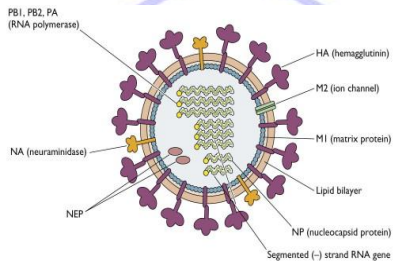


Universal Influenza A (M2) Vaccines: Antibody ELISA Kits, Recombinant Proteins, Peptides and Antibodies

Influenza A virus causes influenza in birds and some mammals, and is the only species of influenza virus A. Occasionally, viruses are transmitted from wild aquatic birds to domestic poultry, and this may cause an outbreak or give rise to human influenza pandemics. The Influenza A virus genome is contained on eight single (non-paired) RNA strands that code for eleven proteins (**HA, NA, NP, M1, M2, NS1, NEP, PA, PB1, PB1-F2, PB2**). There are 17 different H antigens (**H1 to H17**) and nine different N antigens (**N1 to N9**). Influenza A virus subtype H5N1, also known as "bird flu", A(H5N1) or simply H5N1, is a subtype of the influenza A virus which can cause illness in humans and many other animal species. Influenza viruses have a relatively **high mutation rate** that is characteristic of RNA viruses. The ability of various influenza strains to show species-selectivity is largely due to variation in the hemagglutinin genes that can significantly alter the ability of viral hemagglutinin proteins to bind to receptors on the surface of host cells. The influenza vaccination, also known as a **flu shot**, is an annual vaccination using a vaccine specific for a given year to protect against the highly variable influenza virus.

Universal Influenza A M2-based vaccines:



A "universal vaccine" is the one that would not have to be designed and made for each flu season. The challenge is to identify single antibody that could neutralize many subtypes of the virus, so that they could be useful in any season, and that

target conserved domains that are resistant to antigenic drift. Another option is to find the conserved antigens, and delivering groups of these antigens to provoke an immune response.

M2 protein in influenza A is encoded by gene segment 7. M2 contains 97 amino acids and is expressed from a spliced mRNA derived from the M1 mRNA. M1 and M2 share the first nine amino acids at their NH2-termini. M2 functions as viroporin. M2 is a tetrameric type III membrane protein (2-24 aa, the extracellular N-terminal domain M2e; the transmembrane (TM) domain (positions 25–46) and the intracellular C-terminal domain (positions 47–97). The 23-aa **influenza M2 protein** remains unchanged over multiple cycles of mutations in the flu virus, and it is considered as a good candidate to

make a "universal vaccine". M2 is a structural protein that is also abundantly expressed on the surface of infected cells. Influenza A virus infection of humans induces a **weak anti-M2 antibody** response that is of short duration. Several novel approaches are being tested to enhance the antigenicity of M2e-protein and produce a viable vaccine: These included inclusion of several different antigens, presented different ways (as fusion proteins, mounted on virus-like

Human Influenza A strains			
consensus M2e sequence		SLLTVEVET	PIRNEWGCRNDSS D
A/Brevig Mission/1/1918 H1N1		SLLTVEVET	PIRNEWGCRNDSS D
A/Puerto Rico/8/1934 H1N1		SLLTVEVET	PIRNEWGCRNGSS D
A/Chile/13/1957 H2N2		SLLTVEVET	PIRNEWGCRNDSS D
A/Japan/170/1962 H2N2		SLLTVEVET	PIRSEWGCRNDSS D
A/An Arbor/7/1967 H2N2		SLLTVEVET	PIRNEWGCRNDSS N
A/Aichi/2/68 H3N2		SLLTVEVET	PIRNEWGCRNDSS D
A/England/878/1969 H3N2		SLLTVEVET	PIRNEWGCRNDSS N
A/Caracas/1/1971 H3N2		SLLTVEVET	PIRKEWGCRNDSS D
A/Taiwan/3/71 H3N2		SPLTVEVET	PIRNEWGCRNDSS D
A/Aichi/69/1994 H3N2		SLLTVEVET	PIRNEWGCRNGSS D
A/Wuhan/359/95 H3N2		SLLTVEVET	PIRSEWGCRNDSS D
A/Wisconsin/10/98 H1N1		SLLTVEVET	PIRNGWCRNDSS D
A/New York/497/2003 H1N1		SLLTVEVET	PIRNEWGCRNDSS D
A/New York/378/2005 H3N2		SLLTVEVET	PIRNEWGCRNDSS D

particles, on non-pathogenic viruses, as DNA, and others, are under development.

Acambis universal flu vaccine (**ACAM-FLU-A™**) based on three M2e domains

presented on **HepB core antigen**. Dynavax has developed a **vaccine N8295** based on two highly conserved antigens NP and M2e and their TLR9 agonist.

The **VAX102** vaccine by Vaxinnate Corp. is a recombinant fusion protein which contains **four tandem copies of the M2e** antigen linked to **Salmonella typhimurium flagellin**, using a TLR5 ligand as an adjuvant. The **M2-OMPC** conjugate vaccine by Merck appeared highly effective in inducing an immunogenic response in ferrets, mice and monkeys. This conjugate was observed to provide 90-100% protection in Balb/c mice when challenged with LD90 of A/Puerto Rico/8/34 (PR8; H1N1) and A/Hong Kong/68xPR8 reassortant (HKxPR8; H3N1) post-immunization. **Universal Influenza A vaccine still remains a dream.**

About ADI's Universal M2e Vaccines ELISA Kits- The primary objective of M2e-based universal vaccines it to induce a powerful antibody response against M2 protein that will neutralize a variety of Influenza A stains. ADI has developed M2E antibody ELISA Kits for humans and animals that will be useful to determine the efficacy of various vaccines and test new vaccines. Antibody ELISA kits for M2e-carrier proteins (HepB, flagellin, and OMPC are also available). ADI is further expanding the antibody ELISAs to measure IgA, IgG (and IgG1, IgG2a, IgG3, IgG4) and IgM classes.

Influenza A Vaccine Related ELISA kits

Vaccines	Target Antigens	ELISA Type	Ab Type	Human	Mouse	Monkey	Rabbit	Others
Influenza (Universal Vaccine)	M2	Ab	IgA	920-200-MHA	920-220-MMA	920-380-MKA	920-240-MRA	Ch, Sw
			IgG	920-205-MHG	920-225-MMG	920-385-MKG	920-245-MRG	920-320-MCG (Ch)
			IgM	920-210-MHM	920-230-MMM	920-390-MKM	920-250-MRM	920-325-MCM (Ch)

Notes: Ch=Chicken; Sw=Swine

Related Items

- OMPC15-R-50 Recombinant (E. coli) Outer membrane protein C Recombinant Protein (ompC/omp1b/porin, 22-367 aa, E. coli, >95%)
- FLGN11-M Mouse monoclonal anti-flagellin protein (Fla/Flic/BOR) IgG
- FLGN15-R-50 Recombinant (E.Coli) purified Borrelia Flagellin p41 (Fla protein/BOR)
- FLGN16-N-50 Flagellin from B. subtilis Fla protein/BOR), purified
- FLGN17-N-50 Flagellin from S. typhimurium Fla protein/BOR), purified
- FLGN18-N-10 Recombiant (E. coli) Flagellin (flaA) from Listeria monocytogenes (1-287, his-tag, >95%)
- HBVC11-M Mouse Anti-Hepatitis B Virus core antigen (HBcAg) IgG
- HBVC15-R-25 Recombinant (E. coli) Hepatitis B Virus core antigen (HBcAg) (1-183aa, 18 kda, >95%)
- Influenza-A-M2e-Universal-Vaccine-ELISA-Flr 160607A

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