

Delineating the interactions between mutagenic signatures, cellular processes, and environment through computational approaches

Speaker: Teresa Przytycka, NIH

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Cancer genomes accumulate a large number of somatic mutations resulting from carcinogenic exposures, cancer related aberrations of DNA maintenance machinery, and normal stochastic events. These processes often lead to distinctive patterns of mutations, called mutational signatures. However interpreting mutation patterns captured by such signatures is often challenging as these specific patterns often emerge as an end effect of the interactions between DNA damage and DNA repair and other molecular processes. Untangling these contributions and identifying interaction between mutagenic processes and other processes cellular processes remains difficult. I will discuss computational methods to elucidate the complex relations between mutational signatures and cellular and environmental processes. In particular I will discuss computational methods to untangle the contributions of DNA damage and repair processes to mutation signatures and network based approaches to uncover the interactions between mutational signatures and biological processes.