GMMA from genetically-engineered meningococcus as vaccine for Africa

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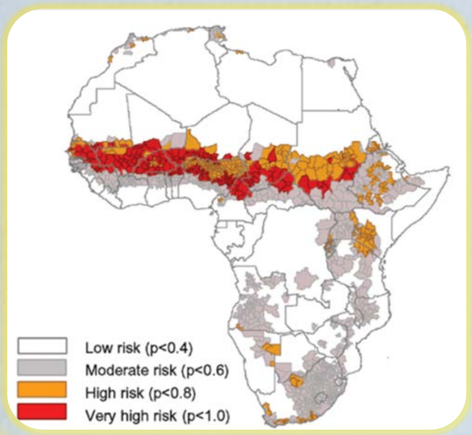
Meningitis in Africa

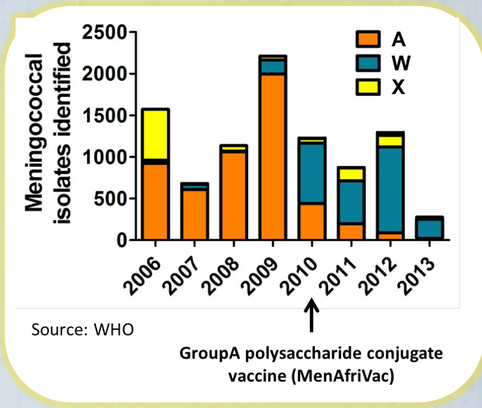


African meningits Belt

- >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

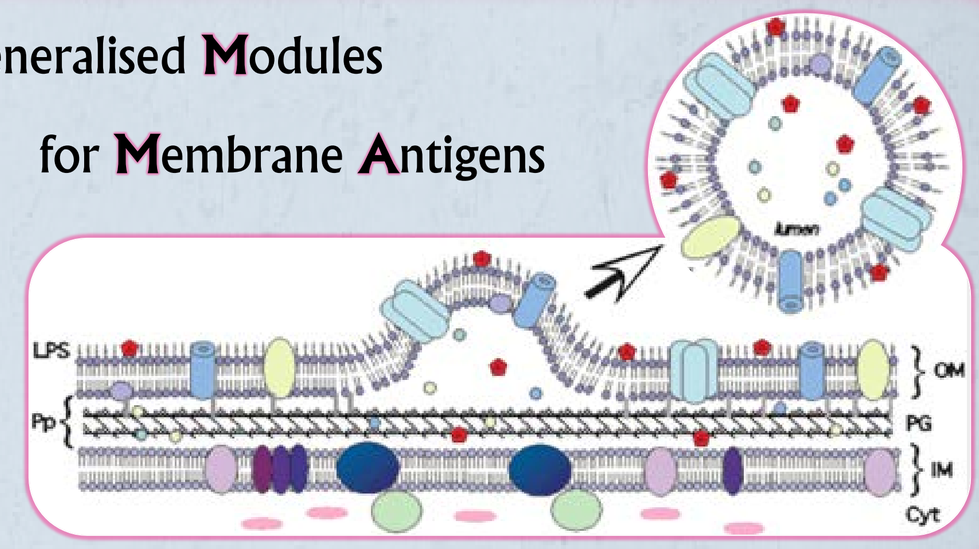
▶ **NO AFFORDABLE VACCINE FOR ALL SEROGROUP AVAILABLE**



GMMA

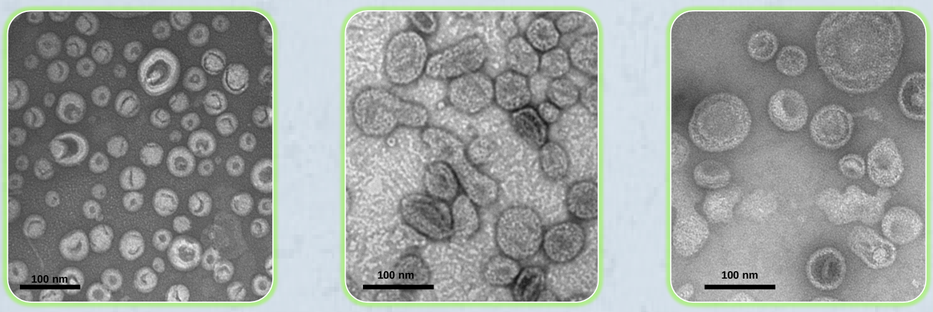
Gram-negative bacteria naturally shed outer membrane vesicles (OMVs). Structural changes in bacterial outer membrane lead to **GMMA**, Generalized Modules for Membrane Antigens: outer membrane vesicles to use as ***vaccine***. They are safe, cheap to produce, and can give broad protection against pathogens.

Generalised **M**odules for **M**embrane **A**ntigens

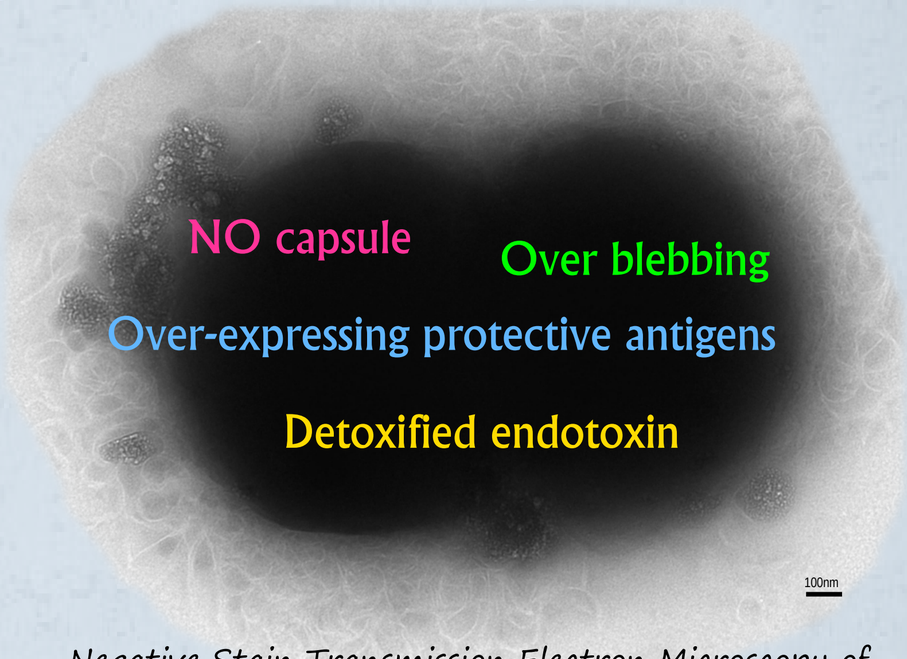


GMMA as vaccine for Africa against *N. meningitidis*

We genetically engeneered a ***N. meningitidis* african strain**: it overproduces GMMA containing protective antigens against meningoccocal strains affecfcting Sub-Saharan Africa.



Negative Stain Transmission Electron Microscopy of GMMA



Negative Stain Transmission Electron Microscopy of engineered *N. meningitidis*

Conclusion and future prospective

- We genetically engineered an African meningoccocal 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.
- Evalution of fine-specificity of protection and mechanism of cellular immunuty to the vaccine are under evaluation.

References

- WHO, 2014
- Keoberling et al., *Vaccine* 2014
- Xie et al., *Vaccine* 2013
- Kuehn and Kesty, *Genes & Dev.* 2005

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