Name: Avian Influenza Virus
AKA: Bird flu, H5N1

Wanted for: Currently, 170 deaths world-wide (up to April 2007, according to the WHO) so the risk to humans remains only a potential one. However, the Spanish Flu Pandemic after World War I claimed 40 million lives and was caused by a relative of the current virus – and such behaviour runs in the family!

Characteristics:
Influenza is generally an infection of the upper respiratory tract (nose, throat, and bronchi), causing inflammation of the airways, fever, and muscle pains. In humans, the infection is rarely serious. Avian influenza viruses, such as H5N1, can sometimes cross the species barrier and infect humans. H5N1 causes severe symptoms in birds and the concern is that it may adapt, allowing it to move through the human population. It would target the lungs in humans, damaging tissues and inducing an uncontrolled immune response, with fluid infiltration and loss of lung function – leading to significant risk of mortality. Since transmission occurs via fluid droplets produced by coughing and wheezing, spread of infection could be explosive in a dense population – with international travel further speeding the spread.

How can Immunology help?
H5N1 is quite an adversary. Influenza viruses are ‘masters of disguise’ such that the viral ‘coat’, a target for the immune system and vaccine manufacture, mutates quickly. If the virus crosses over into humans there will be little ‘natural’ immunity to it, since it will be new to the human population. A potential vaccine will probably need to contain a mixture of viral elements to increase its chances of working effectively. A further strategy is to choose ‘conserved’ viral elements that do not mutate as frequently, as more reliable targets for antibody – however, they can often be less effective immune stimulants. Flu vaccine manufacture is currently quite a slow process – requiring virus to be grown in fertilised hens’ eggs. This restricts the supply and produces a time-lag, making it difficult to respond immediately to any outbreak. Antiviral drugs, such as Tamiflu can improve the chances for infected individuals, but are not a long-term solution. Identifying stable and effective viral characteristics remains important for an effective vaccine, and novel developments, such as effective DNA vaccines (injecting DNA coding for viral proteins directly into individuals) may reduce production times.

Can you help? Immunology needs you!

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