Turning Ribonucleotide Reductase on and Off

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Ribonucleotide reductases (RNRs) use radical-based chemistry to reduce ribonucleotides in order to create the requisite deoxyribonucleotides pools for DNA biosynthesis and repair. To maintain the appropriate deoxyribonucleotide levels in the cell, RNRs are subject to multiple modes of allosteric regulation. Overall RNR activity is regulated by the ratio of ATP to dATP in the cell, with high dATP levels turning RNR off, and increasing ATP levels turning RNR back on. Our laboratory uses crystallography and cryo-electron microscopy to investigate the molecular mechanisms of radical enzymes such as RNR. This presentation will focus on allosteric activity regulation of class Ia RNRs, considering the molecular basis by which ATP and dATP exert their effects and whether all class Ia RNR are likely to use the same mechanism.