



Preventing the next
pandemic at the source with
next-gen needle-free vaccines

Perjan Pleunis – Co-founder, CEO



Next pandemic is at our doorstep

Highly Pathogenic Avian Influenza

BIRD FLU

01

Lethal disease in animals



02

€10 bn+ economic impact



03

High risk of spread



Need

Tackle the issue at the source; Vaccinate!



?



So, the real need is

Needle-free oral vaccines



World Organisation
for Animal Health



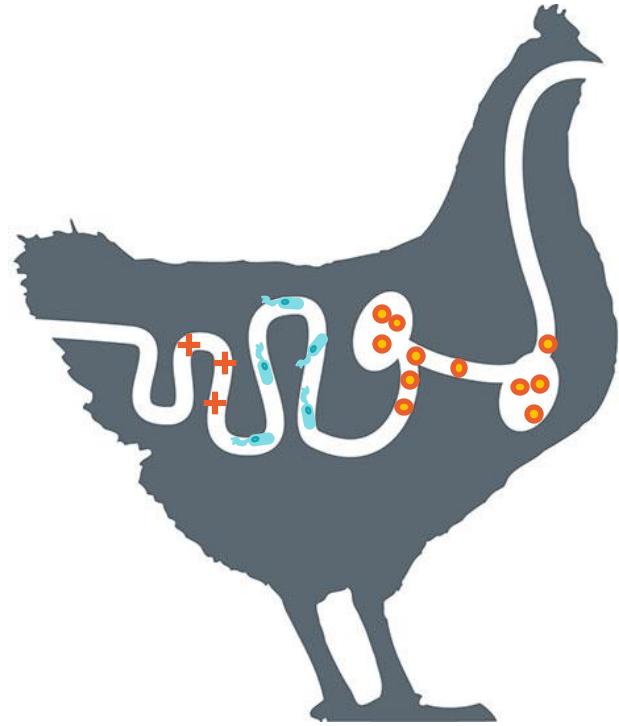
Food and Agriculture
Organization of the
United Nations

LivingMed[®]
Biotech

- ❖ In food or water
- ❖ Based on biological carrier
- ❖ Suitable in multiple species
- ❖ Suitable as platform for other vaccines

In practice

100% safe biological carrier



1



Engineer bacterial molecular chassis

2



Add to food

3



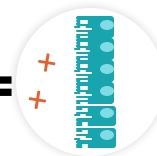
Bacteria arrive in gut

4



Secrete antigen

=



Activate immune system

Advantages



Better protection



Our design aims at delivering MUCOSAL immunity



No needles



Fast, Safe, Convenient and Stress-free for animals.



No waste



No biohazardous and medical waste (i.e. needles, left-overs).



No cooling



No cold-chain needed
Easy shipment, handling, and storage - even in warm regions.

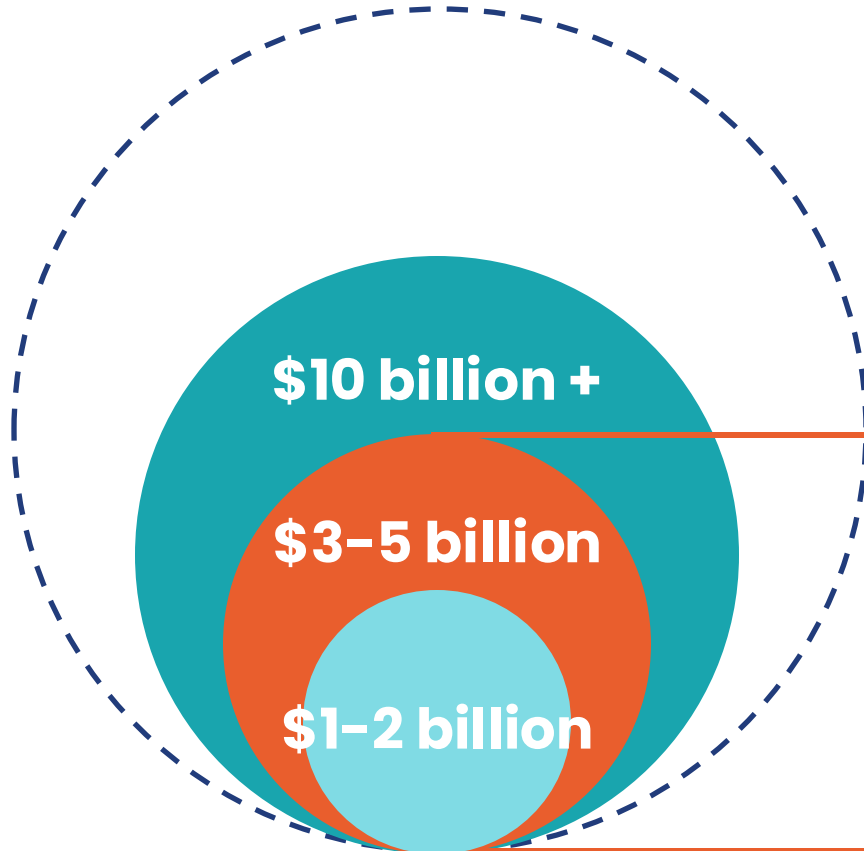


Cost-effective



Competitive PLUS highly efficient supply chain.

Opportunity



MASSIVE POTENTIAL (Human and/or Other disease)

- ❖ Price €€€

TAM INCLUDING SWINE AND CATTLE \$10b +

- ❖ Price €5-10

Initial focus

TAM POULTRY ONLY: \$3-\$5 BILLION

- ❖ 80 billion global poultry population
- ❖ Price of €0.02-0.05

SAM POULTRY ONLY: €1-2 BILLION

- ❖ Average 33% vaccinated globally

Market Landscape

1. Avian Influenza Vaccines



All needle-based



No mucosal immunity



Large interest in Avian Influenza animal vaccines

2. Mucosal vaccines



All for humans



Nose spray / eye drop



Large interest in mucosal vaccines

3. Biological delivery platforms



No focus on Vaccines



Lack important properties



Emerging interest in biological carriers

Leadership Team

LivingMed has an expert diverse leadership team



Perjan Pleunis
Co-founder and CEO

- ❖ Seasoned **entrepreneurial & Bus Dev lead** >25y of experience



Prof. Dr. Philippe Lambin, Co-founder & CSO

- ❖ M.D., **World-leading expert** in precision medicine (627 peer-reviewed articles in highly ranked journals)



Dr. Ernst Soethout
Scientific Advisor

- ❖ **Expert in (animal) vaccine** development with >30y of experience as a vet and vaccinologist



Dr. Niall Bollard
Lead scientist

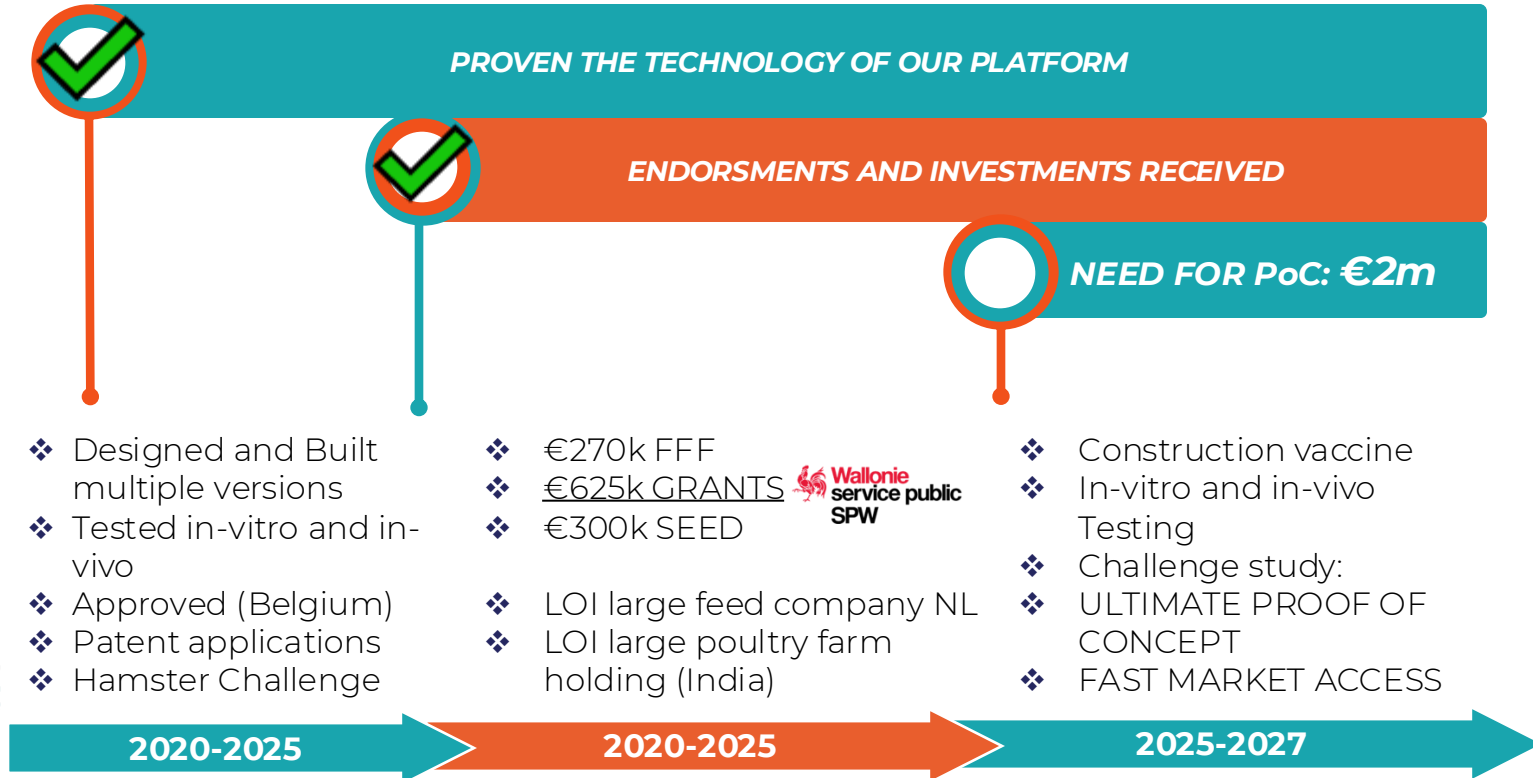
- ❖ Micro-biologist and **expert** in bacterial **engineering**



CER Group
External R&D partner

- ❖ Top Tier Belgian R&D institution / CRO
- ❖ home base of LMB

Milestones and next steps:





Join us in
preventing the **next**
pandemic!



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Back-up Slides

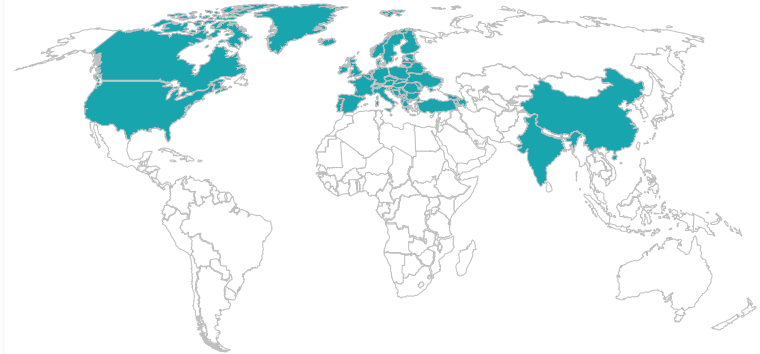


Scientific validation

LivingMed Biotech's pioneering technology works and has solid global scientific backing with extensive IP protection

- ❖ **Proof of Concept:** LMB orally vaccinated hamsters against SARS-CoV-2 with the University of Liège
- ❖ **Demonstrated Efficacy in Chickens:** Successful oral vaccination against HPAI shown by Southwest Jiaotong University ([Ren. Y et al., 2022](#))
- ❖ **World Experts in Clostridium:** Founder recognized internationally (search "Lambin Clostridium" on [Google Scholar](#))
- ❖ **Extensive Research & Publications:** Multiple Clostridium-based chassis created and published
- ❖ **Comprehensive HPAI Efforts:** Feasibility study, Target Product Profile, and antigen selection conducted with a leading veterinary vaccinologist

IP Coverage



- ❖ Patented Oral Vaccine Chassis until 2042: Safe molecular platform approved by the Belgian Authority (FAMHP)

Market sentiment

LivingMed validated potential client interest and sees pharma appetite in oral vaccines

Challenges of traditional needle-based vaccines

1. **Skilled workforce gap:** not enough trained personnel to safely administer injections safely and in the right dosage
2. **Animal welfare concerns:** handling stress can cause sudden death in chickens
3. **High-cost pressure:** needle-based methods can be expensive to buy, ship, store and administer
4. **Time & accuracy trade-off:** large flocks under tight timelines (for several batches/year) lead to vaccination errors

Opportunity for oral vaccines

1. **No (trained) personnel needed:** easily mixed into food or water
2. **Reduced stress & mortality:** no direct handling of animals required, minimizing sudden deaths
3. **Cost-effective:** generates savings throughout the supply chain (no cold chain, easy and long storage and handling, no waste)
4. **Rapid coverage:** entire flocks vaccinated in a single feeding session
5. **Expanded coverage:** vaccinate wild birds and animals at risk

LMB validated the interest with:



- ❖ Major animal food producer
- ❖ \$7bn turnover
- ❖ Develops health products as food additives
- ❖ Gave us a Letter of Interest highlighting our potential



- ❖ Indian family conglomerate with medium scale hatcheries

Pharma exploring needle-free vaccines options:



Competitive advantage

LivingMed Biotech's patented biological carrier has all the superior properties needed, that no competitor that uses a microorganism delivery platform has entirely

By nature:

Superior natural capabilities of our carrier :

- ❖ **Spore-former** making it;
 - Thermo stable
 - Acid resistant (no need to add protective layer)
 - Easy to handle and process
- ❖ **Anaerobic** making it;
 - Only active in the gut (no oxygen), nowhere else
 - Commensal;
 - Already present in natural microbiome of human and animal, safe!
- ❖ **Protein secreting** making it the ideal
 - Bio-factory
 - Delivery vehicle. Produces and delivers, nothing more.
- ❖ **Scalable** to produce

By design:

Our scientists then made it **even safer** by:

- Removing potentially disadvantageous genes
- Creating a biocontainment system

And **more effective** by:

- Engineering fast adaptability (in 11 days)
- Ensuring stable integration

