



Dr. Ramesha Thimmappa

Associate Professor & Ramalingaswami Fellow

Specialization: Plant specialized metabolism, Metabolic engineering, and Protein engineering. Approach: Unravelling plant metabolic diversity using biochemistry, molecular biology, and genetics. Design and assembly of novel metabolic pathways in yeast and *N. benthamiana* using synthetic biology methods.

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Dr. Ramesha obtained his Ph. D from the University of Agricultural Sciences (UAS), Bangalore. At UAS, he worked under the guidance of Prof. R. Uma Shaanker on exploring alternate plant sources of the anticancer alkaloid camptothecin (till 2009). During his Ph. D he was awarded Canada Higher Education Visiting Fellowship (2008) to visit Concordia University, Canada to work on part of his Ph. D research work. After graduation, he was awarded a very prestigious Marie Curie International Incoming Fellowship (MC-IIF) (2011- 2013) to work at John Innes Centre (JIC), UK, a premier centre for plant and microbial science in Europe. As part of MC-IIF, he worked on engineering plant triterpene synthases under the supervision of Prof. Anne Osbourn FRS OBE and Dr. Paul O'Maille. Later he continued in the same lab working as a postdoctoral researcher in an Eu- funded consortium project called 'TriForC'- Triterpenes for Commercialization. During these years at JIC Dr. Ramesha continued to work on triterpene synthases- key enzymes in plant triterpenes biosynthesis. Here special emphasis was on discovery of novel enzymes and their chemistries using evolution, protein engineering, metabolic engineering, and synthetic biology approaches. Dr. Ramesha has more than seven years of valuable postdoctoral experience. With this Dr. Ramesha has been recently awarded a prestigious Ramalingaswami Re-entry Fellowship (2020-2025) to move back to India. Currently Dr. Ramesha holds a faculty position at Amity Institute of Genome Engineering, Amity University, Noida, India.

Current Research Projects:

Department of Biotechnology, Gov of India funded Ramalingaswami Re-entry fellowship project on 'Functional exploration of triterpene pathways in model plants' (2020-2025). (Amount: 10 million INR).

Selected Publications:

Hodgson H¹, De La Penna R¹, Stephenson M, **Thimmappa R**, Vincent J, Sattely E, Osbourn A. (2019) Identification of key enzymes responsible for protolimonoid biosynthesis in plants: opening the door to azadirachtin production. **PNAS**. doi.org/10.1073/pnas.1906083116. Equal¹ contribution.

Li Y¹, Wang R¹, Xun X¹, Wang J¹, Bao L¹, **Thimmappa R**¹, Ding J¹, Jiang J¹, Zhang L, Li T, Lv J, Mu C, Hu X, Zhang L, Liu J, Li Y, Yao L, Jiao W, Wang Y, Lian S, Zhao Z, Zhan Y, Huang X, Liao H, Wang J, Sun H, Mi X, Xia Y, Xing Q, Lu W, Osbourn A, Zhou Z, Chang Y, Bao Z, Wang S. (2018) Sea cucumber genome provides insights into saponin biosynthesis and aestivation regulation. **Cell Discovery**. 26; 4: 29. Equal¹ contribution.

Xue Z¹, Tan Z¹, Huang A, Zhou Y, Sun J, Wang X, **Thimmappa RB**, Stephenson MJ, Osbourn A. and Qi X. (2018) Identification of key amino acid residues determining product specificity of 2,3-oxidosqualene cyclase in *Oryza* species. **New Phytologist**. doi:10.1111/nph.15080. Equal¹ contribution

Salmon M¹, **Thimmappa RB**¹, Minto RE, Melton RE, Hughes RK, O'Maille PE, Hemmings AM, Osbourn A. (2016) A conserved amino acid residue critical for product and substrate specificity in plant triterpene synthases. **PNAS**. 113(30)- E4407-E4414. Equal¹ contribution.

Thimmappa R, Geisler K, Louveau T, O'Maille P, Osbourn A. (2014) Triterpene biosynthesis in plants. **Annual Review of Plant Biology**. 65:225-257.

Ramesha BT, Suma HK, Senthilkumar U, Priti V, Ravikanth G, Vasudeva R, Kumar TR, Ganeshaiyah KN, Uma Shaanker R. (2013) New plant sources of the anti-cancer alkaloid, camptothecin from the Icacinaceae taxa, India. **Phytomedicine**. 20(6): 521-527.