

IMPORTANT – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.

Part A. PERSONAL INFORMATION		CV date	21/06/2023
First name	Óscar		
Family name	Monroig Marzá		
Gender	Male	Birth date	27/04/1974
ID number	73387643W (National ID)		
e-mail	oscar.monroig@csic.es	URL Web	www.iats.csic.es
Open Researcher and Contributor ID (ORCID)	0000-0001-8712-0440		

A.1. Current position

Position	Senior Tenured Scientist (<i>Investigador Científico de OPIs</i>)		
Initial date	22/05/2023		
Institution	Consejo Superior de Investigaciones Científicas		
Department/Center	Instituto de Acuicultura Torre de la Sal		
Country	Spain	Teleph. number	+34 964 319 500
Key words	Aquaculture, lipid biochemistry, essential nutrients, molecular biology		

A.2. Previous positions

Period	Position / Institution / Country
2018-2023	<i>Científico Titular de OPIs</i> , IATS-CSIC, Spain
2013-2018	Lecturer, Institute of Aquaculture, University of Stirling (IoA-UoS), UK
2011-2013	Postdoctoral Fellowship “Juan de la Cierva”, IATS-CSIC, Spain
2009-2011	Marie Curie Intra-European Fellowship, IoA-UoS, UK
2007-2009	Postdoctoral Fellowship of the Ministry for Education and Science, IATS-CSIC, Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
PhD in Biological Sciences	Universitat de València, Spain	2006
BSc Honours in Marine Sciences	Universidad de Cádiz, Spain	1998

Part B. CV SUMMARY (*max. 5000 characters, including spaces*)

Dr Óscar Monroig completed his doctorate studies in 2006. His PhD thesis was awarded with the Extraordinary Doctorate Award 2008 from the Universidad de Valencia. As postdoctoral researcher (2007-2013), he was granted fellowships from both Spanish (MEC Postdoctoral Fellowships and Juan de la Cierva) and European (Marie Curie Intra-European Fellowships and Marie Curie Reintegration Grants) programs. Dr. Monroig gained his first permanent academic position as a Lecturer at the Institute of Aquaculture, University of Stirling, UK. Dr Monroig is currently a Senior Tenured Scientist at the Instituto de Acuicultura Torre de la Sal, CSIC.

Dr Monroig's research aims to elucidate of molecular mechanisms involved in the biosynthesis of **omega-3 long- chain polyunsaturated fatty acids** in aquatic organisms and their implications in nutrition of farmed species. He has authored **128 SCI-indexed research papers** (108 since 2013), and **5 book chapters**, accumulating a total of **4793 citations** with an annual average of 656 citations in the last 5 years. Dr. Monroig has an **h-index of 37**. Particularly relevant results have been included in papers published in Science, Science Advances, PNAS, and Philosophical Transactions of the Royal Society B, among others. Furthermore, he is corresponding author of 3 review papers including three in Progress in Lipid Research, all of them highly relevant to this research proposal. Additionally, Dr. Monroig has co-authored over 90 conference contributions, including **nine invited talks**.

Dr. Monroig has participated in a total of 25 research grants from competitive programmes and covering different areas within aquaculture nutrition and aquatic lipid biochemistry. As



Principal Investigator (PI), he currently leads two grants funded by the *Agencia Estatal de Investigación* (AEI) (SIDESTREAM and SPACE). Previously, also as PI, he obtained funding from AEI (IMPROMEGA), the Research Council of Norway (BIOCYCLES), Innovate UK grant (METAMORPHOSIS), a Marie Curie Reintegration Grant (LONGFA), a Scottish Aquaculture Research Forum (UK) project. Since October 2021, Dr. Monroig has been appointed as Academic Fellow by the Universiti Sains Malaysia.

Dr Monroig has delivered teaching in aquaculture nutrition and feeding in a range of BSc and MSc courses both in Spain and UK. He has supervised 6 PhD theses. Currently he is supervising six PhD students from Spanish and Portuguese institutions. Additionally, Dr Monroig has supervised 9 MSc theses.

Among his most relevant editorials roles, Dr Monroig has served as Associate Editor of Fish Physiology and Biochemistry (Springer) and Frontiers in Aquatic Physiology (Frontiers). Moreover, he sits on the boards of the Scientific Committee and Organizing Committee of the international conference “Lipids in the Ocean”.

Part C. RELEVANT MERITS

C.1. Selected SCI-indexed publications in the last 10 years

1. Boyen J., Ribes-Navarro A., Kabeya N., **Monroig Ó.**, Rigaux A., Fink P., Hablützel P., Navarro J.C., De Troch M., 2023. Functional characterization reveals a diverse array of metazoan fatty acid biosynthesis genes. *Molecular Ecology* (in press) DOI: 10.1111/mec.16808
2. Ramos-Llorens M., Ribes-Navarro A., Navarro J.C., Hontoria F., Kabeya N., **Monroig Ó.**, 2023. Can *Artemia franciscana* produce essential fatty acids? Unveiling the capacity of brine shrimp to biosynthesise long-chain polyunsaturated fatty acids. *Aquaculture* 563, 738869.
3. Ribes-Navarro A., Alberts-Hubatsch H., **Monroig Ó.**, Hontoria F., Navarro J.C., 2022. Effects of diet and temperature on the fatty acid composition of the gammarid *Gammarus locusta* fed alternative terrestrial feeds. *Frontiers in Marine Science* 9:931991.
4. Ting, S.Y., Lau, N-S., Sam, K.K., Janaranjani, M., Wong, S.C., **Monroig Ó.**, Quah, E.S.H., Ahmad, A.B., Nik Ahmad Irwan Izzaudin Nik Him, Jaya Ram, A., Shu-Chien, A.C., 2022. Long-chain polyunsaturated fatty acid biosynthesis in a land-crab with advanced terrestrial adaptations (*Gecarcoidea lalandii*): Molecular cloning and functional characterisation of two fatty acyl elongases. *Comp. Biochem. Physiol.* 262B, 110773.
5. Nande M., **Monroig Ó.**, Machado A.M., Castro L.F.C., Lopes-Marques M., Capitão A., Navarro J.C., 2022. The effects of dietary lipids on the fatty acid composition and lipid biosynthesis gene expression of body compartments of *Octopus vulgaris* paralarvae. *Aquaculture* 556, 738293.
6. Luo J., **Monroig Ó.**, Zhou Q., Tocher D.R., Yuan Y., Zhu T., Lu J., Song D., Jiao L., Jin M., 2021. Environmental salinity and dietary lipid nutrition strategy: effects on flesh quality of the marine euryhaline crab *Scylla paramamosain*. *Food Chemistry* 361, 130160.
7. Ribes-Navarro A., Navarro J.C., Hontoria F., Kabeya N., Standal I.B., Evjemo J.O., **Monroig Ó.**, 2021, Biosynthesis of long-chain polyunsaturated fatty acids in marine gammarids: Molecular cloning and functional characterisation of three fatty acyl elongases. *Marine Drugs* 19, 226.
8. Kabeya N., Ogino M., Ushio H., Haga Y., Satoh S., Navarro J.C., **Monroig Ó.**, 2021. A complete enzymatic capacity for biosynthesis of docosahexaenoic acid (DHA, 22:6n-3) exists in the marine Harpacticoida copepod *Tigriopus californicus*. *Open Biology* 11, 200402.
9. Luo J., **Monroig Ó.**, Liao K., Ribes-Navarro A., Navarro J.C., Zhu T., Li J., Xue L., Zhou Q., Jin M., 2021. Biosynthesis of LC-PUFA and VLC-PUFA in *Pampus argenteus*: Characterization of Elovl4 elongases and regulation under acute salinity. *J. Agric. Food Chem.* 69, 932-944.
10. Kabeya N., Gür I., Evjemo J.O, Malzahn A., Hontoria F., Navarro J.C., **Monroig Ó.**, 2020. Unique fatty acid desaturase capacities uncovered in *Hediste diversicolor* illustrate the roles of aquatic invertebrates in trophic upgrading. *Phil. Trans. R. Soc.* 375B, 20190654.



11. Betancor M., Oboh A., Ortega A., Mourente G., Navarro J.C., de la Gándara F., Tocher D.R., **Monroig Ó.**, 2020. Molecular and functional characterization of a putative *elovl4* gene and its expression in response to dietary fatty acid profile in Atlantic bluefin tuna (*Thunnus thynnus*). *Comp. Biochem. Physiol.* 240B, 110372.
12. Cavrois Rogacki T., Rolland A., Migaud H., Davie A., **Monroig Ó.**, 2020. Enriching *Artemia* nauplii with selenium from different sources and interactions with essential fatty acid incorporation. *Aquaculture* 520, 734677.
13. Sánchez Granel M.L., Cánepa C., Cid N.G., Navarro J.C., **Monroig Ó.**, Verstraeten S.V., Nudel C.B., Nusblat A.D., 2019. Gene identification and functional characterization of a $\Delta 12$ fatty acid desaturase in *Tetrahymena thermophila* and its influence in homeoviscous adaptation to low temperature. *Biochim. Biophys. Acta* 1864, 1644-1655.
14. Garrido D., Kabeya N., Betancor M.B., Pérez J.A., Acosta N.G., Tocher D.R., Rodríguez C., **Monroig Ó.**, 2019. Functional diversification of teleost Fads2 fatty acyl desaturases occurs independently of the trophic level. *Sci. Rep.* 9, 11199.
15. Ishikawa A., Kabeya N., Ikeya K., Kakioka R., Cech J.N., Osada N., Leal M.C., Inoue J., Kume M., Toyoda A., Tezuka A., Nagano A.J., Yamasaki Y.Y., Suzuki Y., Kokita T., Takahashi H., Lucek K., Marques D., Takehana Y., Naruse K., Mori S., **Monroig Ó.**, et al, 2019. A key metabolic gene for recurrent freshwater colonization and radiation in fishes. *Science* 364, 886–889.
16. Garrido D., Kabeya N., Hontoria F., Navarro J.C., Reis D.B., Martín M.V., Rodríguez C., Almansa E., **Monroig Ó.**, 2019. Methyl-end desaturases with $\Delta 12$ and $\omega 3$ regioselectivities enable the de novo PUFA biosynthesis in the cephalopod *Octopus vulgaris*. *Biochim. Biophys Acta* 1864, 1134-1144.
17. Kabeya N., Fonseca M.M., Ferrier D.E.K., Navarro J.C., Bay L.K., Francis D.S., Tocher D.R., Castro L.F.C., **Monroig Ó.**, 2018. Genes for de novo biosynthesis of omega-3 polyunsaturated fatty acids are widespread in animals. *Science Advances* 4, eaar6849.
18. Kabeya N., Yevzelman S., Tocher D.R., **Monroig O.** 2018. Essential fatty acid metabolism and requirements of the cleaner fish, ballan wrasse *Labrus bergylta*: Defining pathways of long-chain polyunsaturated fatty acid biosynthesis. *Aquaculture* 488, 199-206.
19. Houston S.J.S., Karalazos V., Tinsley J., Betancor M.B., Martin S.A.M., Tocher D.R., **Monroig O.**, 2017. The compositional and metabolic responses of gilthead seabream (*Sparus aurata*) to a gradient of dietary fish oil and associated n-3 long-chain polyunsaturated fatty acid content. *Brit. J. Nutr.* 118, 1010–1022.
20. Oboh A., Kabeya N., Carmona-Antoñanzas G., Castro L.F.C., Dick J.R., Tocher D.R., **Monroig O.**, 2017. Two alternative pathways for docosahexaenoic acid (DHA, 22:6n-3) biosynthesis are widespread among teleost fish. *Scientific Reports* 7, 3889.
21. **Monroig O.**, de Llanos R., Varó I., Hontoria F., Tocher D.R., Puig S., Navarro J.C., 2017. Biosynthesis of polyunsaturated fatty acids in *Octopus vulgaris*: Molecular cloning and functional characterisation of a stearyl-CoA desaturase and an elongation of very long-chain fatty acid 4 protein. *Marine Drugs* 15, 82.
22. Kabeya N., Sanz-Jorquera A., Carboni S., Davie A., Oboh A., **Monroig O.**, 2017. Biosynthesis of polyunsaturated fatty acids in sea urchins: molecular and functional characterisation of three fatty acyl desaturases from *Paracentrotus lividus* (Lamarck 1816), *PLoS ONE* 12, e0169374.
23. **Monroig Ó.**, Lopes-Marques M., Navarro J.C., Hontoria F., Ruivo R., Santos M.M., Venkatesh B., Tocher D.R., Castro L.F.C., 2016. Evolutionary wiring of the polyunsaturated fatty acid biosynthetic pathway. *Scientific Reports* 6, 20510.
24. **Monroig Ó.**, Hontoria F., Varó I., Tocher D.R., Navarro J.C. 2016. Investigating the essential fatty acids in the common cuttlefish *Sepia officinalis* (Mollusca, Cephalopoda): Molecular cloning and functional characterisation of fatty acyl desaturase and elongase. *Aquaculture* 450, 38–47.
25. Fonseca-Madrigal J., Navarro J.C., Hontoria F., Tocher D.R., Martínez-Palacios C.A., **Monroig Ó.**, 2014. Diversification of substrate specificities in teleostei Fads2: Characterization of $\Delta 4$ and $\Delta 6\Delta 5$ desaturases of *Chirostoma estor*. *Journal of Lipid Research* 55, 1408-1419.



C.2. Congress

Dr. Monroig has co-authored a total of 105 conference communications including 69 posters and 36 oral presentations. Among the latter, Dr. Monroig has delivered **11 invited talks** in international symposia including **2 keynotes** in conferences held in Japan (The 85th Anniversary-Commemorative International Symposium of The Japanese Society for Fisheries Science, Tokyo, 2017) and Portugal (31st ESCPB Congress, Porto, 2018).

C.3. Selected research projects in the last 10 years (a total of 26 since 2012)

1. **TED2021-129647B-I00**. Sustainable production of omega-3 rich polychaetes for aquaculture applying circular economy principles (SPACE). **PIs: Ó. Monroig & J.C. Navarro**. 2022-2024. € 171350
2. **GVA-THINKINAZUL/2021/026**. Acuicultura, Nutrición y Ecotoxicología en relación con la Economía Circular, la Diversidad y el Cambio Climático. PI: J.C. Navarro. € 234656
3. **GRISOLIA/2021/120**. Biosíntesis de ácidos grasos poliinsaturados de cadena larga omega-3 en poliquetos nereidos: aspectos básicos y aplicados. Generalitat Valenciana, Programa Santiago Grisolía 2021. **PI: Ó. Monroig**. 2022-2026. € 93878
4. **PCI2020-111960**. Secondary bio-production of low trophic organisms utilizing side streams from the Blue and Green sectors to produce novel feed ingredients for European aquaculture (SIDESTREAM). Ministerio de Ciencia e Innovación, Programación Conjunta Internacional (EraNet BlueBio). **PI: Ó. Monroig**. 2020-2023. € 150000
5. **AICO/2019/019**. Análisis de las escamas de peces como método predictivo de su composición en ácidos grasos (ANEP). Generalitat Valenciana, Programa Grupos Consolidables 2019. PI: J.C. Navarro. 2019-2021. € 38000
6. **RTI2018-095119-B-I00**. Innovative strategies to improve omega-3 biosynthesis in aquatic invertebrates for Aquaculture (IMPROMEGA). Ministerio de Ciencia, Innovación y Universidades, Programa Estatal de Investigación, Desarrollo e Innovación Orientada a los Retos de la Sociedad. **PIs: Ó. Monroig & J.C. Navarro**. 2019-2022. € 253495
7. **INT-NO/0690**. Recycling of rest raw materials from bio-based industry by production of low trophic Crustaceans (Gammaridae) for new marine ingredients (BIOCYCLES). Research Council of Norway, BIONÆR. I. Standal (Coord., SINTEF OCEAN AS); **Ó. Monroig (PI at IATS-CSIC)**. 2019-2022. € 102086
8. **INNOVATEUK (103918)**, Metamorphosis: a bioprocessing platform for functional insect meals. UK Research and Innovation. Entomics (Coord), **Ó. Monroig (PI at Uni. Stirling)**, D. Charalampopoulos (PI at Reading Uni.). 2018-2020. £ 900000 (£ 150000 for UoS)
9. **AGL2015-70994-R**. Characterization and modulation of ω 3 LC-PUFA biosynthesis in fish: a sustainability issue for future diversification of aquaculture. Plan Nacional de I+D+i. PI: Covadonga Rodríguez (ULL). 2016-2019. € 109000
10. **AGL2014-52003-C2-1-R**. Nutritional improvements for juvenile production of Atlantic bluefin tuna (*Thunnus thynnus* L.): basic and molecular aspects. Plan Nacional de I+D+i. PI: Gabriel Mourente (Uni. Cádiz). 2014-2017. € 151250
11. **AGL2013-40986-R**, Ácidos grasos poliinsaturados de cadena muy larga en peces: biosíntesis e implicaciones durante fases tempranas de desarrollo en especies cultivadas. Plan Nacional de I+D+i (2013-2016). PIs: Juan C. Navarro & Francisco Hontoria (CSIC). 2014-2018. € 121000
12. **GV/2013/123**, Biosíntesis de ácidos grasos poliinsaturados en organismos acuáticos: uso de *Saccharomyces cerevisiae* para el estudio funcional de enzimas desaturadas y elongasas implicadas en su biosíntesis. Generalitat Valenciana. Proyectos de I+D para grupos de investigación emergentes. **PI: Ó. Monroig (CSIC)**. 2013-2014. € 6000

C.4. Contracts, technological or transfer merits

TECHNOLOGICAL SUPPORT CONTRACT with University of Sains Malaysia. *Establishment and exploration research project on sustainable aquaculture between CSIC and University of Sains Malaysia*. 2021-2023. **ÓM appointed as Academic Fellow**. MYR 168000 (€ 34810)

Patent application number 202231056: to "NON-INVASIVE PROCEDURE TO PREDICT THE PROFILE OF FATTY ACIDS IN FISH MUSCLE", on behalf of CSIC.