Influenza A viruses with the ability to cross the specific barrier between human beings and animals make possible interspecies transmission. The importance factor of potential infectivity of influenza A viruses is the suitability of the receptor binding site of the host and viruses. The affinities of avian and human influenza virus to bind with the receptor and the distributions of receptor in animals are differed. Double staining of lectin histochemistry was performed to identify both SA α2,3 Gal and SA α2,6 Gal receptors in trachea and lung tissue of dogs, cats, tigers, ferret, pigs, ducks and chickens. Moreover, in order to understand the structure and quantity of influenza A receptor sialyl sugar chains in lung tissue in cats and dogs glycosylation profiles of N-glycans were determined from lung tissues of dogs and cats by using multi-dimensional HPLC mapping combined with mass spectrometry.

The results demonstrated different N-linked glycans composition ratios between cats and dogs. There were a total of 30 kinds of N-linked glycans from cat lungs, and 29 kinds from dog lungs. Cat lungs exhibited both 5-N-acetylneuraminic acid and 5-N-glycolylneuraminic acid sialic acid (SA α2,3 Gal and SA α2,6 Gal), but dog lungs contained only 5-N-acetylneuraminic (SA α2,3 Gal and SA α2,6 Gal) molecular species. The composition ratios of molar percentage of SA α2,3 Gal for domestic cat and dog lungs were 21.5 and 9.9, respectively, while the composition ratios of SA α2,6 Gal were 47.1 and 59.2, respectively. The anatomical distribution of the receptors were abundantly presented in trachea, bronchus and bronchiole, but in alveoli of dogs and cats showed SA α2,6 Gal only. Furthermore, endothelial cells in lung tissues showed evidence of SA α2,3 Gal. These results suggested that dogs and cats closed contact to humans should be of greater concern as an intermediate host of avian influenza A which is potential of a mixing vessel for viral adaptation and reassortment.