

Prof. Ning-Yi Zhou

State Key Laboratory of Microbial Metabolism & School of Life Sciences and Biotechnology
Shanghai Jiao Tong University
800 Dong-Chuan Road, Shanghai 200240, China
+86-21-3240-4135; ningyi.zhou@sjtu.edu.cn

Biography: Ning-Yi Zhou received his Bachelor's degree in Microbiology from Wuhan University and PhD in Microbiology from Imperial College London (with David Leak). Following postdoctoral trainings at Imperial College and University of Wales, Bangor (with Peter Williams), he was appointed as a professor in Wuhan Institute of Virology, Chinese Academy of Sciences in 2000. He joined Shanghai Jiao Tong University as a distinguished professor in 2013. His research is focused on the genetics and biochemistry of microbial aromatic catabolism as well as the bioaugmentation of contaminated soil with microbial degraders. He is the Director of Environmental Microbiology Committee, Chinese Society for Microbiology and also serves as an editor for "Applied and Environmental Microbiology" and an associate editor for "Frontiers in Microbiology".



Microbial degradation of three isomeric mononitrophenols

There are three isomeric mononitrophenols: *ortho*-nitrophenol (ONP), *meta*-nitrophenol (MNP) and *para*-nitrophenol (PNP). Their wide application has led to the accumulation of nitrophenols as contaminants in the environment. This talk will present the biochemistry and genetics of microbial degradation of three nitrophenol isomers including their chlorinated derivatives. *Pseudomonas* sp. strain WBC-3, *Cupriavidus necator* JMP134 and *Alcaligenes* sp. strain NyZ215 are able to utilize PNP, MNP and ONP, respectively, as a sole source of carbon, nitrogen and energy. The underlying degradation mechanisms at both genetic and biochemical levels have been elucidated for each of these three strains. It has been shown that *pnpA*-encoded PNP 4-monooxygenase, *mnpA*-encoded MNP nitroreductase and *onpA*-encoded ONP 2-monooxygenase catalyze the initial reactions of PNP, MNP and ONP catabolism, respectively, with concomitant release of nitrite, ammonium and nitrite, respectively. A transcriptional regulation study demonstrated that the transcription of three PNP catabolic operons were activated by two LysR-type transcriptional regulators PnpR and PnpM in strain WBC-3. During the investigation of 2-chloro-4-nitrophenol (2C4NP) degradation, the catabolism pathway was found to be initiated by a two-component *para*-nitrophenol monooxygenase in Gram-positive *Rhodococcus imtechensis* RKJ300 and by a single component monooxygenase in Gram-positive *Burkholderia* sp. strain SJ98. In strain RKJ300, the dechlorination during 2C4NP degradation occurred before ring cleavage but it did after ring cleavage in strain SJ98.