Metal-based enzyme promiscuity of mammalian senescence marker protein-30

Rinkoo Devi Gupta
South Asian University, India

Senescence marker protein-30 (SMP30) is a lactonase enzyme involved in the biosynthesis of ascorbic acid in mice. However in human, there is no ascorbic acid biosynthesis, the expression of SMP30 has been reported in liver, kidney and other tissues. Hence, to study the role of SMP30 in human is an area of intensive research. SMP30 is also known as Regucalcin due to its involvement in calcium homeostasis. Recent studies showed its association in organophosphate hydrolysis including nerve agents like sarin and soman. Since SMP30 is also involved in calcium homeostasis, we are investigating the metal-based substrate specificities shown by SMP30. Studying the enzymatic activities and metal-based substrate specificities of SMP30 in the presence of different divalent cations may be a useful approach for discovering the precise physiological role in human. Therefore, cDNA of mouse liver SMP30 was cloned in bacterial expression vector and sequence verified. The protein was overexpressed with 6xHis tag in E. coli (BL21) cells and purified for biochemical characterization. We used a bacterial codon-optimized synthetic gene to study the human SMP30. Purified proteins were used to measure the activities in the presence of different metals like Ca\(^{2+}\), Cd\(^{2+}\), Co\(^{2+}\), Mg\(^{2+}\) and Mn\(^{2+}\). Metal specificities were examined with several substrates like phenyl acetate, naphthyl acetate, parathiol, paraoxon and thiobutyrolacton. SMP30 shows highest esterase activity in the presence of Co\(^{2+}\) as compare to other divalent cations.

Biography
Rinkoo Devi Gupta has completed her PhD from Banaras Hindu University and Postdoctoral studies from Weizmann Institute of Sciences, Israel. She is working as an Assistant Professor in South Asian University, New Delhi, an international university established by SAARC nations. She has published more than 25 papers in reputed journals including Nature Chemical Biology and Nature Methods. Her area of current research is to understand the molecular evolution of enzymes, protein engineering and drug discoveries.

rgupta@sau.ac.in

Notes: