

## NEW DEVELOPMENTS IN RABIES VACCINES

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Since 1885 and the first application to Joseph Meister of the original Louis Pasteur's vaccine, "vaccinology" has become a specific topic in science to which rabies has predominantly contributed. The Pasteur's type of vaccines, produced on animal nervous tissues, are no more recommended by WHO due to potential adverse effects and their use has significantly diminished since 15 years. They have been progressively replaced by safer and more immunogenic vaccines purified from cell culture supernatants that are produced by companies from developed or emerging countries. Under an inactivated form, these vaccines are used for pre- and postexposure treatment in humans as well as for parenteral vaccination of domestic animals with possible adjuvant.

In the developed world, the systematic vaccination of dogs and the consecutive disappearance of dog rabies has led to the "emergence" of wildlife vectors in the epidemiological landscape, mainly carnivores and chiropters. New "replicative" vaccines have thus been developed for oral vaccination of wildlife, either attenuated rabies viruses or recombinant vaccines using different viruses (vaccinia virus, adenovirus, etc) expressing the rabies glycoprotein. Introduced in convenient baits, these replicative vaccines have succeeded to eliminate fox rabies from Western Europe, demonstrating once again the reactivity of the rabies community, from scientists to industrials, veterinarians and field workers.

Despite these constant progresses, new challenges are still ahead to improve rabies vaccinology and several of them will be discussed:

1. how to increase the spectrum of protection of classical anti-rabies vaccine to divergent Lyssaviruses that have been evidenced in bats. All vaccine strains currently used are from classical rabies virus genotype 1.
2. is oral vaccination a realistic complementary approach to parenteral vaccination for stray dog populations
3. can we still innovate in recombinant vaccines
4. may vaccines combine rabies antigens with other immunogens (different antigens, immunomodulatory or immuno-contraceptive molecules, ...).

