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Anti-retroviral Drugs and Vaccines

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Abstract. This manuscript summarizes the break-out session held on anti-retroviral drugs and vaccines at the *Koala Conservation Workshop: The koala and its retroviruses: implications for sustainability and survival* held at San Diego Zoo, April 17–18, 2013. Discussants considered the utility of natural retroviral systems as models for treatment and prevention of koala retrovirus (KoRV) infection, in particular, feline leukemia virus infection of the cat and AIDS virus infections of humans and non-human primates. Key lessons learned from those model systems may be applicable to the development of anti-retroviral drugs for treatment of KoRV infection or vaccines to prevent it. Aspects of the experience with model systems that are most likely to be translatable to KoRV infection include the identification of optimal drug targets, parameters for drug delivery, components of an effective vaccine, and approaches to measure protection.

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1 What natural retroviral systems might serve as useful models for treatment and prevention of KoRV infection?

FeLV infection in the cat

- Both FeLV and KoRV infect the natural host in the wild.
- Natural infection is associated with leukemia/lymphoma and with wasting disease, among other less common disease outcomes.
- Natural infection is frequently cleared by an effective immune response.
- Endogenous and exogenous viruses occur in both systems.
- FeLV and KoRV occur naturally in distinct subtypes defined by envelope sequence and receptor utilization. They utilize common receptors.
- FeLV-A is the horizontally transmitted subtype spread cat-to-cat in nature. Other subtypes arise *de novo* in each infected animal. The horizontally-transmissible FeLV-A subtype appears to be analogous to KoRV-B.

AIDS virus infections in nonhuman primates (NHP)

- AIDS viruses are lentiviruses (HIV, SIV) rather than gammaretroviruses (KoRV-A,B; FeLV-A,B).
- SIV infection occurs in the natural host (African NHP) and in experimental infection of Asian macaques.
- The virus is exogenous. Typically horizontal transmission occurs although vertical transmission (maternal-fetal or via nursing) can occur.
- Infection of natural hosts does not typically lead to progressive disease.

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