Division of Analysis and Consulting

Division leader: Franklin Georgsson

Specific Skill Area	Key Person
• **Microbiological analysis of food, water and environmental samples** ○ Shelf life analysis of food ○ Food Safety ○ Microbiology tests of medicine ○ Microbiology tests of cosmetics ○ Food poisoning outbreaks ○ Efficacy testing of pharmaceuticals and cosmetics ○ Risk analysis and assessment ○ Food laws and regulation ○ Development of analytical methods ○ Training and Consulting ○ Cleaning and Hygiene	**Franklín Georgsson** Director, Division of Analysis and Consulting
• **Chemical Analyses of food and feed:** ○ Composition analysis of food/feed/oils/additives ○ Quality assurance of food/feed ○ Rapid analytical methods (NIR/IR) in food/feed ○ Enzymatic bioanalysis of food/beverages ○ Amine and fatty acids in seafood and oil	**Heiða Pálmadóttir** Chemical Analysis Group Leader
• **Consulting** ○ HACCP ○ Quality Control ○ Quality Management ○ Cleaning and Hygiene ○ Canning ○ Semi-preserves ○ Dissemination	**Margeir Gissurarson** Project Leader
Experimental Technique	**Key Person**
• Kjeldahl/DUMAS • Kjeltec (Soxtech)	**Heiða Pálmadóttir**
Equipment or Infrastructure	
• High Performance Liquid Chromatography (HPLC) • Gas Chromatography (GC)	Division of Analysis and Consulting

Division of Biotechnology and Biomolecules

Division leader: Dr. Hordur G. Kristinsson

Specific Skill Area	Key Person
• **Bioactive compound and biomolecule extraction, isolation and analysis** ○ Fish proteins ○ Fish proteins, isolates and hydrolysates ○ Enzyme hydrolysis ○ Peptide bioactivity ○ Cell culture ○ Seaweed ○ Antioxidants ○ Lipid oxidation ○ Flavour chemistry ○ Bioactivity ○ Sensory and consumer studies	**Hordur G. Kristinsson, PhD.** Director, Division of Biotechnology and Biomolecules **Rósa Jónsdóttir, MSc.** Biomolecules Research Group Leader
• **Biotechnology and bioinformatics** ○ Extremophilic enzymes from bacteria and phages: Carbohydrate processing and DNA enzymes ○ Recombinant proteins ○ Enzyme characterization ○ Strain engineering ○ Fermentation ○ Production of commercial enzymes ○ Metagenomics ○ Pan Genomics ○ Bioinformatics software design	**Guðmundur Óli Hreggviðsson, PhD.** Biotechnology Group Leader **Ólafur H. Friðjónsson, PhD.** Project Leader
• **Extremophilic microorganisms** ○ Sampling from geothermal areas ○ Diverse cultivation techniques ○ Isolation of phages ○ Enrichments ○ Species composition analysis ○ Environmental assessments ○ Strain collection of extremophiles	
Experimental Technique	**Key Person**
• Proteomics • Chemical and cell based anti-oxidant, anti-hypertensive and anti-diabetic assays • *In-vitro* simulated digestion • Oxidation measurements and antioxidants • Sugar quantification and analysis • Degree of hydrolysis by pH stat and OPA methods • Surimi production and quality analysis	**Hordur G. Kristinsson, PhD.** **Rósa Jónsdóttir, MSc.**

• Sampling and/or *in situ* enrichments • Cultivation of aerobes, anaerobes, microaerophiles, H_2 oxidizing bacteria, photosynthetic organisms etc. • Enrichments for specific traits • DNA extraction techniques for environmental samples • Culture independent species composition analysis • Microbial ecology analysis - MOTHUR • Overexpression and characterization of extremophilic enzymes • Functional assays, end-product analysis • Gene knock-outs and insertions • New/alternative pathway designs • Fermentation techniques, including *E. coli* and *Pichia* • Laboratory and intermediate scale protein isolation • FLX sequencing – Metagenomics – Pan genomics • Paired end sequencing • Sequence capture • Data processing and annotations • Software design for database processing and comparative analysis	**Guðmundur Óli Hreggviðsson, PhD.** **Ólafur H. Friðjónsson, PhD.**
Equipment or Infrastructure	
• Chromatographic methods such as Solid Phase Micro Extraction – Gas Chromatography – Mass Spectrometry (SPME-GC-MS), Gas Chromatography – Flame Ionisation Detector/Olfactometry(GC-FID/O), High Performance Liquid Chromatograpy (HPLC), Fast Protein Liquid Chromatography (FPLC), GC-FID (for fatty acid analysis) • Capillary electrophoresis (CE-DAD) • Ettan IPGphor 3 Isoelectric Focusing Unit • X-Cell SureLock™ Mini-Cell Electrophoresis System • Herasafe KS Biological Safety Cabinet • POLARstar OPTIMA, microplate reader • Cell lines: HepG2, HepG2-C3A, HT1080, Detroit 551, TF-1 • TAX-T2 Texture analyser • Strain collections • Genome libraries • Anaerobic chamber • Photosynthetic cultivation lab • Gas platform, H_2, N_2, CO_2 etc. • Tangential Flow Filters (TFF) (GE healthcare) • Flow sorting cytometer (BD, FACS Aria II) • DNA and protein electrophoresis equipment • Southern blotting • ABI 3730 DNA analyser	Division of Biotechnology and Biomolecules

• Roche 454 GS FLX+ next-generation sequencer • Bioinformatic computing facilities and software • Substrate assays • Thin layer chromatography • Gene Pulser Xcell electroporation system • BioFlo 3000 benchtop fermentor **Biotechnology and biomolecule pilot facilities for scale-up, including but not limited to:** • Thermally regulated reaction/extraction tanks (up to 2000 liter capacity) • Reactors • Industrial decanter • Separators • Filtration units • GEA micro- and ultrafiltration fractionation unit • Vacuum concentrator • Spray & freeze driers	

Division of Food Safety, Environment and Genetics

Division leader: Dr. Anna K. Daníelsdóttir

Specific Skill Area	Key Person
• **Multilateral fisheries research, management and policy development**	**Anna Kristín Daníelsdóttir, PhD.** Director, Division of Food Safety, Environment and Genetics
• **Food and environmental chemical research, including trace element analysis, processing and food safety** ○ Trace element analysis ○ Chemical analysis of residues and contaminants ○ Chemical risks and food safety ○ Food process contaminants ○ Speciation analysis of trace elements	**Helga Gunnlaugsdóttir, PhD.** Leader of the Chemistry and Risk Assessment Research Groups
• **Environmental Chemistry** ○ Environmental chemistry and pollution ○ Environmental monitoring ○ Analysis of organic environmental pollutants ○ Pesticide analysis	**Hrönn Jörundsdóttir, PhD.** Project Leader
• **Microbiological genetic research into food and the environment** ○ Metagenomics ○ Metatranscriptomics ○ Phylogenetic analyses ○ Extremophilic enzymes from bacteria and phages: ○ Enzyme characterization ○ Strain engineering ○ Fermentation (small scale) ○ Isolation of phages ○ Enrichment techniques ○ Microbial species composition analysis ○ Environmental assessments ○ Strain collection and cultivation of extremophiles ○ Shelf life analysis of fish ○ Food poisoning outbreaks ○ Noro and Hepatitis A viruses ○ Genetically modified organism detection (GMO) ○ Probiotics in aquaculture	**Viggó Marteinsson, PhD.** Microbiology Research Group Leader **Eyjólfur Reynisson, PhD.** Project Leader

• **Genetic research, including population, individual and marker-based analyses. Particularly with regard to fisheries, aquaculture and breeding** ○ Parental assignment ○ Genetic identification of animal and plant species ○ Authenticity and traceability of animal, fish and food products ○ Breeding programs for aquaculture and agriculture ○ Population/stock structure in marine and freshwater species ○ Development of species specific marker panels (microsatellite and SNPs) ○ Identification of genes of interest ○ Marine metagenomics ○ Population and phylogenetic analyses ○ Bioinformatics • **Risk assessment** ○ Benefit-risk assessment of foods ○ Total diet study methods to estimate exposure ○ Contaminants and nutrients in Icelandic food products	**Sarah Helyar, PhD.** Genetics Research Group Leader **Helga Gunnlaugsdóttir, PhD.** Leader of the Chemistry and Risk Assessment Research Groups
Experimental Technique	**Key Person**
• Speciation analysis of trace elements	**Helga Gunnlaugsdóttir, PhD.**
• Liquid & gas chromatography • Mass spectrometry • Screening techniques	**Hrönn Jörundsdóttir, PhD.**
• Microsatellite genotyping • SNP library development and genotyping • Conventional and quantitative PCR • Sanger sequencing • Next generation sequencing	**Sarah Helyar, PhD.**
• Sampling strategy of aerobes and anaerobes • *In situ* enrichments and cultivation • Enrichments for specific traits and monitoring • DNA extraction techniques for environmental samples and harsh conditions • Culture independent species composition analysis • Microbial ecology analysis (ARb, Quiieme) • PCR, cloning and sequencing • Fermentation techniques • High hydrostatic pressure cultivation • Cell sorting and isolation	**Viggó Marteinsson, PhD.** **Eyjólfur Reynisson, PhD.**

• Risk ranking • Risk assessment • Quantitative assessment that integrate the risks and benefits of dietary change to estimate net health impact • Total diet study methodology	**Helga Gunnlaugsdóttir, PhD.**
Equipment or Infrastructure	
• ICP-MS • GC-MS • GC-ECD/FID • LC-DAD/Fluorescence • Real Time PCR (Stratagene Mx3005P & Mx3000P) • 384 well PCR blocks • ABI 3730 DNA analyser • Roche 454 GS FLX+ next-generation sequencer • Laboratory automation robot • Bioinformatics computing workstations and facilities • Probiotic aquaculture facilities • Extremophile genome library • Anaerobic chamber • Photosynthetic cultivation lab • Gas platform, H_2, N_2, CO_2 etc. • Cross flow filters for large volumes • Cell sorting flow cytometer (BD, FACS Aria II) • DNA and protein electrophoresis equipment • Southern blotting • Substrate assays • Thin layer chromatography • Gene Pulser Xcell electroporation system • BioFlo 3000 benchtop fermentor • GEA micro- and ultrafiltration fractionation unit • ISCAR (Icelandic strain collections and Records) • Spray & freeze driers • QALIBRA software (www.qalibra.eu) • Database regarding contaminants in seafood • Food composition data (ISGEM database for nutrients and heavy metals)	Division of Food Safety, Environment and Genetics

Division of Innovation and Consumers

Division leader: Haraldur Hallgrímsson

Specific Skill Area	Key Person
• **Current and new markets for food and food products** ○ Marketing ○ Business development ○ Market analysis and strategy ○ Finance and operation ○ Packaging design	**Haraldur Hallgrímsson** Director, Division of Innovation and Consumers
• **New food product development, marketing and export** ○ The retail market ○ Market and product intelligence ○ Product and recipe development ○ Packaging ○ Labelling of foodstuffs ○ Costs and cost prices ○ Salting and marinating of pelagic fish species ○ Roe and caviar products	**Gudmundur Stefánsson, PhD.** Markets and Exports Research Group Leader
• **Consumers and food products** ○ Sensory evaluation ○ Consumer research	**Aðalheiður Ólafsdóttir**, Sensory panel leader
• **Entrepreneurs and product development** ○ Value chain of fish and food products ○ Product development ○ Small scale food production	**Vigfús Ásbjörnsson**, Product Development and Entrepreneurs Research Group Leader
Experimental Technique	**Key Person**
• Sensory evaluation techniques • Focus groups • Consumer research	**Aðalheiður Ólafsdóttir**
Equipment or Infrastructure	
• Sensory laboratory and panellists • Food laboratories: Reykjavík, Höfn & Fluðir	Division of Innovation and Consumers

Division of Value Chain, Processing and Aquaculture

Division leader: Arnljótur Bjarki Bergsson

Specific Skill Area	Key Person
• **Value chain services to SME´s, co-operatives and associations. Industry-level factors, legislation and research into:** ○ Fisheries, management and sustainability ○ Fishing gear and on-board handling ○ Stakeholder interaction ○ Data banks ○ Simulation modelling ○ Life Cycle Assessment ○ Traceability	**Jónas Viðarsson** Value Chain Research Group Leader
• **Developments in seafood processing and handling** ○ Salting ○ Texture ○ Enzymatic treatment ○ Thawing ○ NIR spectroscopy ○ Nuclear magnetic resonance (NMR) ○ Freezing ○ Reducing ○ Transport ○ Filleting ○ Chilling ○ Water holding capacity (WHC) ○ Colour ○ Oxidation ○ Image Analysis ○ Drying ○ Packaging	**Magnea Karlsdóttir** Processing Research group Leader **Arnljótur Bjarki Bergsson** Director, Division of Value Chain, Processing and Aquaculture
• **Aquaculture and utilization of natural resources** ○ Improved larval quality and growth (probiotics, immune stimulation) ○ Marine microalgae and zooplankton production ○ Immunology ○ Gene expression (Real Time quantitative PCR) ○ Microbial community analysis (DNA studies, cultivation & characterization) ○ Image analysis ○ Bioprospecting, bioactivity analysis ○ Enzyme activity analysis ○ Enzyme hydrolysis	**Rannveig Björnsdóttir, PhD.** Aquaculture Research Group Leader

○ Chemical analysis ○ Elemental analysis ○ Alternative raw materials in feed and feed formulation ○ Effects of diets on fish growth and performance	**Jón Árnason, PhD.** Project Manager
Equipment or Infrastructure	
• SimaPro • ANSYS Fluent • HOBOware • CAMO Unscrambler • Machine vision • Texture • Water activity • Low field NMR (bench top and portable) • NIR spectrophotometer (MPA) • Differential scanning calorimetry (DSC) • Experimental freshwater facilities • Experimental feed extruder • ELISA plate readers, Immunoblotting equipment, Bioscreen • Cryosectioning and analysis (Leica CM 1800, microscopes and camera) • Real Time PCR equipment • Ion selective electrodes • Experimental microalgae cultivation and harvesting technology • Metagenomics analysis (programs, software) • XRD and XRF (X-ray fluorescence and X-ray crystallography)	Division of Value Chain, Processing and Aquaculture (University of Akureyri)