

GSK vaccines development pipeline

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This
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vaccines in

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Helping to protect Australians of all ages* from vaccine-preventable diseases

*Age indication varies by product



GSK is developing innovative vaccines to prevent diseases

Innovative vaccine technologies*



Viral vectors^{1,2}



Reverse vaccinology³⁻⁸



GSK adjuvant system^{9,10}



Bioconjugation¹¹⁻¹³



mRNA technology¹⁴⁻¹⁷



GMMA technology¹⁸⁻²⁴



MAPS technology^{25,26}

Maternal immunisation²⁷



Paediatrics^{27,28}



Adolescents and young adults^{27,28}



Adults^{27,28}



Older adults^{27,28}



Travellers^{27,29}



Occupational health³⁰



Vaccines for all

*This slide describes vaccine platform technologies supporting the development of a vaccine pipeline. This is not a comprehensive description of all platform technologies.

GMMA, generalised modules for membrane antigens; mRNA, messenger ribonucleic acid.

References: 1. Pinschewer DD. *Swiss Med Wkly* 2017;147:w14465. 2. Tatsis N et al. *Mol Ther* 2004;10:616–29. 3. Sette A et al. *Immunity* 2010;33:530–41. 4. Delany I et al. *Cold Spring Harb Perspect Med* 2013;3:a012476. 5. Da Silva MK et al. *Viruses* 2023;15:2130. 6. De Gregorio E et al. *Nat Rev Immunol* 2014;14:505–14. 7. Vernikos GS. *Nat Rev Microbiol* 2008;6:334–5. 8. Rappuoli R. *Curr Opin Microbiol* 2000;3:445–50. 9. Puledran B et al. *Nat Rev Drug Discov* 2021;20:454–75.

10. Garçon N et al. *Hum Vacc Immunother* 2017;13:19–33. 11. Strugnelli R et al. *Perspect Vaccinol* 2011;1:61–88. 12. Martin P et al. *Vaccines (Basel)* 2022;10:212. 13. Pollard AJ et al. *Nat Rev Immunol* 2009;9:213–20. 14. Sagili Athony DP et al. *Clin Drug Investig* 2021;41:499–509. 15. Al Fayed NA et al. *Pharmaceutics* 2023;15:1972. 16. Chaudhary N et al. *Nat Rev Drug Discov* 2021;20:817–838. 17. Gote V et al. *Int J Mol Sci* 2023;24:2700. 18. Micoli F et al. *Front Immunol* 2021;12:719315.

19. Micoli F et al. *Proc Natl Acad Sci USA* 2018;115:10428–33. 20. Tennant SM et al. *Vaccine* 2016;34:2907–10. 21. Berlanda Scorza F et al. *PLoS ONE* 2012;7:e35616. 22. Gerke C et al. *PLoS ONE* 2015;10(8):e0134478. 23. van der Pol L et al. *Biotechnol J* 2015;10:1689–1706. 24. Mancini F et al. *Front Immunol* 2021;12:715393. 25. Zhang F et al. *Proc Natl Acad Sci USA* 2013;110:13564–69. 26. Malley R et al. *Expert Rev Vaccines* 2024;23:196–204. 27. GSK. Pipeline [accessed 2026 March]. Available at: www.gsk.com/en-gb/innovation/pipeline 28. GSK. Our product areas [accessed 2026 March]. Available at: www.gsk.com/en-gb/products/our-product-areas/#Vaccines 29. CDC. Travelers' health [accessed 2026 March]. Available at: wwwnc.cdc.gov/travel/page/travel-vaccines 30. CDC. Infection Control. www.cdc.gov/infection-control/hcp/safety



GSK vaccines development pipeline

Candidates are in all phases of clinical development

Key:

Viral

Bacterial

Phase I

mRNA seasonal flu/ COVID-19	<i>mRNA</i>	Active immunisation for the prevention of influenza disease and COVID-19 caused by SARS-CoV-2 in adults aged ≥18 years
Group A streptococcal infections	<i>Recombinant/ glycoconjugate</i>	Group A streptococcal infections
Pneumococcal 30+ valent (adults)	<i>MAPs</i>	Active immunisation for prevention of invasive pneumococcal disease and pneumonia caused by selected <i>Streptococcus pneumoniae</i> serotypes in adults aged ≥18 years (≥50 years and 18–49 years at increased risk)

Phase II

COVID-19	<i>mRNA</i>	Active immunisation to prevent COVID-19 caused by SARS-CoV-2 in individuals aged ≥12 years
Seasonal Flu	<i>mRNA</i>	Active immunisation for the prevention of influenza disease in adults aged ≥18 years
Flu H5N1 pre-pandemic	<i>mRNA</i>	Pandemic preparedness registration for active immunisation of adults aged ≥18 years for the prevention of disease caused by influenza A virus H5N1 subtype
UTI	<i>Recombinant subunit, adjuvanted</i>	UTI caused by UPEC in 18+ individuals with ≥1 UTI episode caused by UPEC in the past 12 months
iNTS (<i>S. typhimurium</i> + <i>S. enteritidis</i> + <i>S. typhi</i>)	<i>GMMA and typhoid conjugate vaccine</i>	iNTS and typhoid fever

Phase III

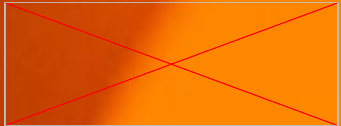
MenB vaccine	<i>Recombinant protein and outer membrane vesicle</i>	Prevention of invasive disease caused by <i>Neisseria meningitidis</i> serogroup B in individuals aged ≥2 months (USA)
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COVID-19, coronavirus disease 2019; GMMA, generalised module for membrane antigen; iNTS, invasive non-typhoidal salmonella; MenB, meningococcal B strain; MMRV, measles, mumps, rubella and varicella; mRNA, messenger ribonucleic acid; S, *Salmonella*; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; UPEC, uropathogenic *Escherichia coli*; USA, United States of America; UTI, urinary tract infection.

Reference: GSK. Pipeline [accessed 2026 March]. Available at: www.gsk.com/en-gb/innovation/pipeline

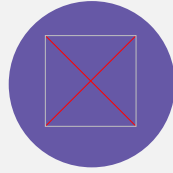


MAPS technology



What is MAPS technology?

MAPS technology simplifies vaccine design while aiming to enhance the depth and breadth of protection against infectious diseases and beyond.



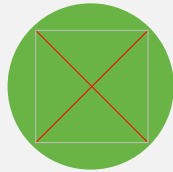
Simplified vaccine design

MAPS incorporates multiple polysaccharide and disease-specific proteins into a single vaccine.



Multiple immune responses

MAPS induces multiple immune responses against both polysaccharides **and** proteins.



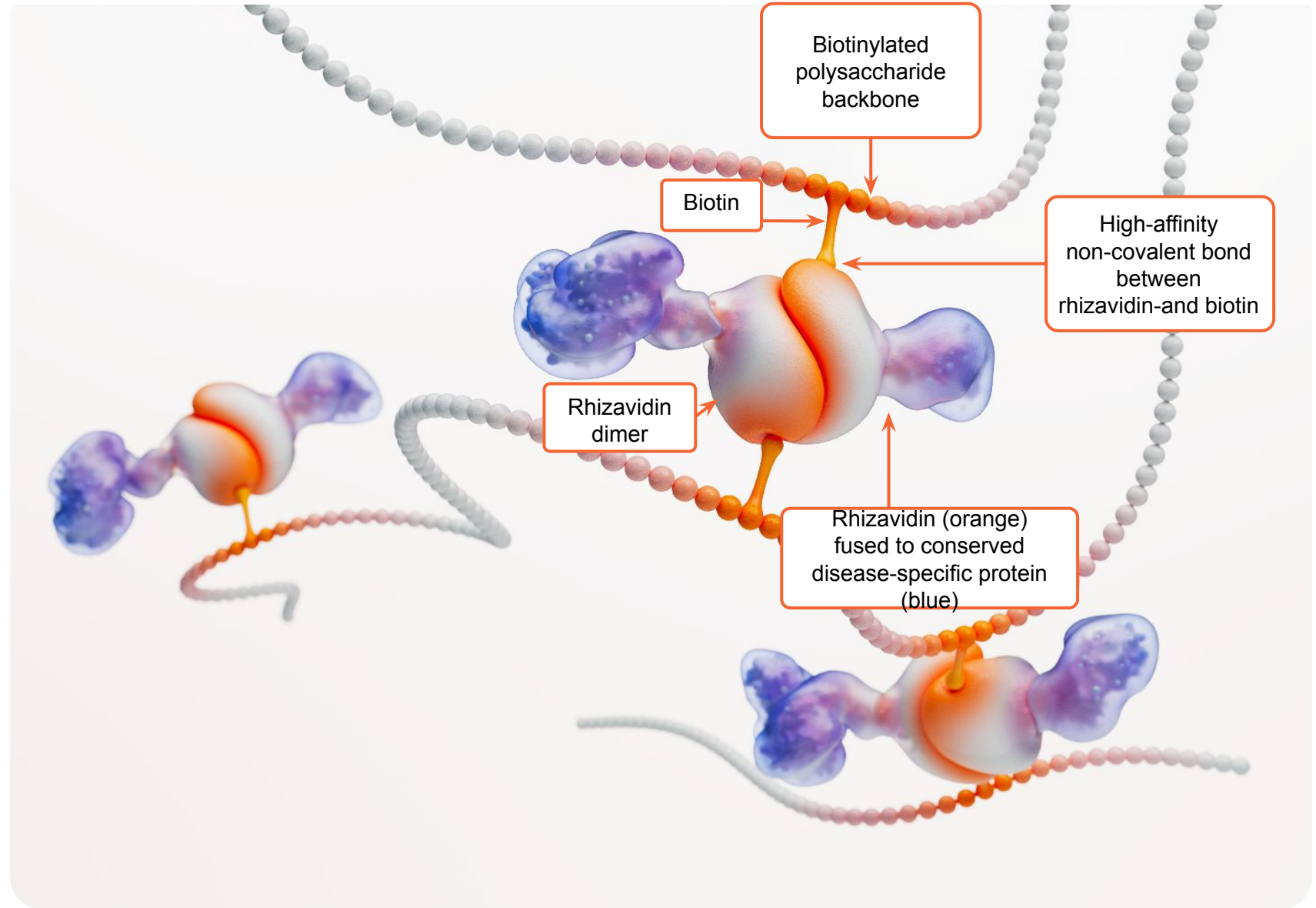
Broader disease protection

MAPS technology allows for an expanded range of polysaccharide and conserved disease-specific proteins, and supports the potential for more extensive disease protection.



What does the assembled MAPS structure look like?

A macromolecular structure is created by strong **non-covalent affinity interactions** between a rhizavidin fusion protein and a **biotinylated polysaccharide**.¹⁻³

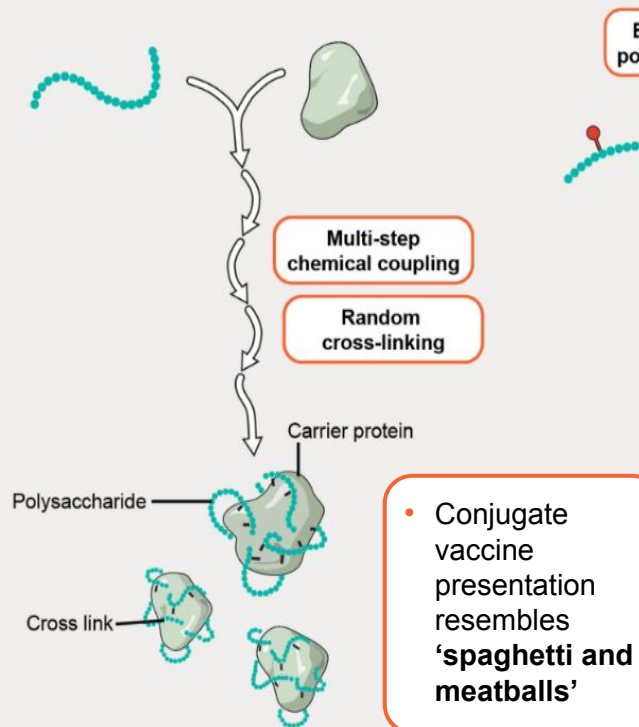


How is MAPS different from conventional conjugation technology?

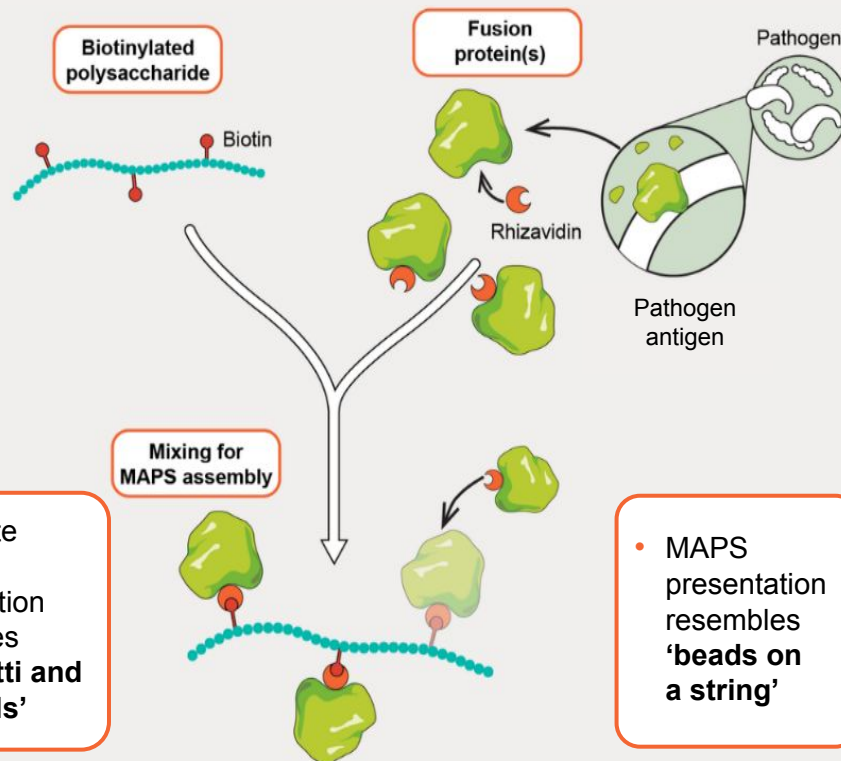
MAPS is a new approach to vaccines that combines polysaccharides and conserved disease-specific proteins by high-affinity biotin-rhizavidin chemistry.

- Conjugate vaccines use carrier proteins to enhance immunogenicity to the polysaccharide antigens; these proteins are not specific to the pathogen or disease¹⁻³
- Random **chemical cross-linking** used may **compromise immune recognition sites ('epitopes')**¹⁻³
- This may reduce the efficacy of the vaccine^{1,2}

Conventional conjugate vaccine



MAPS vaccine



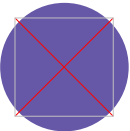

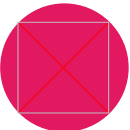

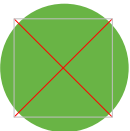



- MAPS uses a **high-affinity single site interaction** between a rhizavidin fusion protein and a biotinylated polysaccharide⁴⁻⁷
- This **reduces the risk of compromising immunogenic epitopes**

- MAPS presentation resembles **'beads on a string'**

MAPS technology allows the immunogenic potential of epitopes to be preserved



How do MAPS and conjugate vaccine technologies compare?

	Conjugate vaccine	MAPS vaccine
Mechanism	 <p>Covalent bond between protein and polysaccharide antigens</p>	 <p>Non-covalent bond between proteins and polysaccharides</p>
Protection	 <p>Disease-specific immunostimulation provided by polysaccharide; Attenuated immunogenicity with increasing valency</p>	 <p>Disease-specific immunostimulation provided by both polysaccharide & proteins; expanded valency possible</p>
Immune response	 <p>Primarily antibody-mediated immunity to polysaccharides</p>	 <p>Antibody-mediated immunity to polysaccharide; disease-specific antibody and cellular immunity to protein; increased breadth of immunity</p>
Design and manufacturing	 <p>Complex chemistry, expensive to make one vaccine containing many conjugate preparations, limitations to adding antigens due to covalent binding, risk of epitope damage</p>	 <p>Simplified manufacturing, customisable, precise, reproducible, rapid, modular, 'plug and play'</p>

i

- Disease-specific polysaccharides and proteins are combined in a single vaccine¹
- Specific and durable affinity binding occurs between biotin and rhizavidin¹⁻³

i



- Conjugation technology provides immunity only to polysaccharides¹
- MAPS induces multiple immune responses against disease-specific polysaccharides and proteins^{1,3}

Innovative MAPS technology simplifies vaccine design while eliciting a more comprehensive and potent immune response.







How does the immunological profile of MAPS vaccines compare with other types of vaccine?

Immune responses to proteins¹

Conjugate ²		✓	✓	X	X
MAPS ³⁻⁵		✓	✓	✓	✓

MAPS technology elicits disease-specific immune responses to carrier protein³⁻⁵

Immune responses to polysaccharides¹

Technology/antigen	Antibody response	Source of help	Ig	Affinity maturation	Memory response	
Free PS ^{2,4,6}		TI	BCR cross-linking	IgM/IgG	-	-
Bacteria ^{7,8}		Non-classic TD (CD1d)	T cells	IgG	-	+/-
Conjugate ^{2,4,6}		Classic TD (MHCII)	T _H 2 cells	IgG	+	+
MAPS ³⁻⁵		Classic TD (MHCII)	T _H 2 cells	IgG	+	+

MAPS technology is designed to elicit robust B-cell and T-cell immune responses.

BCR, B-cell receptor; CD, cluster of differentiation; IgG/M, immunoglobulin G/M; MHC, major histocompatibility complex; PS, polysaccharides; TD, T-dependent response; T_H, T-helper; TI, T-independent response.

References: 1. Unpublished data. 2. Wuorimaa T et al. *Scand J Immunol* 2001;53:422–8. 3. Cieslewicz B et al. *Vaccines (Basel)* 2022;10:1069. 4. Zhang F et al. *Proc Natl Acad Sci USA* 2013;110:13564–9. 5. Zhang F et al. *Vaccines (Basel)* 2022;11(1):91. 6. Guttormsen HK et al. *Infect Immun* 1998;66(5):2026–32. 7. Chen Q et al. *J Immunol* 2008;181(12):8258–66. 8. Colino J et al. *J Immunol* 2009;183(3):1551–9.



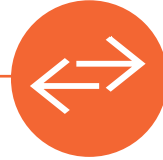
Are there other benefits of MAPS technology?

MAPS technology provides additional benefits, including modularisation of vaccine construction.



'Plug and play' nature

MAPS structure can be modular in construction.^{1,2}



Two-way presentation

Broader relevancy overall (PS presents protein, and/or protein presenting PS).^{1,2}



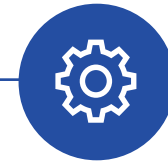
Protein: PS control

Ratio between PS and protein can be controlled effectively.^{1,2}



Single point attachment

Single attachment between PS and protein limits damage to either.^{1,2}



Highly stable

Once affinity-linked, the bond between rhizavidin and biotin is highly stable.¹⁻³

MAPS technology offers a multifaceted and customisable vaccine platform



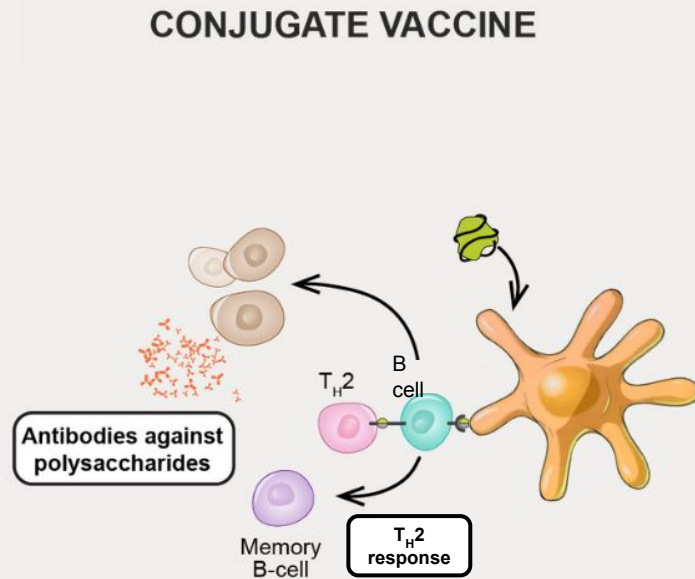


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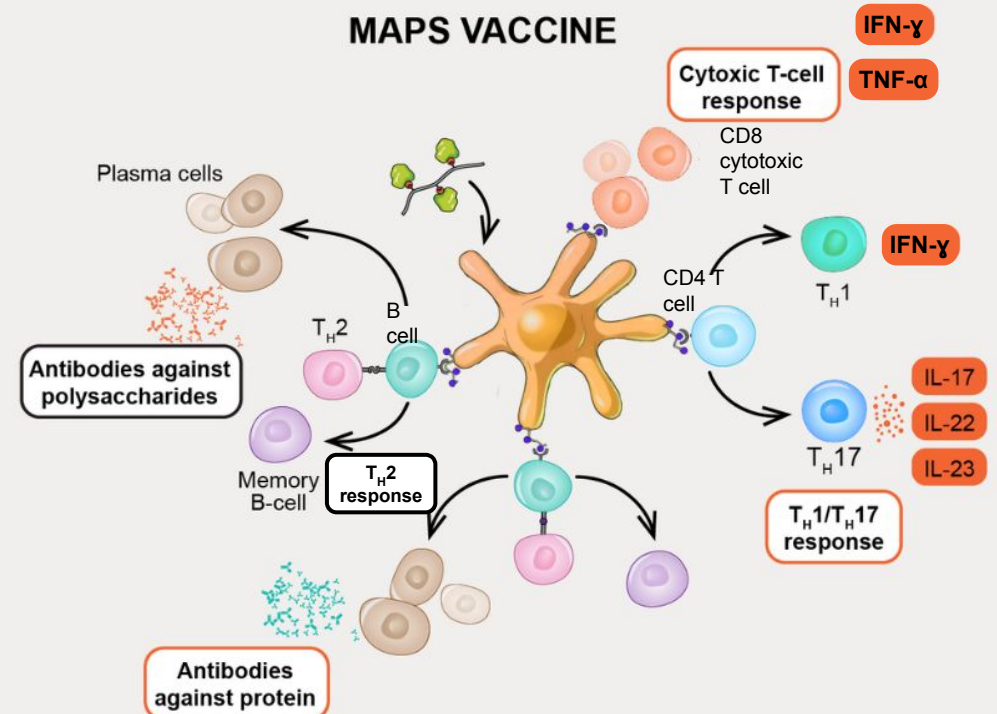


What is the immunological profile induced by MAPS vaccines?

MAPS technology provides the potential for a **broader immune response** compared with conventional conjugate technology.¹⁻⁴



Conjugate vaccine provides primarily antibody-mediated immunity to disease-specific polysaccharides.



MAPS vaccine candidates provide antibody- and cell-mediated disease-specific immunity to polysaccharides and proteins.

CD, cluster of differentiation; IFN- γ , interferon gamma; IL, interleukin; TH, T-helper; TNF- α , tumour necrosis factor alpha.

References: 1. Zhang F et al. *Proc Natl Acad Sci USA* 2013;110:13564–9. 2. Cieslewicz B et al. *Vaccines (Basel)* 2022;10:1069. 3. O'Hara JM et al. *mBio* 2023;14:e0361122. 4. Zhang F et al. *mBio* 2022;13:e0379021.

Summary

Innovative and elegant MAPS technology simplifies vaccine design while eliciting a more comprehensive and potent immune response

MAPS technology utilises a patented **high-affinity biotin-rhizavidin binding** interaction to present both polysaccharides and disease-specific proteins leading to **multiple disease-specific immune responses from a single vaccine**

MAPS technology enables **increased vaccine valency** without compromising the immune responses to individual vaccine types or strains

The ability of MAPS to incorporate highly conserved proteins as carriers in addition to polysaccharides leads to the inherent **potential to provide protection against non-vaccine types***

Compared with conventional conjugate vaccines, MAPS technology can offer a **broader range of immunity** as well as a **simplified manufacturing process** and a precise, reproducible, modular, 'plug and play' design

MAPS is an exciting advancement in vaccine development technology, potentially **expanding the coverage of vaccines** against existing and future pathogens

