



THE UNIVERSITY *of* EDINBURGH
Royal (Dick) School of
Veterinary Studies

Towards Edible Vaccines In Chickens

Dr. Kate Sutton



Biotechnology and
Biological Sciences
Research Council

Vaccination on a large scale



Requirements

Cheap

Easy to produce

Easy to administer

No residual pathogenicity

Low/no boost necessary

Reduction of transmission

Applicability

Individual Application

- Injection
- Eye/nose drop
- Wing-web scarification

Mass Application

- Drinking water
- Spray
- Aërosol
- In ovo



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Reduction of transmission

LMIC

Small batches of vaccine

No cold chain requirements

**Non-specialised applicability
of the vaccine**

Vaccine Advancements

- ✓ Dissolved in 1 mL of water within 10 seconds
- ✓ Small batches – one table can immunised 50 chickens
- ✓ Stable for 24 h at room temperature
- ✓ Demonstrated using a well known commercial vaccine against NDV



VetRecord

Research

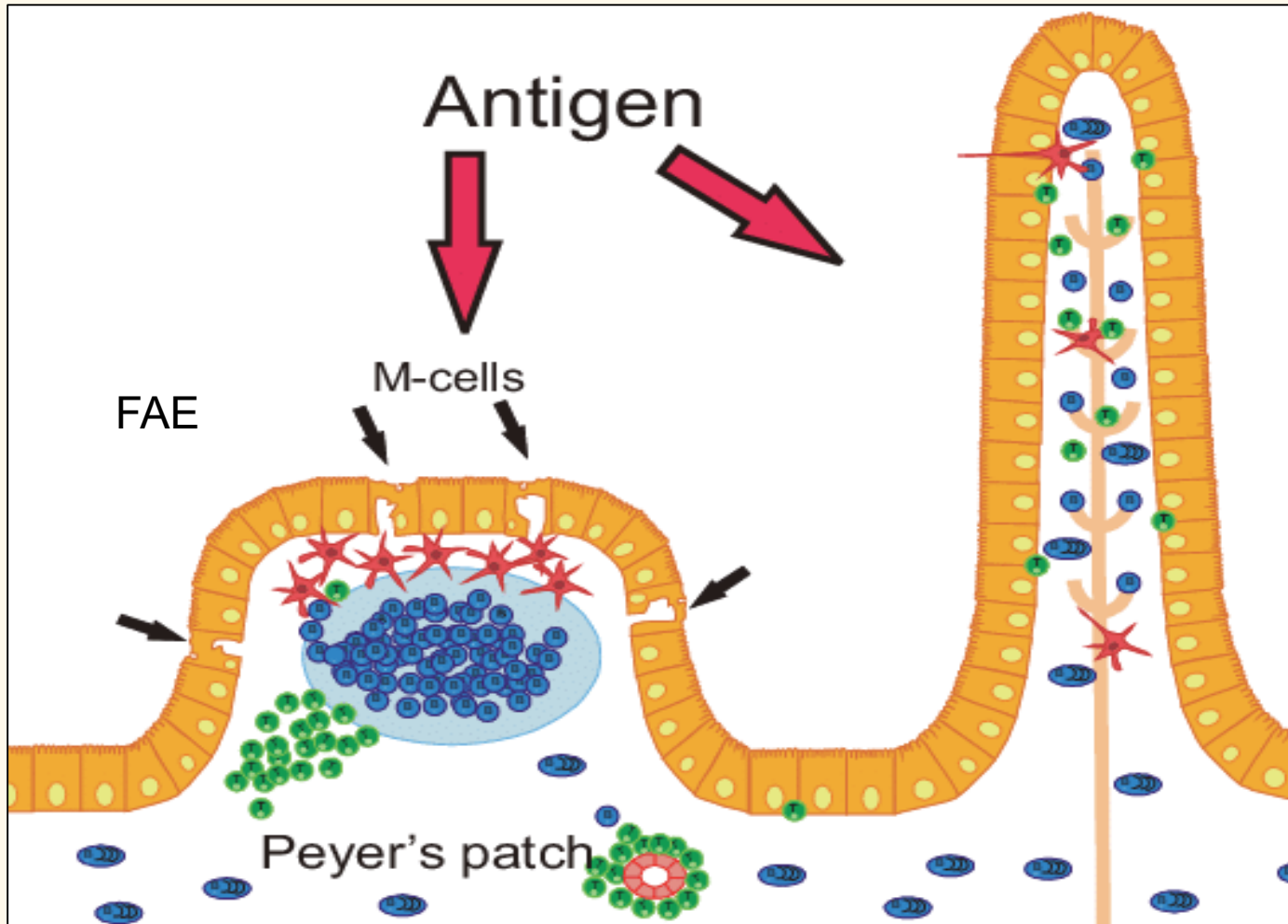
Development of a low-dose fast-dissolving tablet formulation of Newcastle disease vaccine for low-cost backyard poultry immunisation

M. Lal PhD✉, C. Zhu PhD, C. McClurkan BS, D. M. Koelle MD, P. Miller DVM, PhD, C. Afonso PhD, M. Donadeu DVM, MS, B. Dungu DVM, PhD, D. Chen PhD

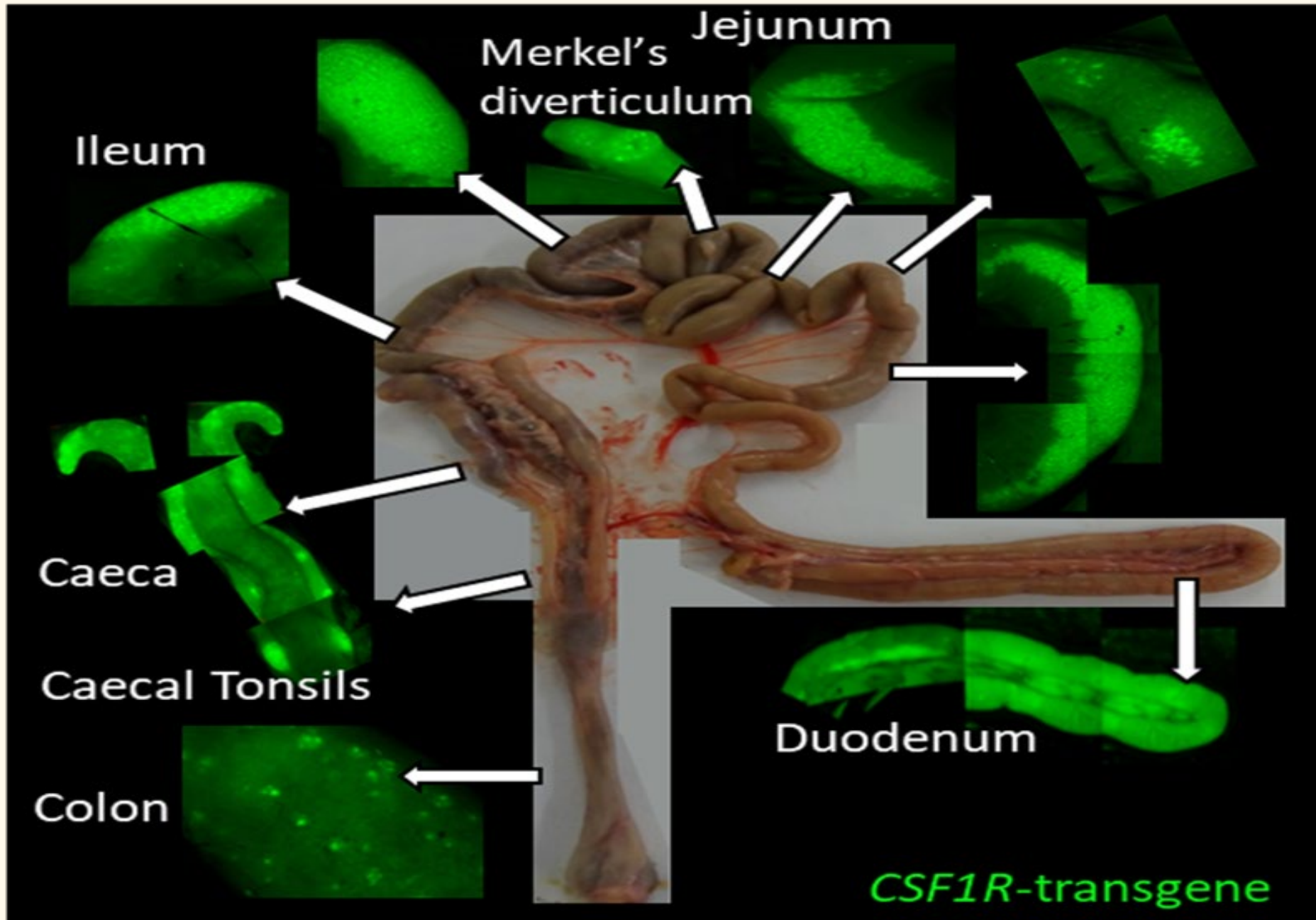
First published: 17 May 2014 | <https://doi.org/10.1136/vr.101926> | Citations: 1



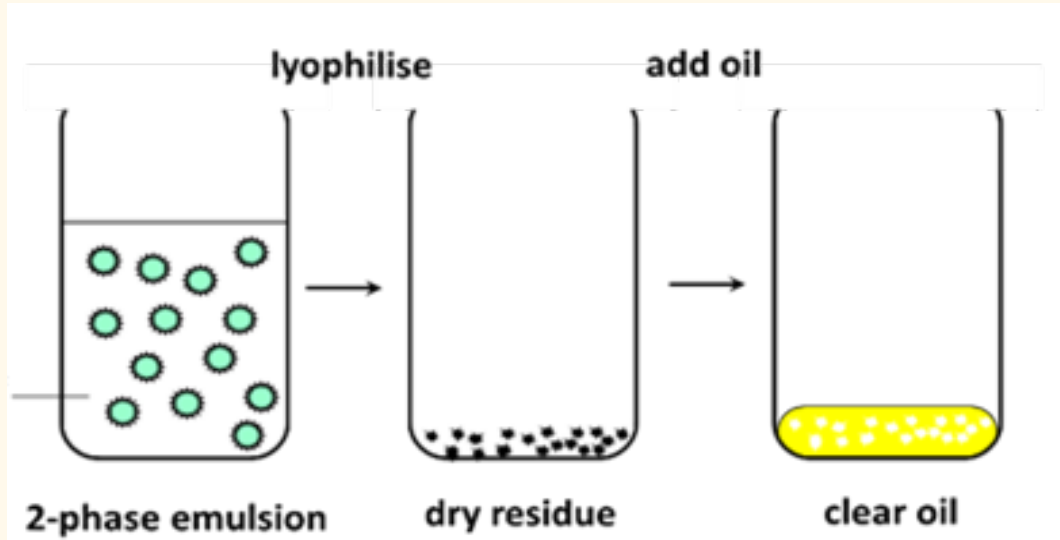
Vaccine uptake through the Gastrointestinal tract



CSF1R-Reporter Transgenic Chickens



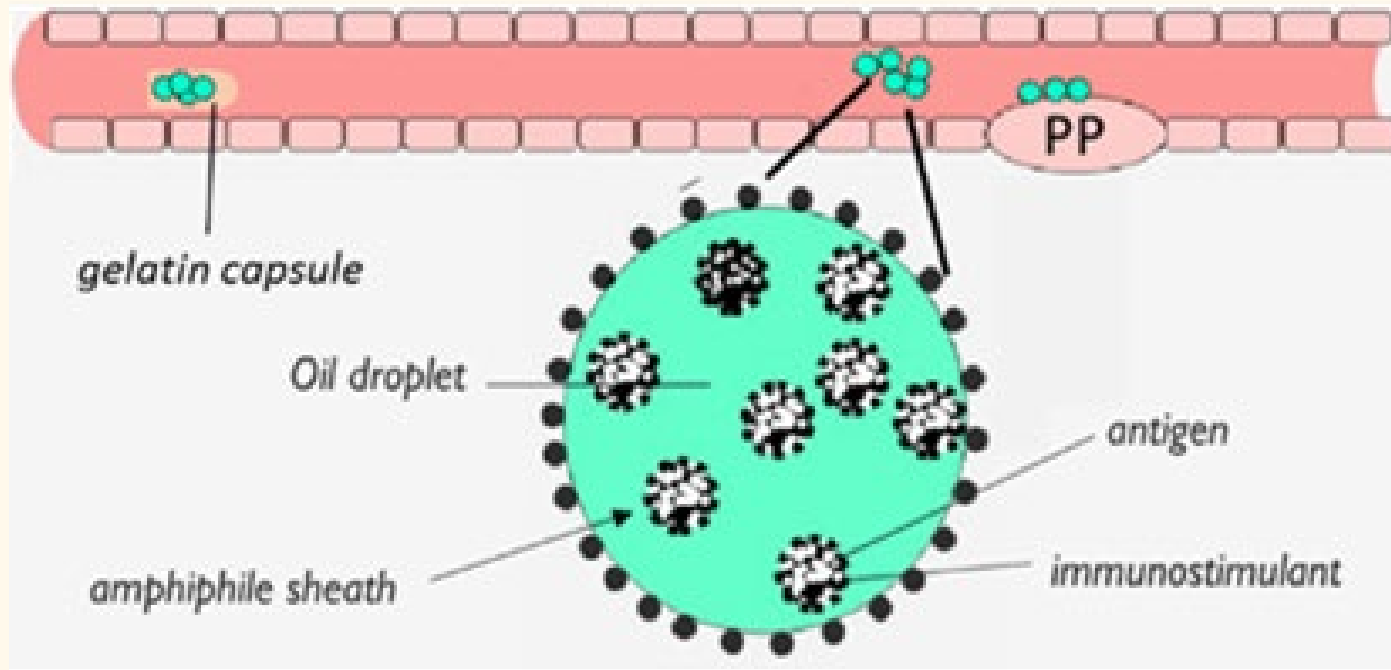
Proxima Concept's Vaccine Carrier



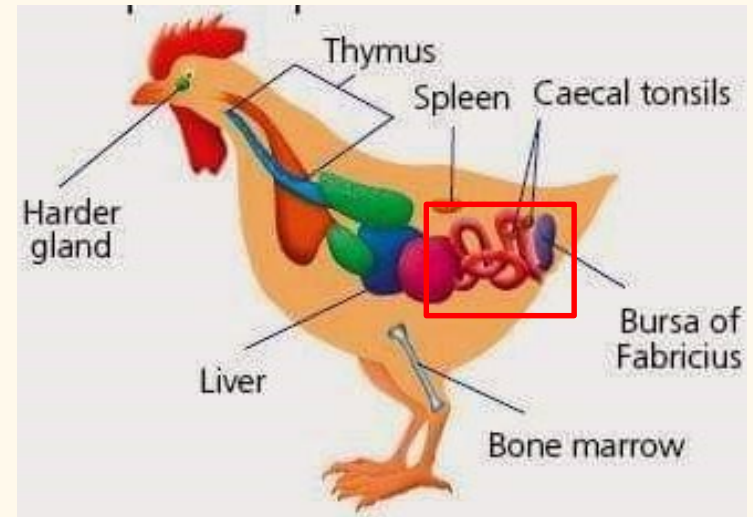
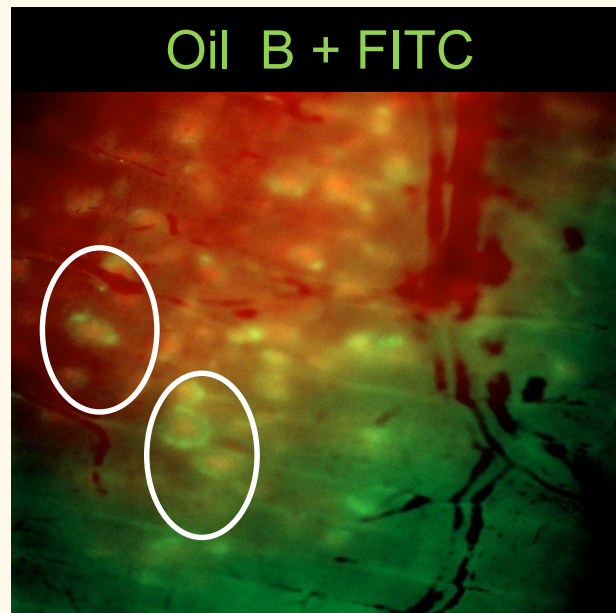
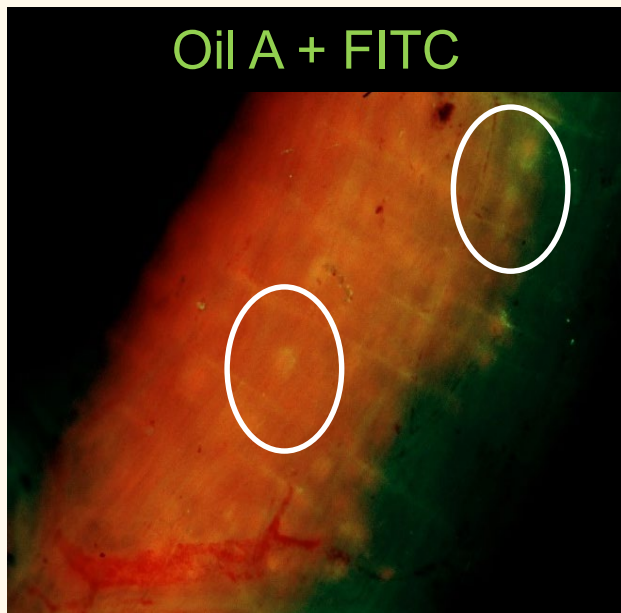
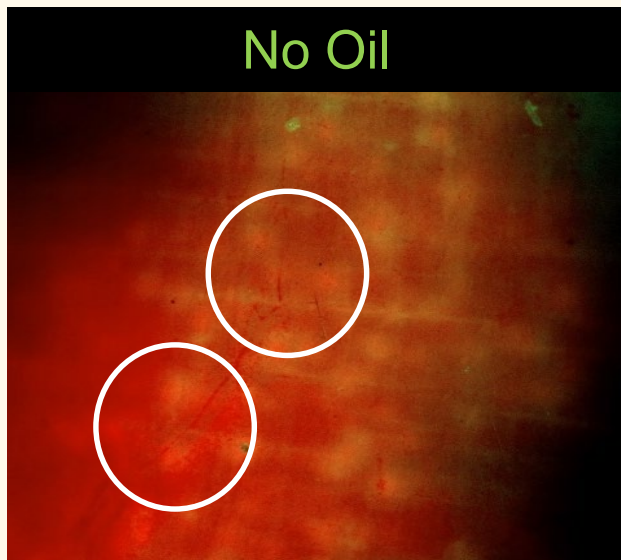
Capsules



Proxima Concept's Vaccine Carrier

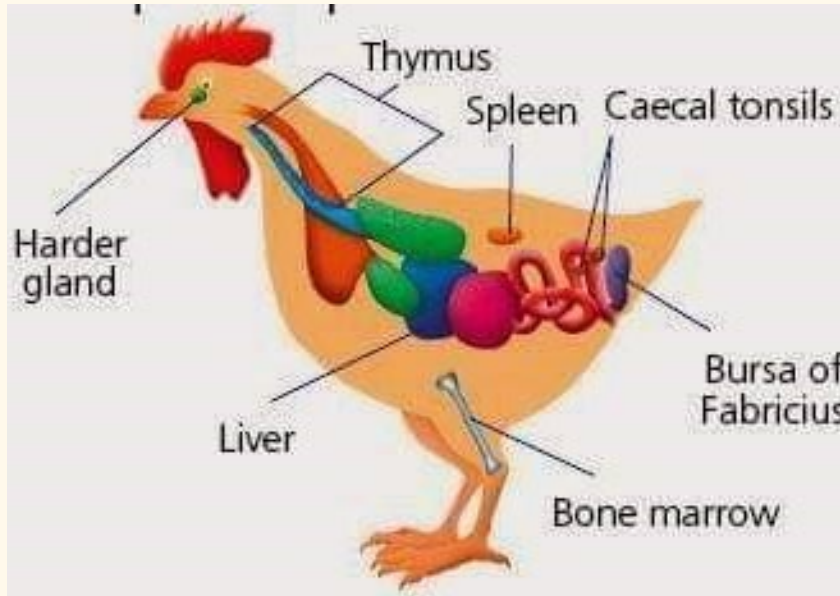


Co-localisation of Proxima's Oils with Peyer's Patches



Duodenum

Vaccination using the Oil Carriers



Groups

Oil alone

Oil + KLH

Oil + CTB

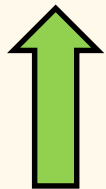
Oil + CTB + KLH

Week 3

Week 5

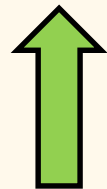
Week 7

Week 9



Blood
sample

Oral
Immunisation



Blood
sample

Oral
Immunisation



Blood
sample

Oral
Immunisation



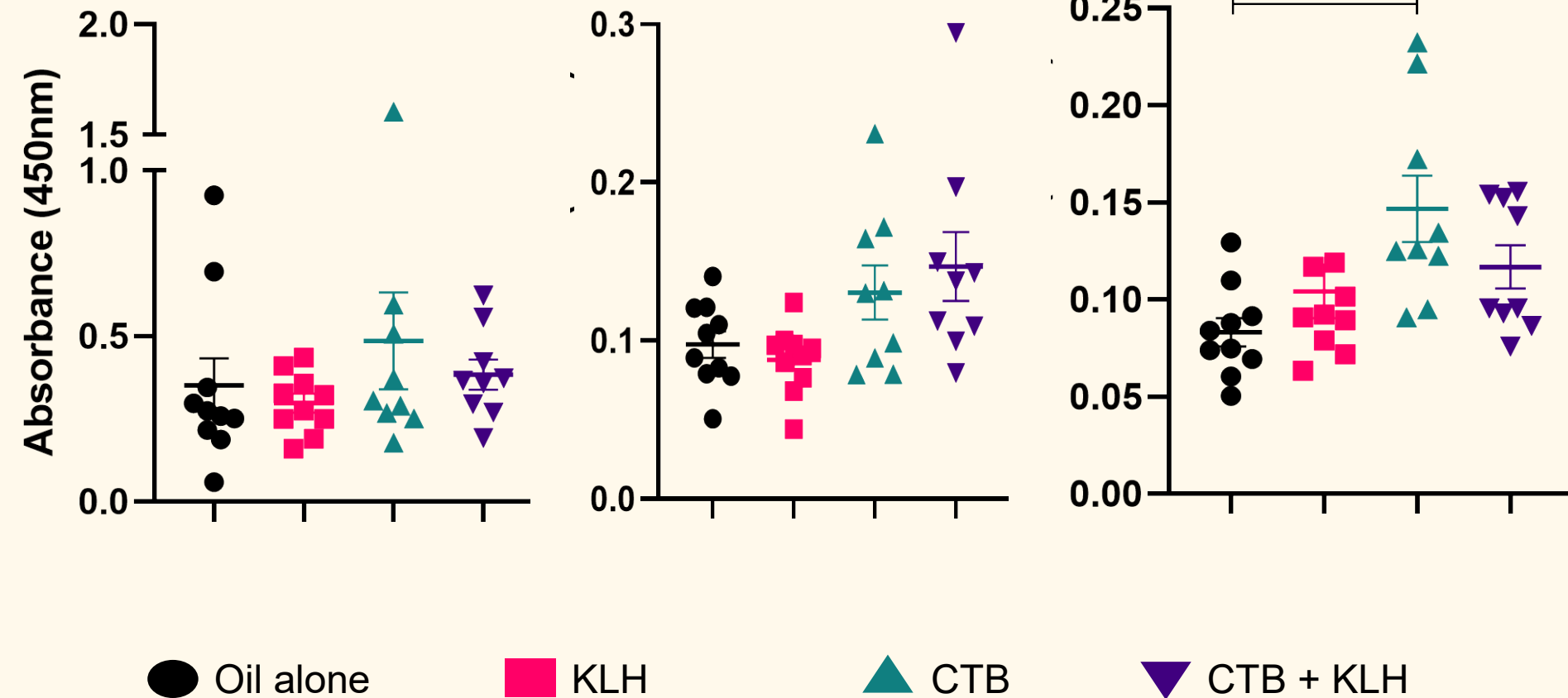
Cull
Blood &
Mucosal samples

Mucosal IgA-specific CTB response

Duodenum

Jejunum

Caeca



Week 9

Results

Proof-of-principal

- Co-localisation of Proxima's oil formulations with Peyer's patches in the intestinal tract
- Induction of Systemic and Mucosal immune response post-oral immunisation

Future Prospects

- Potential to deliver vaccine proteins to the mucosal immune system
- Oral administration
- Cheap to produce

Acknowledgments

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Chickens

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AVIAN
RESEARCH
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