Biosketch

Univ.-Prof.in Dipl.-Ing.in Dr.in Kristina Djinović-Carugo

Position in CoE: Key Researcher

Personal Details

Place of birth Ljubljana, Slovenia

NationalitySlovenianChildren1 (1994)

Affiliation: University of Vienna, EMBL Grenoble

E-Mailkristina.djinovic@univie.ac.atProfileReseacherID: AAW-1167-2021List of publicationsORCID: 0000-0003-0252-2972

Academic age 30 years since PhD



Academic Career and Positions Held

I earned a Master's degree in chemistry from University of Ljubljana, Slovenia, in 1989 as well as my PhD in Structural Biology in 1992, with the research performed at the University of Pavia, Italy. Subsequently, I continued to work as a PostDoc at University of Pavia before I moved in 1995 to EMBL Heidelberg, Germany, as a PostDoc with Matti Saraste, financed by EMBL long-term fellowship. Subsequently, I was an EMBL staff scientist. In 1999, I moved to Sincrotrone Trieste – Elettra, Italy, as a head of Structural Biology Laboratory and subsequently as Head of Unit of Structural Biology and Crystallography. In 2004, I accepted a full professorship in Molecular Structural Biology at the University of Vienna. From 2009–2022 I served as the Head of the Department of Structural and Computation Biology. From 2009–2016, I was Director of Laura Bassi Excellence Center for Optimal Structural Studies. Since 2001, I have held a visiting professorship in molecular structural biology at the University of Ljubljana, Slovenia. From July 2022, I am Director of EMBL Grenoble, while remaining 25% employed with the University of Vienna, where I maintain an active research group.

Scientific Achievements and Scientific Contribution to the CoE

Scientific Achievements. I have authored 146 publications, which appeared in international peer reviewed and several in high visibility journals. My research spans a variety of topics, in particular structure-function analysis of metallo-enzymes involved in protection from chemical and oxidative damage and structural biology of actin-based cytoskeleton, with focus on muscle Z-disk. I determined the structure of the yeast Cu, Zn superoxide dismutase, and the structure of a novel nickel-dependent superoxide dismutase. Since a decade this branch of my research has focused on structure-function relations studies on chlorite-dismutases, using X-ray crystallography combined with molecular biophysics and biochemistry. My second branch of research revolves around molecular mechanisms underlying the architecture and assembly of the striated muscle Z-discs – boundaries between adjacent sarcomeres, using an integrative structural biology approach on reconstituted Z-disc complexes, where I contributed several seminal structures.

Scientific Contribution to the CoE. My expertise in structural biology of diverse biological systems will contribute to the elucidation of molecular mechanisms of guanidine (a nitrogen fertilizer) degradation by guanidinases in comammox microbes and in structural biology and structure-informed engineering to repurpose enzymes with roles in protein metabolism and microbe-microbe interactions to catalyze the transformation of pharmaceuticals.

10 Most Important Publications (*relevant for the CoE)

- **1.** Sponga, A.; Arolas, J. L.; (24 authors); **Djinović-Carugo, K.** Order from Disorder in the Sarcomere: FATZ Forms a Fuzzy but Tight Complex and Phase-Separated Condensates with α-Actinin. *Sci. Adv.* **2021**, 7 (22), eabg7653. *https://doi.org/10.1126/sciadv.abg7653*.
- 2. *Pinotsis, N.; Zielinska, K.; Babuta, M.; Arolas, J. L.; Kostan, J.; Khan, M. B.; Schreiner, C.; Salmazo, A.; Ciccarelli, L.; Puchinger, M.; Gkougkoulia, E. A.; Ribeiro, E. de A.; Marlovits, T. C.; Bhattacharya, A.; Djinovic-Carugo, K. Calcium Modulates the Domain Flexibility and Function of an α-Actinin Similar to the Ancestral α-Actinin. *Proc. Natl. Acad. Sci. U.S.A.* 2020, 117 (36), 22101–22112. https://doi.org/10.1073/pnas.1917269117.
- **3.** *Mlynek, G.; Kostan, J.; Leeb, S.; **Djinović-Carugo, K.** Tailored Suits Fit Better: Customized Protein Crystallization Screens. *Crystal Growth & Design* **2020**, *20* (2), 984–994. https://doi.org/10.1021/acs.cgd.9b01328.
- **4.** *Djinović-Carugo, K.; Carugo, O. Naked Metal Cations Swimming in Protein Crystals. *Crystals* **2019**, 9 (11), 581. https://doi.org/10.3390/cryst9110581.
- 5. *Schaffner, I.; Mlynek, G.; Flego, N.; Pühringer, D.; Libiseller-Egger, J.; Coates, L.; Hofbauer, S.; Bellei, M.; Furtmüller, P. G.; Battistuzzi, G.; Smulevich, G.; Djinović-Carugo, K.; Obinger, C. Molecular Mechanism of Enzymatic Chlorite Detoxification: Insights from Structural and Kinetic Studies. ACS Catal. 2017, 7 (11), 7962–7976. https://doi.org/10.1021/acscatal.7b01749.
- **6.** Ribeiro, E. de A.; Pinotsis, N.; Ghisleni, A.; Salmazo, A.; Konarev, P. V.; Kostan, J.; Sjöblom, B.; Schreiner, C.; Polyansky, A. A.; Gkougkoulia, E. A.; Holt, M. R.; Aachmann, F. L.; Žagrović, B.; Bordignon, E.; Pirker, K. F.; Svergun, D. I.; Gautel, M.; **Djinović-Carugo, K.** The Structure and Regulation of Human Muscle α-Actinin. *Cell* **2014**, *159* (6), 1447–1460. *https://doi.org/10.1016/j.cell.2014.10.056*.
- 7. Kostan, J.; Salzer, U.; Orlova, A.; Törö, I.; Hodnik, V.; Senju, Y.; Zou, J.; Schreiner, C.; Steiner, J.; Meriläinen, J.; Nikki, M.; Virtanen, I.; Carugo, O.; Rappsilber, J.; Lappalainen, P.; Lehto, V.; Anderluh, G.; Egelman, E. H.; Djinović-Carugo, K. Direct Interaction of Actin Filaments with F BAR Protein Pacsin2. EMBO Rep 2014, 15 (11), 1154–1162. https://doi.org/10.15252/embr.201439267.
- **8.** *Mlynek, G.; Sjöblom, B.; Kostan, J.; Füreder, S.; Maixner, F.; Gysel, K.; Furtmüller, P. G.; Obinger, C.; Wagner, M.; Daims, H.; **Djinović-Carugo, K.** Unexpected Diversity of Chlorite Dismutases: A Catalytically Efficient Dimeric Enzyme from Nitrobacter Winogradskyi. *J Bacteriol* **2011**, *193* (10), 2408–2417. https://doi.org/10.1128/JB.01262-10.
- 9. Kostan, J.; Sjöblom, B.; Maixner, F.; Mlynek, G.; Furtmüller, P. G.; Obinger, C.; Wagner, M.; Daims, H.; Djinović-Carugo, K. Structural and Functional Characterisation of the Chlorite Dismutase from the Nitrite-Oxidizing Bacterium "Candidatus Nitrospira Defluvii": Identification of a Catalytically Important Amino Acid Residue. *Journal of Structural Biology* 2010, 172 (3), 331–342. https://doi.org/10.1016/j.jsb.2010.06.014.
- 10. Wuerges, J.; Lee, J.-W.; Yim, Y.-I.; Yim, H.-S.; Kang, S.-O.; Djinović-Carugo, K. D. Crystal Structure of Nickel-Containing Superoxide Dismutase Reveals Another Type of Active Site. Proc. Natl. Acad. Sci. U.S.A. 2004, 101 (23), 8569–8574. https://doi.org/10.1073/pnas.0308514101.