Autogenous vaccines in Germany

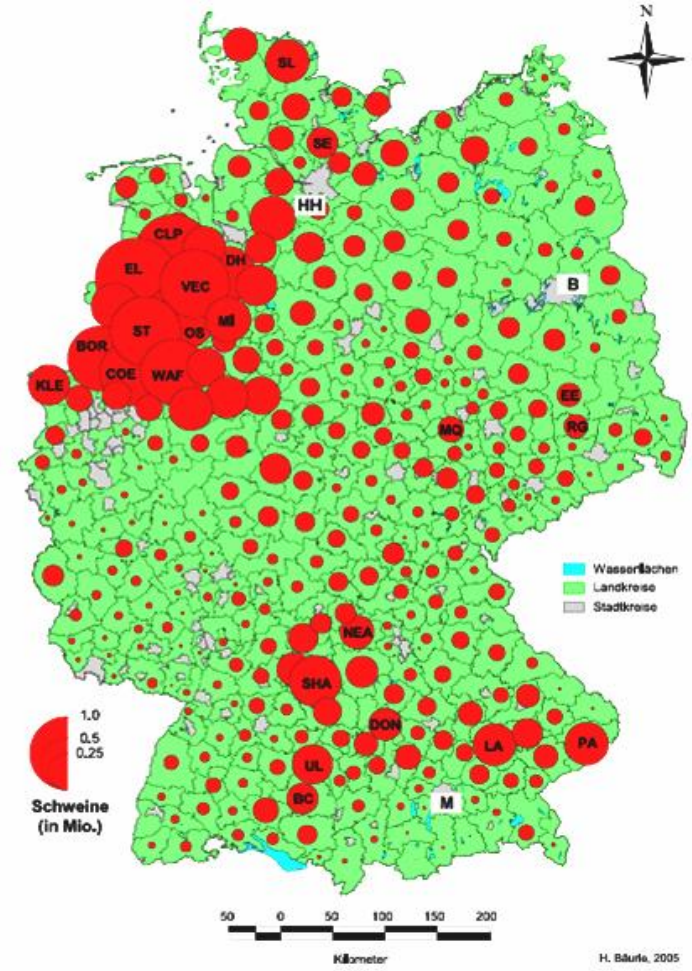
Legislation, production and use of autogenous vaccines in pigs in Germany

Alexander Maas, 02.05.2013

vaxxinova

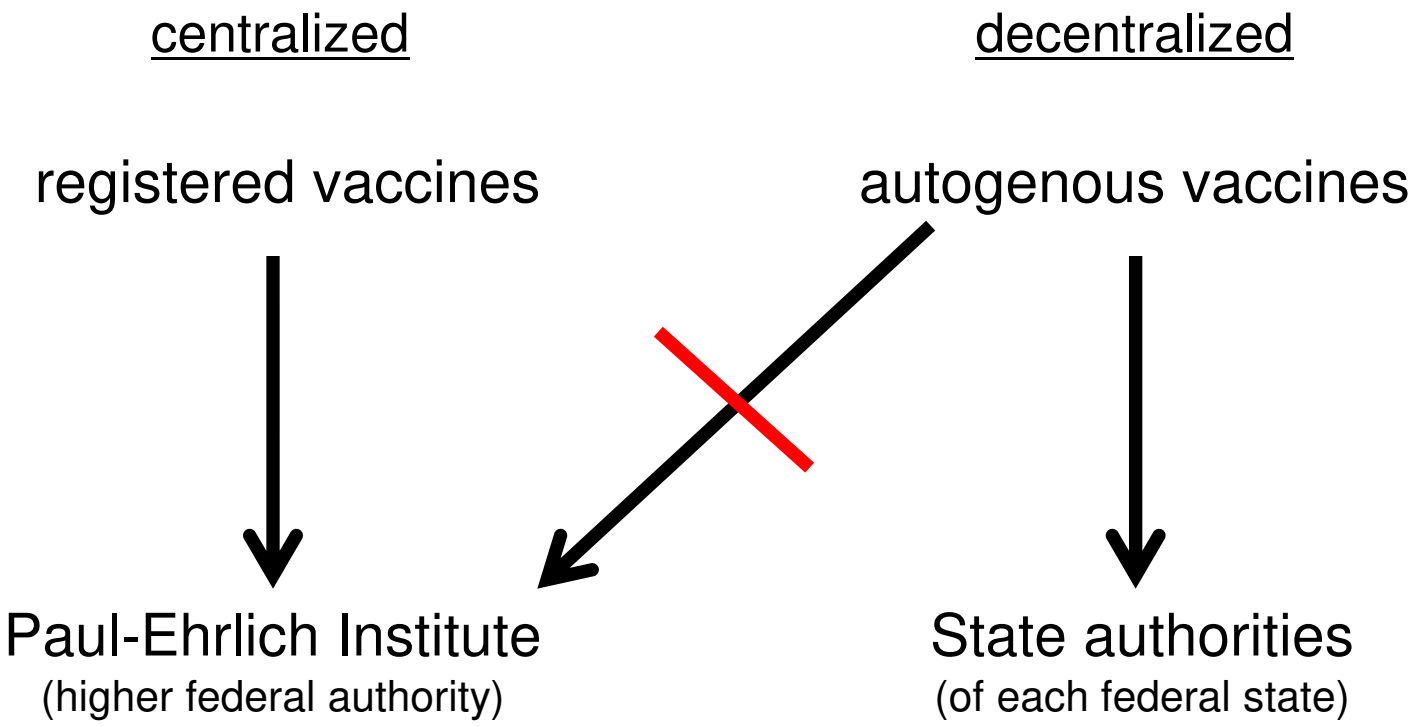
Federal system in Germany

Pig distribution in Germany (2005)



Political map of Germany

Control & permission responsibilies



Basic legal principles

- Tiergesundheitsgesetz /Tierseuchengesetz => Bundestag
  (animal health law/epizootic disease law) (lower house of federal parliament)
- Tierimpfstoffverordnung => Bundestag
  (veterinary vaccine act) (lower house of federal parliament)
- Ausführungshinweise (execution remarks) (federal states)
- Manufacturing permission (federal states)

Basic legal principles

Tiergesundheitsgesetz:

One single passage dealing with autogenous vaccines

§ 17c:

(1) „ vaccines have to be registered…. with the exception of inactivated vaccines which are produced with pathogens isolated in a certain herd“

Basic legal principles

Tierimpfstoff-Verordnung

- Definition of autogenous vaccines:

„inactivated vaccines produced with pathogens isolated in certain herd and used only in that certain herd

- Production and storage requirements for autogenous vaccines:

⇒ No need for apply Good Manufacturing Practice (GMP), but according to current state of scientific and technical knowlegde

- Raw materials

⇒ No need to use European Pharmacopoia listed raw materials (e.g. yeast from the supermarket)

- Batch release

⇒ No central batch release

- Expiry date

⇒ Restricted to 6 month after production

Basic legal principles

Ausführungshinweise zur Tierimpfstoffverordnung vom 24. Oktober 2006 (BGBl)

⇒ Try to explain generally defined passages:

„it is allowed to vaccinate herds with pathogens isolated in the later production, for example is it allowed to vaccinate sows with pathogens isolated in the weaning or fattening unit, independed from the location or the ownership of the animals…“

Basic legal principles

Manufacturing permission

⇒ Granted by the local state authority
⇒ Contains further requirements and interpretation of the current law

Field of use:
„ autogenous vaccines are allowed to be used if in the field of application no appropiate, registered vaccine is available…“

⇒ No registered vaccine exists (e.g. Sc. suis, St. hyicus…)
⇒ No registered vaccine available (delivery problems)
⇒ Registered vaccines provide not sufficient efficacy (HPS, APP…)

In consequence, autogenous vaccines can only be regarded as supplementation and not as alternative to registered vaccines

Basic legal principles

⇒ Only generally defined

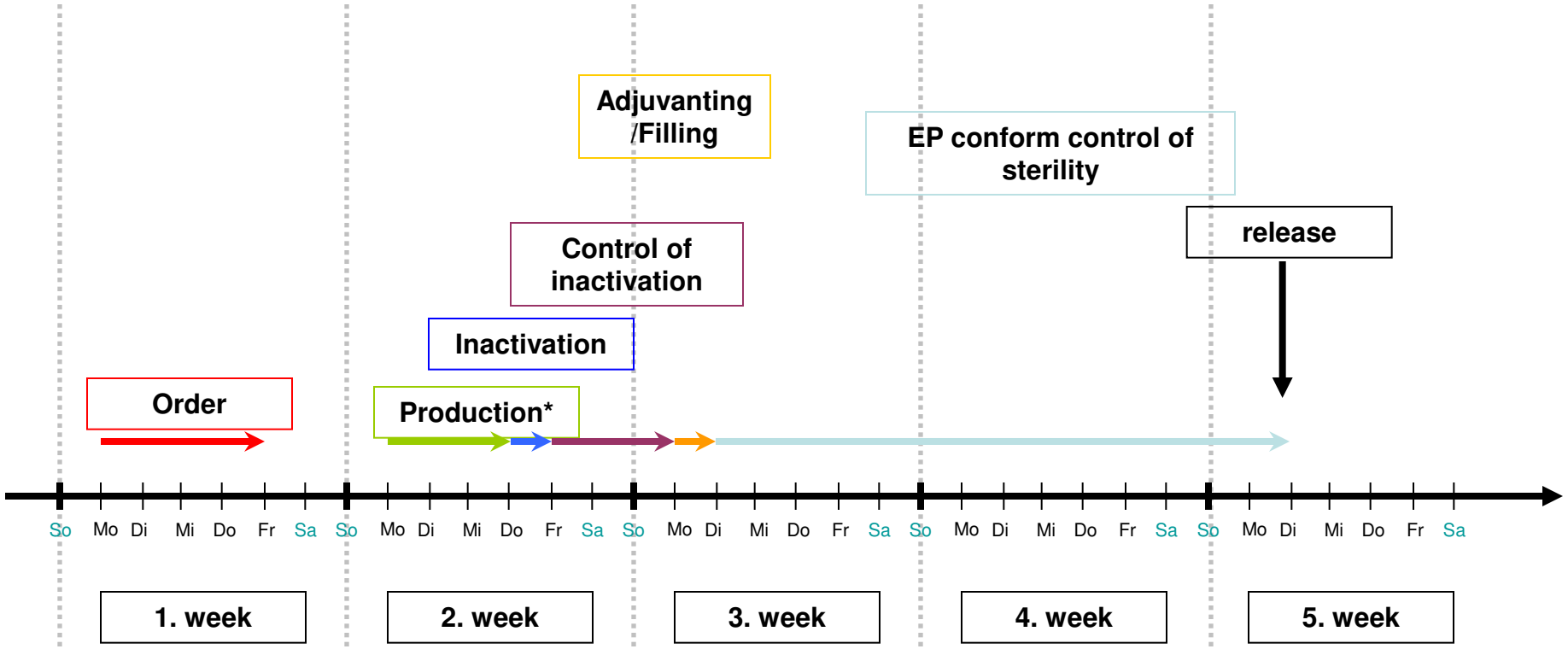
⇒ No definition of „ current state of scientific and technical knowledge“

⇒ Considerable differences in the production requirements between federal states

⇒ No clear definition of „farm/herd“

⇒ No clear definition for „field of use“

Timeline for optimal production of „rapidly growing bacteria“

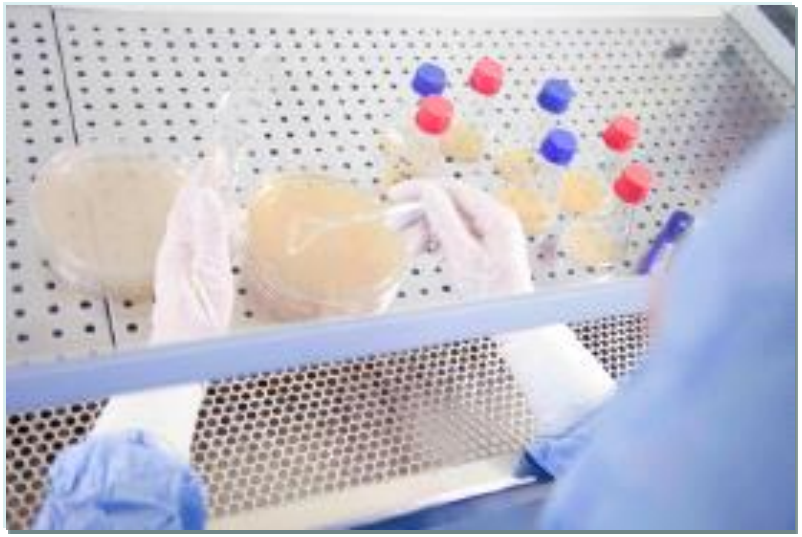


* depending on agent 2 to 6 days

vaxxinova

Vaccine plant

Bacterial production



Filling

Field of use in swine

- *Haemophilus parasuis*
- *Streptococcus suis*
- *Actinobacillus pleuropneumoniae*
- *Pasteurella multocida*
- *Bordetella bronchiseptica*
- *Mycoplasma hyorhinis*

- *Staphylococcus hyicus*
- *Staphylococcus aureus*

- *Escherichia coli*
- *Clostridium perfringens*

- *Clostridium difficile*
- *Streptococcus dysgalactiae spp. equisimilis*
- *Arcanobacterium (Trueperella) pyogenes*
- *Enterobacter spp./Klebsiella species*
- *Mycoplasma hyosynoviae*

Diagnostics

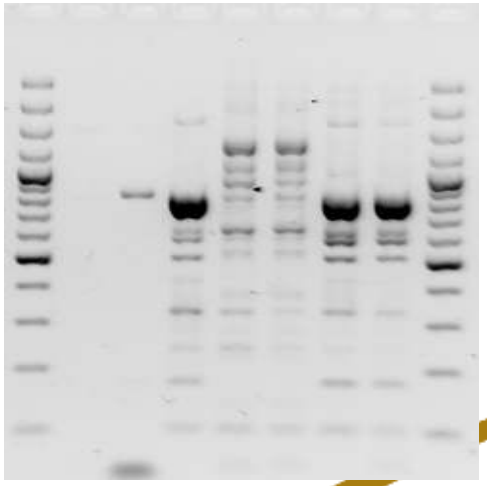
⇒ plays a key role in the success of autogenous vaccines

⇒ Selection of animals important task of the veterinarian

⇒ Highly experienced lab for the isolation

⇒ Typing of strains essential for selection (St. hyicus, APP, HPS…)

⇒ Exclusion of alternatives (SIV, PRRS, PCV-2…)



Haemophilus parasuis

- Distributed in all swine herds
- Often problems in herds with high health management
- Polyserositis, Pneumonia, Meningitis, Polyarthritis
- 15 serotypes are described
- Registered vaccines containing serotypes 4 and 5
- Only limited crossprotection

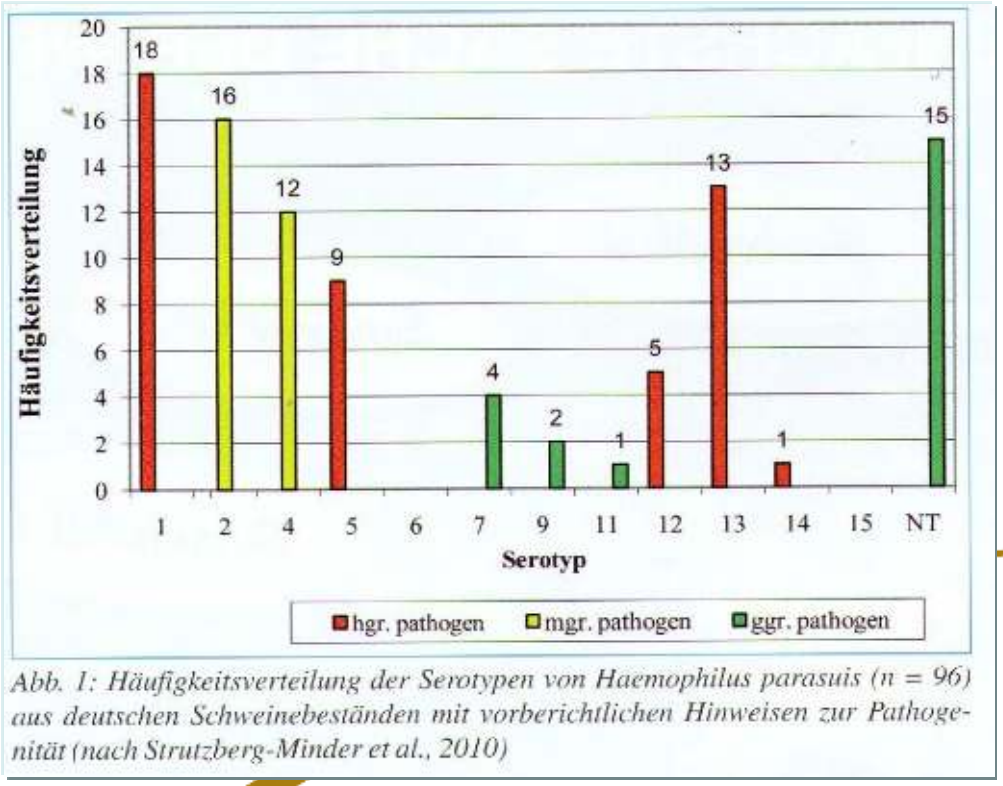


Abb. 1: Häufigkeitsverteilung der Serotypen von Haemophilus parasuis (n = 96) aus deutschen Schweinebeständen mit vorberichtlichen Hinweisen zur Pathogenität (nach Strutzberg-Minder et al., 2010)

(Lappe, 2011)

Haemophilus parasuis

⇒ Autogenous vaccine contain often more than one strain

⇒ Isolation of disease causing strain is essential for success

⇒ Sow vaccination leads to protection up to six weeks post partum

⇒ Piglet vaccination usually not before four weeks of age

⇒ Often combined vaccination (sows/piglets)

Streptococcus suis

- Distributed in all swine herds
- Meningitis, Polyarthritis,
- Virulent serotypes are often serotypes 1, 2, 7, 9
- No registered vaccines
- Nearly no crossprotection between serotypes

Noe

Streptococcus suis

⇒ Autogenous vaccine contain often more than one strain

⇒ Isolation of disease causing strain is essential for success

⇒ Sow vaccination leads to protection up to six weeks post partum

⇒ Piglet vaccination usually not before four weeks of age

⇒ Interference between sow and piglet vaccination up to 6 week of age

CLINICAL AND VACCINE IMMUNOLOGY, Oct. 2010, p. 1589–1597 Vol. 17, No. 10
1556-6811/10/$12.00 doi:10.1128/CVI.00159-10

Immunogenicity of an Autogenous *Streptococcus suis* Bacterin in Preparturient Sows and Their Piglets in Relation to Protection after Weaning▽†

Christoph Georg Baums,[1]* Christian Brüggemann,[1] Christoph Kock,[3] Andreas Beineke,[2] Karl-Heinz Waldmann,[3] and Peter Valentin-Weigand[1]

Swine Influenza - SIV

Epidemiological Research project

Number of tested samples:	2696 in 382 herds
Number of positive samples:	658 (24.4%) of 154 (40,4%) herds
Distribution of subtypes:	H1N1 = 50%, H1N2 = 10,4% H3N2 = 6,5%, H1N1pdm =1,3% H1pdmN2 = 7,1%

Reassortants of pandemic influenza A 1 virus H1N1/2009 and endemic porcine HxN2 viruses emerge in swine populations in Germany

E. Starick, Elke Lange, Christian Grund, Elisabeth grosse Beilage, Stefanie Döhring, Alexander Maas, Thomas Noé, M. Beer, T.C. Harder

Opportunity/Limitation

Opportunity

- Herd-specific opportunity to prevent bacterial diseases
- Reduction of bacterial caused infections and thereby reducing antibiotic medication
- Offers the possibility to combine different pathogens in a single vaccine
- Well-grounded diagnostics are the basic requirement for the success of an autogenous vaccine

Limitation

- Only limited published efficacy data
- Only inactivated vaccines
- Difficult to isolate pathogens
- Chances of success dependent on pathogen (e.g. *Sc. suis vs.* HPS*)*
- Multifactorial infections (diahrroea/ viral pathogens)
- No differentiation of infected and vaccinated animals

Summary

Based on the German experience:

⇒ Autogenous vaccines can only be regarded as supplementation and not as alternative to registered vaccines

⇒ Autogenous vaccines are mainly used for highly variable pathogens

⇒ Autogenous vaccines are not able to completely replace antibiotic use

⇒ Diagnostic work plays a key role

⇒ Vaccination is increasingly relevant

Vielen Dank für Ihre Aufmerksamkeit