H1N1 Virus exhibits drug resistance within 2 days

Singapore – A team of doctors and researchers from various collaborating institutions made a startling discovery recently about the emergence of resistance to Tamiflu, an antiviral drug used to combat flu, including the seasonal influenza A pandemic (H1N1) 2009 virus.

Dr. Timothy Barkham, Senior Consultant in Laboratory Medicine at Tan Tock Seng Hospital (TTSH), stated that although increasing numbers of drug-resistant strains of pandemic flu virus are being reported, most of the early examples had been found in immunosuppressed patients, who have a weak immune system, and had taken 4 to 14 days of treatment to develop.

The mutant virus reported by Dr Barkham was detected in a sample from a previously healthy 28-year-old female patient, at TTSH, within 48 hours after she had been given Tamiflu.

Careful detective work allowed the team to show that the mutant strain developed within two days of exposure to the drug and that it had not been present in the patient at the initial point of infection. The team's observation of this rapid emergence of resistance happens to be the fastest recorded.

Although much less than 1% of flu is currently resistant, the researchers warned that clinicians should consider resistance when patients who are seriously ill with flu fail to respond to treatment for pandemic (H1N1), as this case shows it can evolve almost overnight.

Dr. Barkham said, “As with all antimicrobial medicines, we should not give patients antiviral drugs unless it is really necessary, in order to preserve them for patients who really need them.” He noted that antivirals are likely to be most effective in severe flu but of limited benefit in mild infections.

The research was supported by three A*STAR institutes: the Experimental Therapeutics Centre (ETC), the Genome Institute of Singapore (GIS), and the Bioinformatics Institute (BII). ETC developed the method used to chart the evolution of drug resistance in the
influenza virus, while GIS provided the technology to sequence the viral genome and BII compared the mutant to previous resistant strains to confirm its novelty.

Commenting on the contribution by A*STAR, Prof Sir George Radda, Chairman of A*STAR’s Biomedical Research Council, said “This is a great example of how A*STAR’s institutes contributed their expertise and worked together with clinicians to fight against a deadly virus. I hope to see more of such valuable partnerships in the future.”

In addition to TTSH, BII, ETC, and GIS, the research team also included scientists and clinicians from SGH, CDC and MOH. The team wrote an article, “Emergence of Oseltamivir-Resistant Pandemic (H1N1) 2009 Virus within 48 Hours”, which will be published in the Journal, ‘Emerging Infectious Diseases’, this October. They were part of the Health Service Development Programme for respiratory infection, funded by MOH.

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