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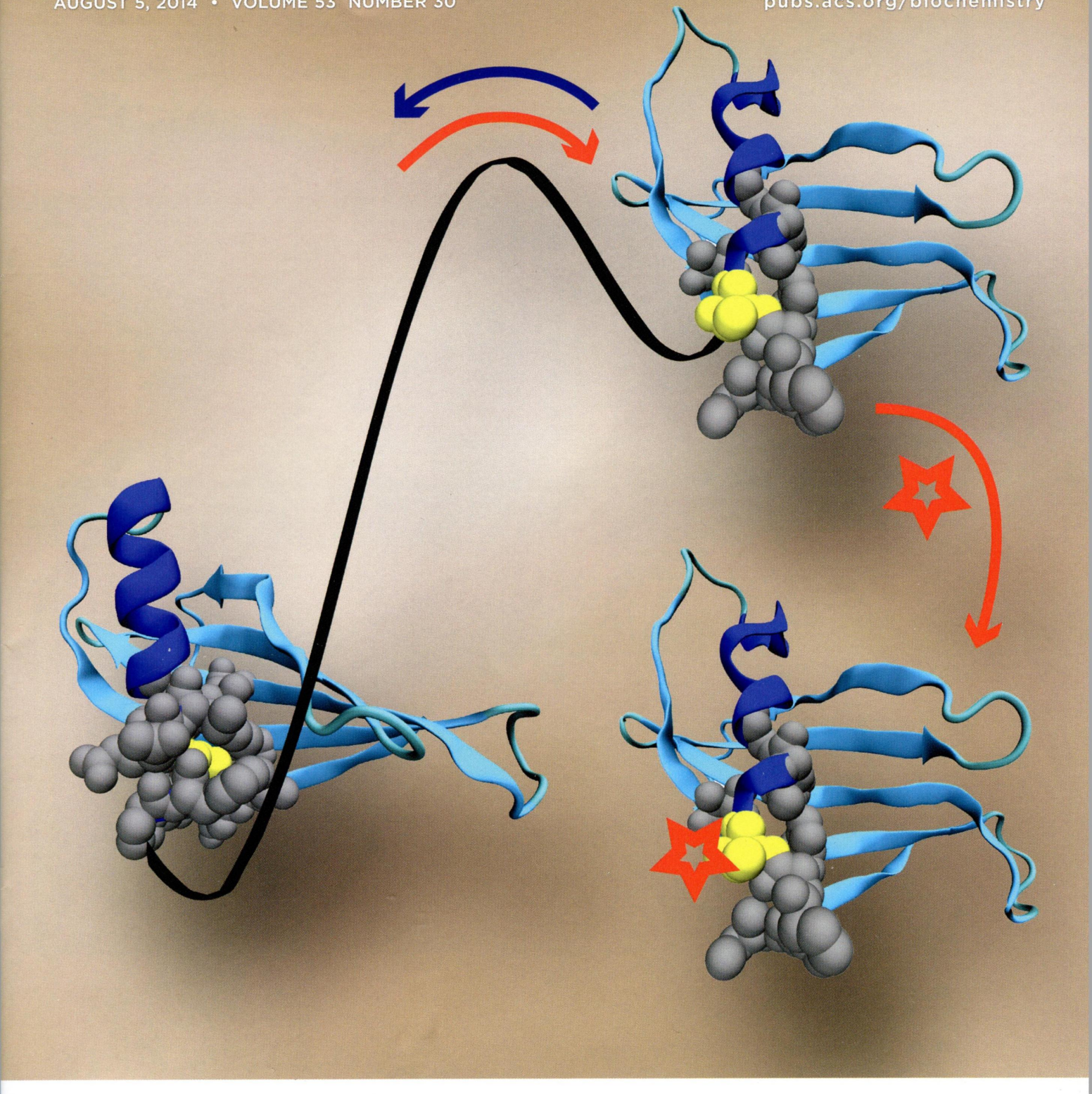

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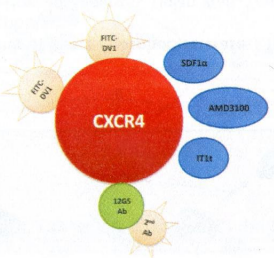
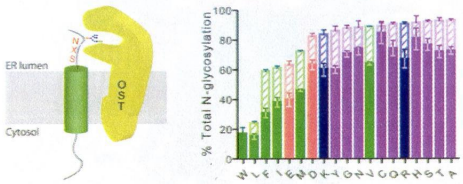
ON THE COVER: Thiol labeling of a single cysteine residue (yellow spheres) has been used to monitor rare unfolding events in a protein under nativelike conditions. The residues (gray spheres) surrounding the buried cysteine move apart, resulting in solvent exposure and hence labeling of the side chain thiol. This deprotection of the side chain is associated with an energy barrier between the native state and a partially unfolded, labeling-competent intermediate. Such intermediates have been mapped onto the unfolding energy landscape of the protein monellin using the kinetic and thermodynamic information obtained from thiol labeling. [Malhotra, P., and Udgaonkar, J. B. (2014) *Biochemistry* 53, 3608−3620]

Rapid Reports



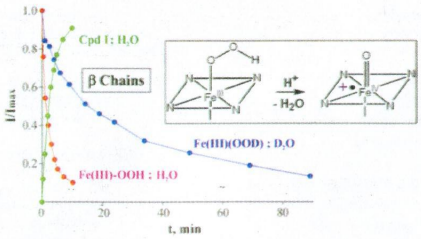
Articles



4894 S dx.doi.org/10.1021/bi500296d

Electron Paramagnetic Resonance and Electron-Nuclear Double Resonance Studies of the Reactions of Cryogenerated Hydroperoxoferric−Hemoprotein Intermediates

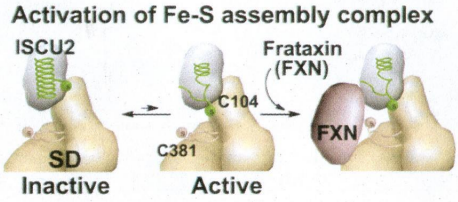
Roman Davydov, Mikhail Laryukhin, Amy Ledbetter-Rogers, Masanori Sono, John H. Dawson,* and Brian M. Hoffman*



4904 S dx.doi.org/10.1021/bi500532e

Human Frataxin Activates Fe−S Cluster Biosynthesis by Facilitating Sulfur Transfer Chemistry

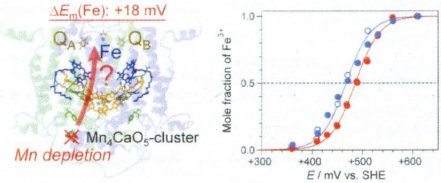
Jennifer Bridwell-Rabb, Nicholas G. Fox, Chi-Lin Tsai, Andrew M. Winn, and David P. Barondeau*



4914 S dx.doi.org/10.1021/bi500549b

Long-Range Interaction between the Mn_4CaO_5 Cluster and the Non-heme Iron Center in Photosystem II as Revealed by FTIR Spectroelectrochemistry

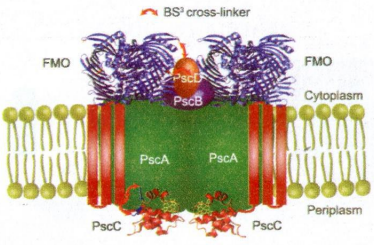
Yuki Kato* and Takumi Noguchi*



4924 Ⓢ dx.doi.org/10.1021/bi5006464

Structural Analysis of the Homodimeric Reaction Center Complex from the Photosynthetic Green Sulfur Bacterium *Chlorobaculum tepidum*

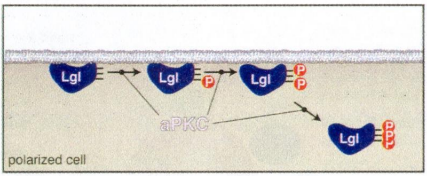
Guannan He, Hao Zhang, Jeremy D. King, and Robert E. Blankenship*



4931 dx.doi.org/10.1021/bi500748w

Ordered Multisite Phosphorylation of Lethal Giant Larvae by Atypical Protein Kinase C

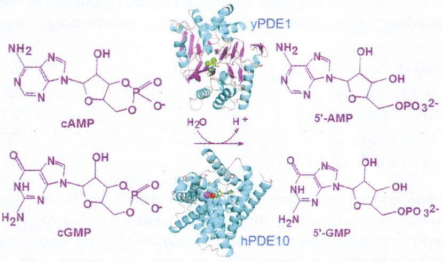
Chiharu Graybill and Kenneth E. Prehoda*



4938 dx.doi.org/10.1021/bi500406h

Dual Specificity and Novel Structural Folding of Yeast Phosphodiesterase-1 for Hydrolysis of Second Messengers Cyclic Adenosine and Guanosine 3′,5′-Monophosphate

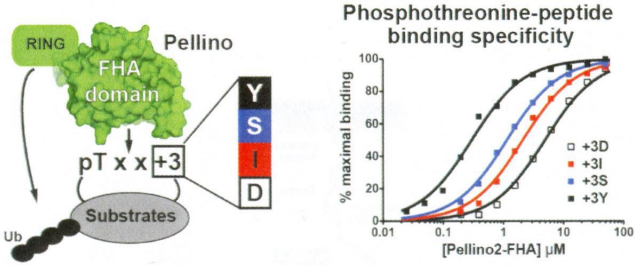
Yuanyuan Tian, Wenjun Cui, Manna Huang, Howard Robinson, Yiqian Wan, Yousheng Wang,* and Hengming Ke*



4946 dx.doi.org/10.1021/bi5005156

The Pellino E3 Ubiquitin Ligases Recognize Specific Phosphothreonine Motifs and Have Distinct Substrate Specificities

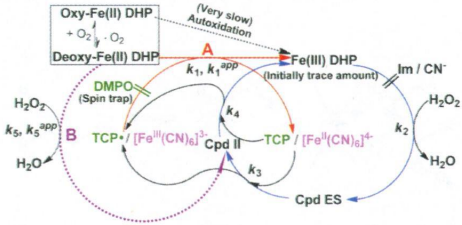
Yu-San Huoh and Kathryn M. Ferguson*



4956 dx.doi.org/10.1021/bi5002757

Evidence of the Direct Involvement of the Substrate TCP Radical in Functional Switching from Oxyferrous O_2 Carrier to Ferric Peroxidase in the Dual-Function Hemoglobin/Dehaloperoxidase from *Amphitrite ornata*

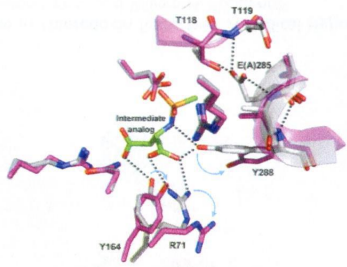
Shengfang Sun, Masanori Sono,* Jing Du, and John H. Dawson*



4970 dx.doi.org/10.1021/bi500719k

Aspartoacylase Catalytic Deficiency as the Cause of Canavan Disease: A Structural Perspective

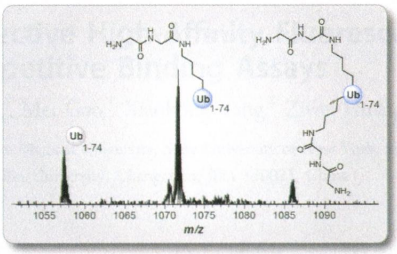
Yasanandana S. Wijayasinghe, Alexander G. Pavlovsky, and Ronald E. Viola*



4979 S dx.doi.org/10.1021/bi5006305

Middle-Down Mass Spectrometry Enables Characterization of Branched Ubiquitin Chains

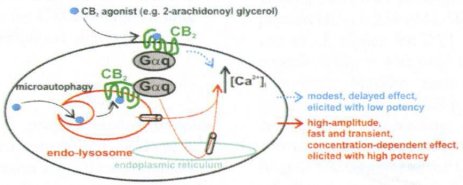
Ellen M. Valkevich, Nicholas A. Sanchez, Ying Ge, and Eric R. Strieter*



4990 S dx.doi.org/10.1021/bi500632a

Differential Activation of Intracellular versus Plasmalemmal CB_2 Cannabinoid Receptors

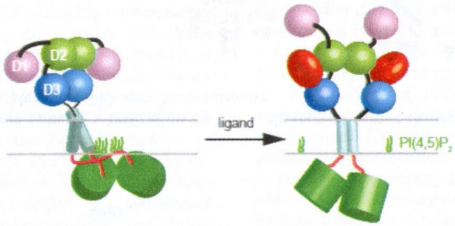
G. Cristina Brailoiu, Elena Deliu, Jahan Marcu, Nicholas E. Hoffman, Linda Console-Bram, Pingwei Zhao, Muniswamy Madesh, Mary E. Abood,* and Eugen Brailoiu*



5000 S dx.doi.org/10.1021/bi500327q

Coupling of Transmembrane Helix Orientation To Membrane Release of the Juxtamembrane Region in FGFR3

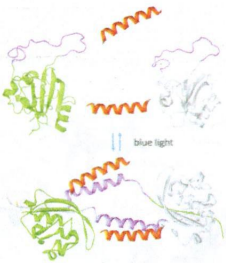
Hiroko Tamagaki, Yusuke Furukawa, Ritsuko Yamaguchi, Hironobu Hojo, Saburo Aimoto, Steven O. Smith, and Takeshi Sato*



5008 S dx.doi.org/10.1021/bi500622x

Optical Control of Protein–Protein Interactions via Blue Light-Induced Domain Swapping

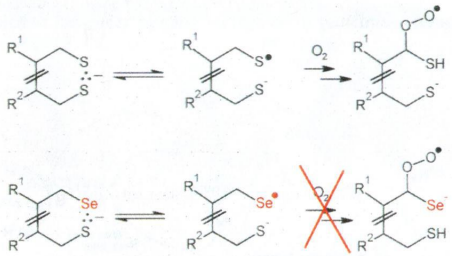
Jakeb M. Reis, Darcy C. Burns, and G. Andrew Woolley*



5017 S dx.doi.org/10.1021/bi5003376

Why Selenocysteine Replaces Cysteine in Thioredoxin Reductase: A Radical Hypothesis

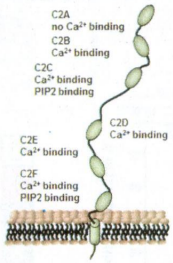
Thomas Nauser,* Daniel Steinmann, Guido Grassi, and Willem H. Koppenol*



5023 S dx.doi.org/10.1021/bi5004469

Characterization of the Lipid Binding Properties of Otoferlin Reveals Specific Interactions between PI(4,5)P2 and the C2C and C2F Domains

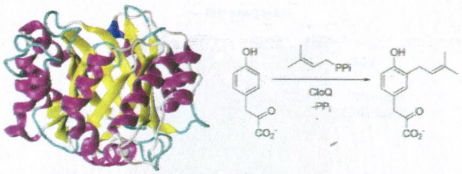
Murugesh Padmanarayana, Nicole Hams, Lee C. Speight, E. James Petersson, Ryan A. Mehl, and Colin P. Johnson*



5034 dx.doi.org/10.1021/bi500531p

Mechanistic Insights into Mg^{2+}-Independent Prenylation by CloQ from Classical Molecular Mechanics and Hybrid Quantum Mechanics/Molecular Mechanics Molecular Dynamics Simulations

Craig A. Bayse and Kenneth M. Merz*

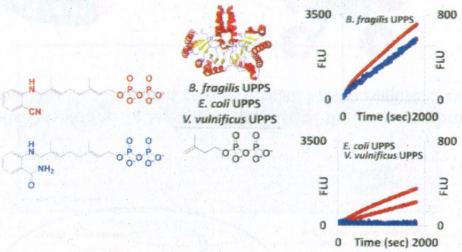


CloQ

5042 Ⓢ dx.doi.org/10.1021/bi500545g

Species Differences in Alternative Substrate Utilization by the Antibacterial Target Undecaprenyl Pyrophosphate Synthase

Samantha Dodbele, Christina D. Martinez, and Jerry M. Troutman*



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