

Determination of *N*-linked sialyl-sugar chains in the lung of domestic cats and dogs in Thailand susceptible to the highly pathogenic avian influenza virus (H5N1)

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Highly pathogenic and potentially pandemic H5N1 avian influenza A viruses have become endemic and now resident in Asia, Europe, Africa and middle east, and they may not easily eradicable. H5N1 viruses have been shown to cross the species barrier and able to infect dogs and cats. Domestic cat and dog that naturally infected with H5N1 in Thailand showed the severe pulmonary edema and pneumonia in lung tissues with other tissue dysfunction. In order to understand the structure and quantity of influenza A receptor sialyl sugar chains in cats and dogs especially in lung tissue we demonstrated that glycosylation profiles of *N*-glycans derived from lung tissue of dog and cat in Thailand which is susceptible to H5N1 by using multi-dimensional HPLC mapping method combined with mass spectrometry. The results showed different of *N*-linked glycans composition ratios between dogs and cats. Thirty kinds of *N*-linked glycans such as 11 neutral, 13 mono-, 3 di and 3 tri-sialyl sugar chains from cat's lung, and twenty nine kinds of 16 neutral, 11 mono- and 2 di-sialyl sugar chain structure from dog's lung. Cat lung has both of 5-*N*-acetylneuraminic acid and 5-*N*-glycolylneuraminic acid sialic acid (Sia α 2-3Gal and Sia α 2-6Gal) but dog lung contains only 5-*N*-acetylneuraminic (Sia α 2-3Gal and Sia α 2-6Gal) molecular species. The compositions ratios of molar percent of Sia α 2-3Gal in domestic cat and dog lung were 21.5 and 9.9, respectively while the composition ratio of Sia α 2-6Gal in cat and dog were 47.1 and 59.2, respectively. Due to the higher ratio of Sia α 2-3Gal which avian influenza viruses preferentially bind to Sia α 2-3Gal therefore, these results may indicate that why domestic cats are more susceptible than dogs in case of avian influenza infection.