

Dr. Tvrtko Smital – CURRICULUM VITAE

First name: Tvrtko
Family name: Smital
Date of birth: October 14th 1968
Place of birth: Vinkovci, Croatia
Nationality: Croatian
Present position: Head of the Laboratory for Molecular Ecotoxicology, Division for Marine and Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia,
Marital status: Married, daughter Mila (20 yrs), sons Tomo (17 yrs) and Mika (13 yrs)



Education:

- University of Zagreb, Faculty of Science; B. Sc., 1994, Biology-Ecology
- University of Zagreb, Faculty of Science; M. Sc., 1998, Biology-Toxicology
- University of Zagreb, Faculty of Science; PhD, 1999, Biology-Ecotoxicology

Employment:

- 1995 – 1998, postgraduate student, Laboratory for Molecular Ecotoxicology, Department for Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia;
- 1998 – 2000, Research Assistant, Laboratory for Molecular Ecotoxicology, Department for Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia;
- 2000 – 2002, Higher Research Assistant, Laboratory for Molecular Ecotoxicology, Department for Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia;
- 2003/2004 – Hopkins Marine Station of Stanford University, CA, USA – postdoctoral research, *Fulbright Scholar Program*;
- 2004 – present, Head of the Laboratory for Molecular Ecotoxicology, Department for Marine and Environmental Research, Ruđer Bošković Institute, Zagreb, Croatia.

Graduation thesis:

The determination of inhibitors of the multixenobiotic resistance (MXR) mechanism, *Faculty of Science, University of Zagreb, Zagreb, Croatia, 1994.*

Master thesis:

In vivo determination of the concentration of inhibitors of the multixenobiotic resistance (MXR) in river waters, *Faculty of Science, University of Zagreb, Zagreb, Croatia, 1998.*

PhD thesis:

Activity of the multixenobiotic resistance mechanism in aquatic organisms as the indicator of environmental quality, *Faculty of Science, University of Zagreb, Zagreb, Croatia, 1998.*

Research interests, experience and competences:

Environmental toxicology: research on the interaction of environmental contaminants with basic cellular detoxification mechanisms in aquatic organisms: phase I and II detox enzymes and phase 0/III polyspecific uptake (SLC) and efflux (ABC) transporters; identification of ecotoxic substances in complex environmental samples (sediment, wastewater, surface water, soil, sludge...) using the Effects-Directed Analyses (EDA) approach.

Methods: *in vitro* cell culture techniques; enzymatic analysis, cytotoxicity, genotoxicity, chronic toxicity, phase I and II induction/inhibition, *in vitro* and *in vivo* transport activity determinations for uptake and efflux transmembrane proteins, molecular biology techniques, zebrafish functional genomics based on CRISPR/Cas9 gene editing.

Publication record:

- >50 research articles, 3 book chapters, 1 patent
- >1400 citations (Scopus/Web of Science/)
- *h* index 23 (Mar 2019)

Science Citation Index Publications

1. **Smital T., Pivčević B. and Kurelec B.** (1996) Reversal of multidrug resistance by extract from the marine alga *Caulerpa taxifolia*. *Period. Biol.* **98**: 165-171.
2. **Smital T. and Kurelec B.** (1997) Inhibitors of the multixenobiotic resistance mechanism in natural waters: *In vivo* demonstration of their effects. *Environ. Toxicol. Chem.* **16**: 2164-2170.
3. **Kurelec B., Smital T., Britvić S., Pivčević B., Krča S., Jelaska D., Balen S., Sauerborn R. and Mustajbegović S.** (1997) Multixenobiotic defence mechanism in aquatic organisms. *Period. Biol.* **99**: 319-328.
4. **Smital T. and Kurelec B.** (1998) The chemosensitizers of multixenobiotic resistance mechanism in aquatic invertebrates; A new class of pollutants. *Mutat. Res.-Fund. Mol. M.* **399**: 45-53.
5. **Kurelec B., Britvić S. and Smital T.** (1998) Fragility of multixenobiotic resistance in aquatic organisms enhances the complexity of risk assessment. *Mar. Environ. Res.* **46**: 415-419.
6. **Smital T. and Kurelec B.** (1998) The activity of multixenobiotic resistance mechanism determined by rhodamine B - efflux method as a biomarker of exposure. *Mar. Environ. Res.* **46**: 443-447.
7. **Osmak M., Brozović A., Ambriović-Ristov A., Hadžija M., Pivčević B., and Smital T.** (1998) Inhibition of apoptosis is the cause of resistance to doxorubicin in human breast adenocarcinoma cells. *Neoplasma* **45**: 223-230.
8. **Kurelec B., Smital T., Pivčević B., Eufemia, N. and Epel, D.** (2000) Multixenobiotic resistance, P-glycoprotein, and chemosensitizers. *Ecotoxicology* **9**: 307-327.
9. **Smital T., Sauerborn R., Pivčević B., Krča S. and Kurelec B.** (2000) Interspecies differences in P-glycoprotein mediated activity of multixenobiotic resistance mechanism in several marine and freshwater invertebrates, *Comp. Biochem. Physiol C.*, **126**: 175-186.
10. **Ramljak, S., Hackenberger, B.K., Smital, T. and Britvić, S.** (2000) Evaluation of the genotoxic and cytochrome P450 monooxygenase-inhibitory potential of dicuran on prokaryotic and eucaryotic test systems, *J. Environ. Sci. Health B.* **B35**: 751-770.
11. **Smital, T. and Sauerborn, R.** (2002) Measurement of the activity of multixenobiotic resistance mechanism in the common carp *Cyprinus carpio*. *Mar. Environ. Res.* **54**: 449-453.

12. **Smital, T., Sauerborn, R. and Hackenberger, B.K.** (2003) Inducibility of the P-glycoprotein transport activity in the marine mussel *Mytilus galloprovincialis* and the freshwater mussel *Dreissena polymorpha*. *Aquat. Toxicol.* **65**: 443-465.
13. **Sauerborn, R., Stupin Polancec, D., Zaja, R. and Smital, T.** (2004) Identification of the multidrug resistance-associated protein (MRP) related gene in the red mullet (*Mullus barbatus*). *Mar. Environ. Res.*, **58**: 199-204.
14. **Smital, T., Luckenbach, T., Sauerborn, R., Hamdoun, A.M., Vega, R.L. and Epel, D.** (2004) Emerging contaminants – pesticides, PPCPs, microbial degradation products and natural substances as inhibitors of multixenobiotic defense in aquatic organisms. *Mut. Res.-Fund. Mol. M.*, **552**: 101-117.
15. **Žaja, R., Klobučar, G.I.V., Sauerborn Klobučar, R., Hackenberger, B., and Smital, T.** (2006) Haemolymph as compartment for efficient and non-destructive determination of Pgp mediated MXR activity in bivalves. *Comp. Biochem. Physiol. C.*, **143**: 103-112.
16. **Žaja, R., Sauerborn Klobučar R. and Smital, T.** (2007) Detection and functional characterization of Pgp1 (ABCB1) and MRP3 (ABCC3) efflux transporters in the PLHC-1 fish hepatoma cell line. *Aquat. Toxicol.*, **81**: 365-376.
17. **Krča, S., Žaja, R., Čalić, V., Terzić, S., Grubešić, M.S., Ahel, M. and Smital, T.** (2007) Hepatic biomarker responses to organic contaminants in feral chub (*Leuciscus cephalus*) – laboratory characterization and field study in the Sava River, Croatia. *Environ. Toxicol. Chem.*, **26**: 2620-2633.
18. **Žaja, R., Caminada, D., Lončar, J., Fent, K. and Smital, T.** (2008) Development and characterization of P-glycoprotein 1 (Pgp1; ABCB1) mediated doxorubicin-resistant PLHC-1 hepatoma fish cell line. *Toxicol. Appl. Pharmacol.*, **227**: 207-218.
19. **Žaja, R., Munić, V., and Smital, T.** (2008) Cloning and mRNA expression analysis of an ABCG2 (BCRP) efflux transporter in rainbow trout (*Oncorhynchus mykiss*) liver and primary hepatocytes. *Mar. Environ. Res.*, **66**: 77-79.
20. **Källqvist, T., Milačić, R., Smital, T., Thomas, K.V., Vranes, S. and Tollefsen, K-E.** (2008) Chronic toxicity of the Sava River (SE Europe) sediments and river water to the algae *Pseudokirchneriella subcapitata*. *Water Res.*, **42**: 2146-2156.
21. **Epel, D., Stevenson, C.N., MacManus-Spencer, L.A., Luckenbach, T., Hamdoun, A., and Smital, T.** (2008) Efflux transporters: newly appreciated roles in protection against pollutants. *Environ. Sci. Tech.*, **42**: 3914-3920.
22. **Traven, L., Žaja, R., Lončar, J., Smital, T. and Mićović, V.** (2008) CYP1A induction potential and the concentration of priority pollutants in marine sediment samples – *In vitro* evaluation using the PLHC-1 fish hepatoma cell line. *Toxicol. In Vitro*, **22**: 1648-1656.
23. **Caminada, D., Žaja, R., Smital, T. and Fent, K.** (2008) Human pharmaceuticals modulate P-gp1 (ABCB1) transport activity in the fish cell line PLHC-1. *Aquat. Toxicol.*, **90**: 214–222.
24. **Žaja, R., Munić, V., Sauerborn Klobučar, R., Ambriović-Ristov, A., Smital, T.** (2008) Cloning and functional characterization of apical efflux transporters (ABCB1, ABCB11 and ABCC2) in rainbow trout (*Oncorhynchus mykiss*) hepatocytes. *Aquat. Toxicol.* **90**: 322-332.
25. **Bošnjak, I., Heim, W., Smital, T., Epel, D., Coale, K., Franekić-Čolić, J., Hamdoun, A.** (2009) Multidrug resistance associated protein transport activity mediates differences in accumulation and toxicity of inorganic and organic mercury in sea urchin embryos. *Environ. Sci. Tech.* **43**: 8374-8380.
26. **Lončar, J., Popović, M., Žaja, R., Smital, T.** (2010) Gene expression analysis of the ABC efflux transporters in rainbow trout (*Oncorhynchus mykiss*). *Comp. Biochem. Physiol. C.* **151**: 209-215.
27. **Popović, M., Žaja, R., Lončar, J., Smital, T.** (2010) A novel ABC transporter: the first insight into zebrafish (*Danio rerio*) Abch1. *Mar. Environ. Res.* **69**: S11-S13.
28. **Popović, M., Žaja, R., Smital, T.** (2010) Organic anion transporting polypeptides (OATP) in zebrafish (*Danio rerio*): phylogenetic analysis and tissue distribution. *Comp. Biochem. Physiol. A* **155**: 327-335.
29. **Sauerborn Klobučar, R., Zaja, R., Franjević, D., Brozović, A., Smital, T.** (2010) Presence of Ecotoxicologically Relevant Pgp- and MRP- Transcripts and Proteins in Cyprinid Fish. *Arh. Hig. Rada Toksikol.* **61**: 175-181.
30. **Bošnjak, I., Šegvić, T., Smital, T., Franekić, J., Mladineo, I.** (2011) Sea Urchin Embryotoxicity Test for Environmental Contaminants—Potential Role of the MRP Proteins. *Water Air Soil Poll.* **217**: 627-636.

31. Fischer, S., Loncar, J., Zaja, R., Schnelle, S., Schirmer, K., Smital, T., Luckenbach, T. (2011) Constitutive mRNA expression and protein activity levels of nine ABC efflux transporters in seven permanent cell lines derived from different tissues of rainbow trout (*Oncorhynchus mykiss*). *Aquat. Toxicol.* **101**: 438-446.
32. Smital, T., Terzic, S., Zaja, R., Senta, I., Pivcevic, B., Popovic, M., Mikac, I., Tollefsen, K.E., Thomas, K.V., Ahel, M. (2011) Assessment of toxicological profiles of the municipal wastewater effluents using chemical analyses and bioassays. *Ecotoxicol. Environ. Saf.* **74**: 844-851.
33. Zaja, R., Loncar, J., Popovic, M., Smital, T. (2011) First characterization of fish P-glycoprotein (abcb1) substrate specificity using determinations of its ATPase activity and calcein-AM assay with PLHC-1/dox cell line. *Aquat. Toxicol.* **103**: 53-62.
34. Reifferscheid, G., Maes, H., Allner, B., Badurova, J., Belkin, S., Blum, K., Brauer, F., Bressling, J., Domeneghetti, S., Elad, T., Flückiger-Isler, S., Grummt, H.J., Guertler, R., Hecht, A., Heringa, M., Hollert, H., Huber, S., Kramer, M., Magdeburg, A., Ratte, T., Sauerborn-Klobucar, R., Sokolowski, A., Soldan, P., Smital, T., Stalter, D., Venier, P., Ziemann, C., Zipperle, J., Buchinger, S. (2012) International round-robin study on the Ames fluctuation test. *Environ. Mol. Mutag.* **53**: 185-197.
35. Della Torre, C., Zaja, R., Loncar, J., Smital, T., Focardi, S., Corsi, I. (2012) Interaction of ABC transport proteins with toxic metals at the level of gene and transport activity in the PLHC-1 fish cell line. *Chem. Biol. Interac.* **198**: 9-17.
36. Smital, T., Terzić, S., Lončar, J., Senta, I., Zaja, R., Popović, M., Mikac, I., Tollefsen, K-E., Thomas, K.V., Ahel, M. (2013) Prioritisation of organic contaminants in a river basin using chemical analyses and bioassays. *Environ. Sci. Poll. Res.* **20**: 1384-1395.
37. Zaja, R., Terzić, S., Senta, I., Lončar, J., Popović, M., Ahel, M., Smital, T. (2013) Identification of P-glycoprotein (P-gp, Abcb1) inhibitors in contaminated freshwater sediments. *Environ. Sci. Tech.* **47**: 4813-4821.
38. Traven, L., Mićović, V., Vukić Lušić, D., Smital, T. (2013) The responses of the hepatosomatic index (HSI), 7-ethoxyresorufin-O-deethylase (EROD) activity and glutathione-S-transferase (GST) activity in sea bass (*Dicentrarchus labrax*, Linnaeus 1758) caged at a polluted site: implications for their use in environmental risk assessment. *Environ Monit Assess.* **185**: 9009-9018.
39. Bošnjak, I., Zaja, R., Klobučar, R.S., Sver, L., Franekić, J., Smital, T. (2013) Identification of ABC Transporter Genes in Gonad Tissue of Two Mediterranean Sea Urchin Species: Black, *Arbacia lixula* L., and Rocky, *Paracentrotus lividus* L. *Bull. Environ. Contam. Toxicol.* **91**: 415-419.
40. Popovic, M., Zaja, R., Fent, K., Smital, T. (2013) Molecular characterization of zebrafish Oatp1d1 (Slco1d1), a novel Organic anion transporting polypeptide. *J. Biol. Chem.* **288**: 33894-33911.
41. Ferreira, M., Santos, P., Rey-Salgueiro, L., Zaja, R., Reis-Henriques, M.A., Smital, T. (2014) The first demonstration of CYP1A and the ABC protein(s) gene expression and activity in European seabass (*Dicentrarchus labrax*) primary hepatocytes. *Chemosphere* **100**: 152-159.
42. Popovic, M., Zaja, R., Fent, K., Smital, T. (2014) Interaction of environmental contaminants with zebrafish uptake transporter Oatp1d1 (Slco1d1). *Toxicol. Appl. Pharmacol.* **280**: 149-158.
43. Glisic, B., Mihaljevic, I., Popovic, M., Zaja, R., Loncar, J., Fent, K., Kovacevic, R., Smital, T. (2015) Characterization of glutathione-S-transferases in zebrafish (*Danio rerio*). *Aquat. Toxicol.* **158**: 50-62.
44. Lončar, J., Popović, M., Krznar, P., Zaja, R., Smital, T. (2016) The first characterization of multidrug and toxin extrusion (MATE/SLC47) proteins in zebrafish (*Danio rerio*). *Sci. Rep.* **6**: 28937, DOI: 10.1038/srep28937.
45. Mihaljević, I., Popović, M., Zaja, R., Smital, T. (2016) Phylogenetic, syntenic, and tissue expression analysis of slc22 genes in zebrafish (*Danio rerio*). *BMC Genomics*, **17**: 626, DOI 10.1186/s12864-016-2981-y.
46. Zaja, R., Popović, M., Lončar, J., Smital, T. (2016) Functional characterization of rainbow trout (*Oncorhynchus mykiss*) Abcg2a (Bcrp) transporter. *Comp. Biochem. Physiol. C*, **190**: 15-23.
47. Mihaljević, I., Popović, M., Žaja, R., Maraković, N., Šinko, G., Smital, T. (2017) Interaction between the zebrafish (*Danio rerio*) organic cation transporter 1 (Oct1) and endo- and xenobiotics. *Aquat. Toxicol.* **187**: 18-28.
48. Marić, P., Ahel, M., Senta, I., Terzić, S., Mikac, I., Žuljević, A., Smital, T. (2017) Effect-directed analysis reveals inhibition of zebrafish uptake transporter Oatp1d1 by caulerpenyne, a major secondary metabolite from the invasive marine alga *Caulerpa taxifolia*. *Chemosphere* **174**: 643-654.

49. **Dragojević, J., Mihaljević, I., Popović, M., Zaja, R., Smital, T.** (2017) *In vitro* characterization of zebrafish (*Danio rerio*) organic anion transporters Oat2a-e. *Toxicol In Vitro* **46**: 246-256.
50. **Terzić, S., Udikovic-Kolić, N., Jurina, T., Krizman-Matašića, I., Senta, I., Mihaljević, I., Lončar, J., Smital, T., Ahel, M.** (2018) Biotransformation of macrolide antibiotics using enriched activated sludge culture: Kinetics, transformation routes and ecotoxicological evaluation. *J. Haz. Mat.* **349**: 143-152.
51. **Lončar, J., Smital, T.** (2018) Interaction of environmental contaminants with zebrafish (*Danio rerio*) multidrug and toxin extrusion protein 7 (Mate7/Slc47a7). *Aquat. Toxicol.* **205**: 193-203.
52. **Dean Karaica, Davorka Breljak, Jovica Lončar, Mila Lovrić, Vedran Micek, Ivana Vrhovac Mađunić, Hrvoje Brzica, Carol M. Herak-Kramberger, Jana Ivković Dupor, Marija Ljubojević, Tvrтко Smital, Željka Vogrinc, Gerhard Burckhardt, Birgitta C. Burckhardt, Ivan Sabolić** (2018) Sex-independent expression of chloride/formate exchanger Cfex (Slc26a6) in rat pancreas, small intestine, and liver, and male-dominant expression in kidneys. *Arh. Hig. Rada Toksikol.* **69**: 286-303.
53. **Kostanjevecki, P., Petric, I., Loncar, J., Smital, T., Ahel, M., Terzic, S.** (2019) Biodegradation study of methadone by adapted activated sludge: elimination kinetics, transformation products and ecotoxicological evaluation. *Chemosphere* **214**: 719-728.
54. **Bašica, B., Mihaljević, I., Maraković, N., Kovačević, R., Smital, T.** (2019) Molecular characterization of zebrafish Gstr1, the only member of teleost-specific glutathione S- transferase class. *Aquat. Toxicol.* **208**: 196-207.
55. **Kostanjevecki, P., Petric, I., Loncar, J., Smital, T., Ahel, M., Terzic, S.** (2019) Aerobic biodegradation of tramadol by pre-adapted activated sludge culture: Cometabolic transformations and bacterial community changes during enrichment. *Sci. Total. Environ.* **687**: 858-866.
56. **Dragojević, J., Mihaljević, I., Popović, M., Smital, T.** (2019) Zebrafish (*Danio rerio*) Oat1 and Oat3 transporters and their interaction with physiological compounds. *Comp. Biochem. Physiol. B* **236**: 110309

Book Chapters

1. **Epel, D. and Smital, T.** (2001) Chapter 14: Multidrug-Multixenobiotic Transporters and Their Significance with Respect to Environmental Levels of Pharmaceuticals and Personal Care Products. In: ACS Symposium Series 791 – *Pharmaceuticals and Personal Care Products in the Environment: Scientific and Regulatory Issues*, Daughton, C.G. & Jones-Lepp, T. (Eds.), ACS/Oxford University Press, USA, p. 244-263.
2. **Smital T.** (2008) Acute and Chronic Effects of Emerging Contaminants. In: THE HANDBOOK OF ENVIRONMENTAL CHEMISTRY - Emerging Contaminants from Industrial and Municipal Wastewaters. Barcelo, D. & Petrovic, M. (Eds.), Springer-Verlag, Heidelberg, Germany, p.105-142.
3. **Smital, T. and Ahel, M.** (2015) Ecotoxicological characterization of the Sava River: biomarker responses and biological assays. In: THE HANDBOOK OF ENVIRONMENTAL CHEMISTRY 31 – The Sava River. Milacic, R. (Ed), Springer-Verlag, Heidelberg, Germany.

Patent

- **Kurelec B., Pivčević B. and Smital T.** (1996) Extract from marine tropic alga introduced into Mediterranean, *Caulerpa taxifolia*, reverts multidrug resistance (MDR) in tumour cell culture. *Croat. Pat. App.*, No 559-03-86-01.

Invited Lectures

1. **Smital, T.**, Use of efflux transporters as biomarkers - Marine Pollution Class, Hopkins Marine Station of Stanford University, CA, USA, 09.02.2004;
2. **Smital, T.**, Ecotoxicological relevance of MultiXenobiotic Resistance (MXR) defense system in aquatic organisms, Bodega Bay Marine Laboratory – University of California Davis, Davis, CA, 03.04.2004;
3. **Smital, T.** Ecotoxicological relevance of the MultiXenobiotic Resistance (MXR) inhibitors – MXR inhibitors as a new class of hazardous chemicals among pharmaceuticals, personal care products, pesticides and other conventional

pollutants, *Swiss National Research Programme 50 Seminars*, University of Zürich and University of Lausanne, Switzerland, 27.-30.04.2005;

4. **Smital, T.** Inhibitors of the ABC Transport Proteins as Emerging Pollutants - Determination and Ecotoxicological Relevance. EUROTOX 2006/6CTDC Congress (43rd Congress of the European Societies of Toxicology and 6th Congress of Toxicology in Developing Countries), Cavtat/Dubrovnik, Croatia, 20-24.09.2006;
5. **Smital, T.** Ecotoxicological Relevance of the ABC Transport Proteins in Aquatic Organisms - from multidrug (MDR) to multixenobiotic (MXR) resistance and back. CIIMAR, University of Porto, Porto, Portugal, June 26-27, 2007.
6. **Smital T.** ABC Transport Proteins in Aquatic Organisms – Identification, Characterization and Ecotoxicological Relevance. 2nd FEBS Special Meeting on ABC Proteins, ABC2008, Innsbruck, Austria, March 1-8, 2008.
7. **Smital T.** Effect-directed analyses (EDA) approach for identification of hazardous chemical contamination in the Sava River basin. 2nd REP LECOTOX Workshop: „TRENDS IN ECOLOGICAL RISK ASSESSMENT“, Novi Sad, Serbia, Sep 23, 2009.
8. **Smital, T., Zaja, R., Popović, M., Lončar, J.** Uptake and efflux transporters versus the ADME-Tox concept in aquatic toxicology. Primo 16 - Pollutant Responses in Marine Organisms Conference, Long Beach, CA, SAD, May 14-18, 2011.
9. **Smital T.** Uptake and efflux transport proteins as integral elements of the cellular detoxification and environmental stress response in aquatic organisms. 28th ESCPB Congress (European Society for Comparative Physiology and Biochemistry), Bilbao, Spain, Sep 2-5, 2012.
10. **Smital T.** Polyspecific uptake and efflux membrane transport proteins as integral elements of the cellular detoxification and environmental stress response in zebrafish. EZRC (European Zebrafish Resource Center), KIT (Karlsruhe Institute of Technology). Dec 2, 2014.
11. **Smital, T., Bakran-Petricioli, T., Hamer, B., Petricioli, D., Mlinarić, D.** Current practices in environmental impact assessment of drilling and gas exploitation activities in the Croatian part of the Adriatic Sea. 8th International Oil and Gas Conference and Exhibition, Šibenik, Croatia, October 2015.
12. **Smital, T.** Molecular Ecotoxicology - an exciting journey from basic understanding of cellular defense to new biological indicators of environmental quality. Festival of education and science, Oct 29, 2015, Sinj, Croatia.
13. **Smital, T.** (2018) Research on uptake and efflux transporters in ecotoxicology – a strong link between Switzerland and Croatia. „15th International Symposium on Persistent Toxic Substances“ (ISPTS2018), Basel, Switzerland, Nov 8-10, 2018.

Research projects

Past:

- *The environmental implications of the multixenobiotic resistance mechanism expressed in marine invertebrates*, (1995-1996) - UNEP, FAO, Mediterranean Action Plan, Athens. – member of the project team;
- *Multixenobiotic Resistance in the Environmental Risk Assessment*, (1996-2001) – Project supported by the Croatian Ministry of Science and Tehnology, project No P00981510 – member of the project team;
- *An integrated environmental monitoring system for Croatian freshwater, estuarine and coastal marine areas*, (2002-2004) – Project supported by the Research Council of Norway. Collaborative institutions were Norwegian Institute for Water Research (NIVA, Oslo, Norway), Ruđer Bošković Institute (Zagreb, Croatia), Faculty of Science (Zagreb, Croatia) and Department of Biology, University of Osijek (Osijek, Croatia) – leader of the project workgroup;
- *Multixenobiotic Resistance Mechanism as a Biomarker of Environmental Quality*, (2002-2006) – Project supported by the Croatian Ministry of Science and Technology, project No P0098135 – principal investigator;
- *EMCO - Reduction of environmental and health risks, posed by Emerging Contaminants, through advanced treatment of municipal and industrial wastes*. EC FP6 Project (2004-2007) – leader of the project workgroup;
- *SARIB – Sava River Basin: Sustainable use, management and protection of resources*. EC FP6 Project (2004-2007) - leader of the project workgroup;

- *Profiling of transcript levels and functional properties of (eco)toxicologically relevant ABC transport proteins in rainbow trout (Oncorhynchus mykiss) tissues and corresponding cell lines*, (2008-2009) – Croatia (Ministry of Science Education and Sports) – Germany (DAAD) bilateral project – co-principal investigator;
- *Assessment of hazardous chemical contamination in the Sava River basin*, (2007-2010) – NATO Science for Piece Project – co-director of the project;
- *Establishing and developing of an ecotoxicology platform in Serbia and Croatia: a focus on zebrafish (Danio rerio)* – Swiss National Science Foundation (SNSF), SCOPES 2009-2012: Joint Research Project – co-principal investigator;
- *Systematic Research of the Adriatic Sea as a Base for Sustainable Development of the Republic of Croatia* - Project “Adriatic”, (1998-2010) – Project supported by the Government of the Republic of Croatia - leader of the project workgroup;
- *Ecotoxicological significance of ABC transport proteins in aquatic organisms*, (2008-2013) – Project supported by the Ministry of Science Education and Sports – principal investigator.
- *EDA-EMERGE - Innovative biodiagnosis meets chemical structure elucidation – Novel tools in effect directed analysis to support the identification and monitoring of emerging toxicants on a European scale*, (2012-2015) – Marie Curie Initial Training Networks (ITN) project - leader of the project workgroup;
- *Identification and characterization of cyanobacterial toxins based on their interaction with basic cellular detoxification systems in zebrafish (Danio rerio) and zooplankton Daphnia magna*. Swiss National Science Foundation (SNSF), SCOPES 2014-2016 Joint Research Project – co-principal investigator;
- *Identification and functional characterization of (eco)toxicologically relevant polyspecific membrane transport proteins in zebrafish (Danio rerio)*, (2014-2017) – Croatian Science Foundation research project – principal investigator;

Ongoing:

- *Ecotoxicological characterization of biologically active substances and complex marine environment samples – Project within the Centre for Excellence for Science and Technology – Integration of Mediterranean Region (ZCI-STIM; <https://stim.unist.hr/hr/>) (2017-2021) – project funded by the European Union through the European Regional Development Fund – the Operational Programme Competitiveness and Cohesion 2014-2020 (KK.01.1.1.01); principal investigator.*

Educational Activities/Lecturing

- M. Erk, **T. Smital** – Course *Biological effects of metals and organic pollutants on marine organisms*; Postgraduate study, Oceanology, Faculty of Science, University of Zagreb;
- **T. Smital** – Course *Ecotoxicology*; Postgraduate study "Protection of Nature and the Environment", University of Osijek;
- G. Klobučar, M. Pavlica, V. Garaj-Vrhovac, **T. Smital** – Course *Biomarkers in Biomonitoring of Environmental Contamination*; Postgraduate study in Biology, Faculty of Science, University of Zagreb.

Mentorships

Supervision of 7 undergraduate, 1 MSc and 9 PhD students at Croatian universities. Co-supervision of 7 PhD students and/or postdocs from abroad (Norway, Italy, Serbia, Germany, Portugal, Switzerland).

Referee for Journals

Analytical and Bioanalytical Chemistry; Aquatic Toxicology; Archives for Environmental Contamination and Toxicology; Comparative Biochemistry and Physiology; Chemosphere; Development, Growth and Differentiation; Environmental Pollution; Environmental Science and Technology; Environmental Toxicology; Journal of Cell Physiology; Marine Biology; Marine and Environmental Research; Mutation Research; Water Research, PLOS ONE.

Referee for national science foundations

German Research Foundation (DFG), Portuguese National Science Foundation (FCT), US National Science Foundation, Czech Science Foundation (GACR)

Memberships

Member of Croatian Biological Society, Croatian Toxicological Society and International Society of Ecotoxicology and Environmental Safety (SECOTOX).