ORAL RABIES VACCINATION IN DOGS

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VIRBAC

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PREAMBULE

- Worldwide, dogs are the major reservoir for rabies

- Killing of stray dogs for rabies control is not a solution
  - Wherever it has been done, it has never been a success
  - Other animal species would “take their seat” (e.g. foxes)
  - Overall, it is not considered as ethical

- Stray dogs (dogs which cannot be caught, without owner) are not easily accessible for parenteral vaccination.
  - Hence the possible interest for Oral Vaccination of Dogs (OVD)

- 2 vaccines are recommended by WHO for oral vaccination of dogs
  - SAG2 and V-RG
SAG2 AS CANDIDATE FOR ORAL VACCINATION OF DOGS

- SAG2 strain is safe:
  - It has been widely used in Europe, for rabies elimination in wildlife (foxes and raccoon dogs) in a number of countries.
  - No vaccine-induced rabies case has been reported in Europe with SAG2

- SAG2 safety has been validated onto in 43 animal species (target and non-target): rodents, carnivores, primates, cattle, birds

<table>
<thead>
<tr>
<th>Common vole</th>
<th>Merion</th>
<th>Domestic ferret</th>
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<tbody>
<tr>
<td>(Microtus arvalis)</td>
<td>(Meriones)</td>
<td>(Mustela putorius fur)</td>
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<td>Bank vole</td>
<td>Greater Egyptian Jerboa</td>
<td>Honey badger</td>
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<tr>
<td>(Myodes glareolus)</td>
<td>(Jaculus orientalis)</td>
<td>(Melioua capensis)</td>
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<td>European water vole</td>
<td>Red fox</td>
<td>European badger</td>
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<td>(Arvicola amphibius)</td>
<td>(Vulpes vulpes)</td>
<td>(Meles meles)</td>
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<td>Tundra vole</td>
<td>Black-backed Jackal</td>
<td>African civet</td>
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<td>(Microtus oeconomus)</td>
<td>(Canis mesomelas)</td>
<td>(Civetis civetta)</td>
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<tr>
<td>Northern red-backed vole</td>
<td>Side-striped Jackal</td>
<td>Large-spotted genet</td>
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<td>(Myodes rutilus)</td>
<td>(Canis adustus)</td>
<td>(Genetta tigrina)</td>
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<tr>
<td>Arctic ground squirrel</td>
<td>Golden Jackal</td>
<td>Slender mongoose</td>
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<td>(Spermophilus parryii)</td>
<td>(Canis aureus)</td>
<td>(Galeraella sanguinea)</td>
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<td>Field mouse</td>
<td>Western coyote</td>
<td>Raccoon</td>
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<td>(Apodemus flavicollis/syladicus)</td>
<td>(Canis latrans)</td>
<td>(Procyon lator)</td>
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<td>Norway rat</td>
<td>Domestic dog</td>
<td>Striped skunk</td>
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<td>(Rattus norvegicus)</td>
<td>Meriones</td>
<td>(Mephitis mephitis)</td>
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<td>Multi-mammate mouse</td>
<td>Wild dog</td>
<td>Chimpanzee</td>
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<td>(Mastomys natalensis)</td>
<td>Lycaon pictus</td>
<td>(Papio ursinus)</td>
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<td>Bushfelt gerbil</td>
<td>Raccoon dog</td>
<td>Western European hedgehog</td>
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<td>(Gerbilliscus leucogaster)</td>
<td>(Nyctereutes procyonoides)</td>
<td>(Erinaceus europeus)</td>
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<td>North African gerbil</td>
<td>Domestic cat</td>
<td>Wild boar</td>
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<td>(Gerbillius campestris)</td>
<td>(Felis catus)</td>
<td>(Sus scrofa)</td>
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<td></td>
<td>Domestic cat</td>
<td>Domestic goat</td>
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<td>(Felis catus)</td>
<td>(Capra hircus)</td>
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<td>Cow</td>
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<td>(Bos primigenius)</td>
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<td>Carrion crow</td>
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<td>(Corvus corone)</td>
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<td>Pied crow</td>
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<td>(Corvus albus)</td>
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<td>Rook</td>
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<td>(Corvus frugilegus)</td>
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<td>Buzzard</td>
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<td>(Buteo buteo)</td>
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<td>Red kite</td>
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<td>(Milvus milvus)</td>
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<td>Tawny owl</td>
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<td>(Strix aluco)</td>
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<td>Long-eared owl</td>
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<td>(Asio otus)</td>
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<td>Barn owl</td>
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<td>(Tyto alba)</td>
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Virbac
SAG2 & Oral vaccination of dogs - INDIA

- Safety and efficacy trials made in India (Bhopal, 2004)

  - **Safety**
    - No salivary excretion of infective viral particle.
    - No adverse clinical sign up to 219 days post-baiting
    - No replication of the bait virus in brain / salivary glands

  - **Efficacy**
    - 100% of the vaccinated dogs resisted to viral challenge.
    - 100% of the unvaccinated dogs died.

- SAG2 is now registered in India
  - the only oral rabies vaccine for dogs registered in the world
SAG2 and oral vaccination of dogs – other countries

- Feasability trials have been carried out in several countries:
  - India,
  - Tunisia,
  - Mexico,
  - South Africa,
  - Indonesia,
  - Morocco

All trials were pilot. No large scale trial has ever been made

- Some infos on the SAG2 bait development
SAG2 - Bait for dogs

- Blister containing the vaccine
  - Identical to the wildlife bait blister \(10^{7.8}\) CCID50 / bait

- Shape and size: suitable for dogs
  - Round, 44mm diam.
  - Thin, so the blister is easily pierced, and vaccine in contact with oral mucosa and tonsils.
  - Adherent to the blister
  - Cement colour, not to attract attention to humans

- Bait casing is palatable to stray dogs
  - Chicken liver flavour
MOROCCO TRIAL (2014)

- **Preamble**
  - Canine rabies is important in Morocco
  - 20 human deaths reported annually

- **Protocolle**
  - Use of SAG2 bait, palatable for dogs (chicken liver taste)

- Distribution models:
  - Door to door distribution model (on 60 owned dogs)
  - Hand out (on 15 stray dogs)
  - Wildlife immunization model (30 baits - 4 lines, near slaughterhouse & market).
MOROCCO TRIAL : RESULTS

- **DDDM (door to door distribution model)**
  - 100% of dogs are attracted to the bait
  - 77% of dogs eat the bait. 80% of blisters were pierced.
  - So 67% of dogs were in contact with the vaccine.

- **Hand out**
  - 100% of dogs are attracted
  - 46% of dogs took the bait (some eat / some bury it).
  - Others are scared

- **WIM (wildlife immunization model)**
  - 73% of baits have disappeared
  - 68% of found capsules were pierced

- Conclusions
Oral vaccination of dogs - limitations

- People may be scared with dogs
  - Either for parenteral, or for oral vaccination, we need people comfortable with handling dogs

- Goal is to reach 70% vaccination of the given population
  - We do not reach this figure with OVD
    - All dogs are attracted, but some are scared and will not take the bait. Or will take it, but not eat it.
  - WIM: which % of animals ate the bait?

- Logistics:
  - Bait storage -20° C (from storage rooms, transportation, down to villages).
  - Baits have to be defrozen before vaccination

- Organization
  - Involvement of the community
  - Baits remains – to be destroyed
  - Hours of the day
OVD – Pre-requisites

- Parenteral vaccination needs to be maximized beforehand
  - Pet (owned animals)
  - Accessible dogs

- Special teams to be trained on how to approach dogs

- Data to be available
  - dog population (sensus),
  - Incidence on rabies in dogs
  - human population,
  - Yearly number of bites
• Rabigen SAG2 is an adequate candidate for oral vaccination.
  ▪ It is safe
  ▪ It is efficient
  ▪ It is palatable

• Oral vaccination is a tool for rabies control in stray dogs, but cannot be the tool.
  ▪ It can come in addition to parenteral vaccination, but cannot substitute to it.
  ▪ It cannot be implemented before parenteral vaccination has been optimized.

• Further trials needs to be done. And strategies need to be suited to each specific situation.
RABIGEN SAG2  - features and benefits

Thank you!