

# Personalizing medicine to prevent pandemics

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What makes some viral infections fatal and others much less severe is largely a mystery. It is thought that a part of the variability can be attributed to differences in how individuals respond to infection.

Professor Michael Katze, presenting at the Society for General Microbiology's spring meeting in Edinburgh today, describes how computer modelling could be a powerful tool to allow treatments to be tailored to individuals. This approach could ultimately prevent future pandemics.

Professor Katze, from the University of Washington in Seattle reveals how 'systems biology' methods could successfully tackle viral infections, such as HIV and [hepatitis C](#) virus, for which there is still no effective vaccine or treatment.

"Systems biology is like a Rubik's cube - it's a matrix that integrates computational models, experimental systems and high-throughput data in a variety of combinations to solve the puzzle of virus-host interactions. It provides a powerful new approach to virology, [drug discovery](#) and vaccine development," explained Professor Katze.

Computer models of the whole cell can be made and tested by simulating virus-induced changes and monitoring the whole cell response. Comparing the model to real biological examples allows the model to be refined and allows researchers to make further predictions about how different cells respond to different changes.

Improved animal models may help us understand how differences in an individual's genetic make-up affect HIV development. "Determining which host genes affect HIV progression has been relatively slow using the current techniques in isolation," remarked Professor Katze. "Some current studies indicate there is a link between genes that affect how [virus particles](#) enter the [host cell](#) and disease progression," he continued.

Identifying the molecules produced from these host genes could provide a method to effectively detect disease, predict how individuals respond to infection and even establish how effective a vaccine is. "If this becomes as easy as doing a simple blood test, we will be equipped to provide the most effective treatment to the individual. This will limit the spread of the virus which in turn could help protect the population as a whole and even prevent the next pandemic," suggested Professor Katze.

Provided by Society for General Microbiology

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