

STRESS-INDUCED VARIATION AND THE EVOLUTION OF PATHOGENS

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Genetic variation – e.g. recombination and mutation– provides the raw material for evolutionary change. In most population genetics models, variation is assumed to be generated at a uniform rate, depending on the genes coding for variation but not on the state of the individual. In this talk I discuss the implications of a new assumption - that the generation of genetic variation is to some degree regulated by the organism, so that more variation is generated under stress. Using computational models, we found that stress-induced genetic variation is likely to evolve, and might have dramatic implication for adaptation. In the context of pathogen evolution, stress-induced variation can greatly affect the ability of pathogen populations to evolve efficient drug-resistance. I will present and discuss results pertaining to three mechanisms of genetic variation in pathogens: sexual reproduction, recombination, and viral superinfection.