GMMA from genetically-engineered meningococcus as vaccine for Africa

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Meningitis in Africa

African meningitis Belt
- >350 million people at risk
- Incidence up to 1000 per 100,000 people
- Mortality up to 15% of cases

• Serogroup A cases ↓
• Serogroup W and X still causing epidemics

► NO AFFORDABLE VACCINE FOR ALL SEROGROUP AVAILABLE

GMMA

Gram-negative bacteria naturally shed outer membrane vesicles (OMVs). Structural changes in bacterial outer membrane lead to GMMA, Generalized Modules for Membrane Antigens: outer membrane vesicles to use as vaccine.

They are safe, cheap to produce, and can give broad protection against pathogens.

GMMA as vaccine for Africa against N. meningitidis

We genetically engineered a N. meningitidis african strain: it overproduces GMMA containing protective antigens against meningococcal strains affecting Sub-Saharan Africa.

- NO capsule
- Over blebbing
- Over-expressing protective antigens
- Detoxified endotoxin

Negative Stain Transmission Electron Microscopy of GMMA

Conclusion and future prospective

- We genetically engineered an African meningococcal strain with deleted capsule biosynthesis, detoxified endotoxin, over-expression of protective antigens, and over-blebbing.
- GMMA from this mutated strain are promising as an affordable vaccine against all N. meningitidis serogroups causing meningococcal disease in sub-Saharan Africa.
- Evaluation of fine-specificity of protection and mechanism of cellular immunity to the vaccine are under evaluation.

References
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- Koeberling et al., Vaccine 2014
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