenosyl-homocysteine hydrolase, Peroxiredoxins	154
	Hemocytes	2DE LC-ESI-MS/MS	Hemocyanin, Prophenoloxidase, Serine proteinase-like protein, Heat shock protein 90, Alpha-2-macroglobulin, 14-3-3 protein epsilon, Calmodulin, Hemocyanin	158
Skeletal deformities	Vertebral column	2DE MALDI-TOF-TOF LC-ESI-MS/MS	Tropomyosin-1 Tropomyosin-4 Parvalbumins	161
Parasite	Liver	2D-DIGE	ApoA-I	123

exposure		MALDI-TOF-TOF LC-MS/MS	Beta-globin, ATP synthase subunit beta	
SEACLAMS				
Immune innate response	Haemolymph	SHOTGUN PROTEOMICS LC-ESI-MS/MS (Orbitrap) Identified < 1000 proteins	Zinc carboxypeptidase a 1-like Ribonuclease oy Plasma alpha-l-fucosidase Lysozyme Serpin B9 Alpha-2-macroglobulin-like protein 1 Cathepsin c c1q domain containing protein 1q6 Containing protein 1q6 Complement component 1 q subcomponent-binding mitochondrial c-type lectin domain family 4 member g Galectin 2 c-type mannose receptor 2 Complement component 1 q subcomponent-binding mitochondrial Vitelline coat lysin m7 among others.	91
Hypoxia	Gill tissue	2DE LC-ESI- MS/MS Identified 66 proteins	Three isoforms of GST (GST-1, GST-2 and GST-3) Peroxiredoxin, 6-phosphogluconate dehydrogenase Phosphoenolpyruvate carboxykinase Cytosolic malate dehydrogenase; Propionyl-CoA carboxylase Succinate dehydrogenase/fumarate reductase	109

Hypoxia	Gill tissue	2DE LC-ESI- MS/MS Identified 41 proteins	Heat shock cognate 71 Heat shock protein 70 Translation elongation factor 1 α α tubulin Gelsolin Fructose-bisphosphate aldolase Tropomyosin	110
Hydrothermal vents (geothermally heated ocean water)	Gill tissue	2DE-DIGE LC-ESI-MS/MS Identified 31 proteins	Actin Ubiquinone S-adenosylhomocysteine hydrolase Cysteine peptidases Chaperonin Catalase	111
Acute exposure to heat (+40 °C)	Gill tissue	2DE-DIGE LC-ESI-MS/MS Identified 27 proteins	Chaperones Cytoskeletal proteins Oxidative stress proteins Regulatory proteins, and a translation initiation factor	112
Hyposalinity	Gill tissue	2DE-DIGE LC-ESI-MS/MS	Chaperoning, Vesicle transport Cytoskeletal adjustments by actin-regulatory proteins Energy metabolism and oxidative stress	113
Hydrothermal vents (geothermally heated ocean water)	Gills and digestive glands	2DE (thiol proteins) MALDI-TOF/TOF MS	S-adenosylhomocysteine hydrolase Alpha enolase Glutamine synthetase type I Actin Fumarylacetoacetate hydrolase	114
Xenobiotics	Digestive glands	2DE-DIGE Organelle proteomics, peroxisomal	Hydroxyacid oxidase 1 Glutathione S-transferase Eldehyde dehydrogenase 4A1 Carbonic anhydrase	87

		proteome MALDI-TOF/TOF MS	ATP synthase Peroxin 10 Cyt P450 "A6 Enoyl-CoA hydrolase Beta-tubulin Alcohol dehydrogenase Catalase	
Antropogenic pollution	Digestive glands	2DE, organelle proteomics, peroxisomal proteome LC-ESI-MS/MS	Epoxide hydrolase Peroxisomal antioxidant enzymes Sarcosine oxidase, acyl-CoA oxidase Peroxisomal multifunctional protein Cu,Zn-superoxide dismutase	129
Effects of oil spills in aquaculture	Digestive glands	2DE, organelle proteomics, peroxisomal proteome MALDI-TOF MS/MS	Beta-oxidation proteins PMP70	130
Human pharmaceutical in sea water	Digestive glands	2DE MALDI-TOF MS/MS	Aconitase Alcohol dehydrogenase Peptidyl-propyl cis-trans isomerase B	140
Algae-derived shellfish toxins	Digestive gland	1DE + 15 slices LC-ESI-M/MS MALDI-TOF MS/MS	Cathepsin D Superoxide dismutase Glutathione S-transferase Pi Bacterial flagellar protein	125
Cyanobacterial toxins in fresh water	Digestive glands	2DE-DIGE LC-ESI-MS/MS (Orbitrap)	Cytoskeleton Proteins of the oxidative pathway, detoxification, and energetic metabolism	143

Cyanobacterial toxins in fresh or marine water	Digestive glands or gills	2DE MALDI-TOF/TOF	ATPase beta subunit Triosephosphate isomerase Calcium-binding and metal transport (EP protein) Mitochondrial 60 kDa heat shock protein	145
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