

Medicine, Nursing and Health Sciences

Biomedicine Discovery Seminar

Monash Biomedicine Discovery Institute



Genome dynamics and rapid adaptation to antifungal drugs



Friday 10th February, 2017



12.00 – 1.00 pm



Level 3 Seminar Room
15 Innovation Walk
Clayton campus



Presenter

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PhD

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Abstract

Rapid responses to acute stresses are essential for survival and adaptation. An excellent model for this is the rapid emergence of drug resistance in fungal pathogens. Fungi can adapt and survive drug concentrations that inhibit the growth of progenitor cells. They often do so via mutations involving whole chromosomes, chromosome arms and some point mutations, similar to cancer cells responding to chemotherapy drugs. Specifically, they undergo ploidy switches, alter chromosome copy number (become aneuploid) and undergo frequent loss of heterozygosity, via recombination and chromosome mis-segregation. Some genes present in altered copy number on aneuploid chromosomes can facilitate survival in the drug. Subsequently, the proportion of adapted cells is enriched in the population. Accordingly, aneuploid formation is a mechanism enabling rapid and transient generation of diversity upon which selection can act.

About the presenter

Judith Berman addresses mechanisms of genome change that underlie rapid phenotypic responses to stress using pathogenic yeasts, including *Candida albicans*. These adaptive changes include shifts in whole genome ploidy, aneuploidy, translocations and altered gene copy number, and involve studies of chromosome components including centromeres, telomeres, origins of replication and repeated DNA regions. Berman and colleagues have developed and adapted many resources for the *Candida* community including tools for studying genome structure and drug responses. The Berman lab discovered that *C. albicans*, long thought to be an obligate diploid, also can form haploids and that aneuploids often arise through a tetraploid intermediate. Berman trained in yeast molecular biology at the Weizmann Institute and at Cornell University. After over 25 years as a professor at the University of Minnesota, she moved her lab to Tel Aviv University in 2012.



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