

MATRIX

A USAID Project to Advance the Research and Development of Innovative HIV Prevention Products for Women

About MATRIX

- MATRIX is a five-year, \$125 million cooperative agreement funded by the U.S. Agency for International Development (USAID) in 2021. MATRIX is being implemented by Magee-Womens Research Institute (MWRI) in close collaboration with 19 partner organizations from North America and Africa. Leading the project is Sharon Hillier, Ph.D., of MWRI and the University of Pittsburgh, USA, with Thesla Palanee-Phillips, Ph.D., from the Wits Reproductive Health and HIV Institute (Wits RHI) and University of Witwatersrand, South Africa, serving as deputy director.
- The mission of MATRIX is to expedite the research and development of a range of HIV prevention products for women that will be safe and effective as well as **acceptable**, **affordable**, **scalable** and **deliverable** in the settings where they are needed most.
- Collectively, MATRIX's partner organizations have expertise across multiple fields, including drug formulation, drug delivery and product development; clinical trials design and implementation; human-centered design and socio-behavioral research; market strategy and business case development; capacity strengthening; and stakeholder engagement.




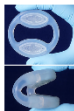




How is MATRIX unique?

- A key feature of MATRIX is its focus on being responsive to end-user and stakeholder feedback during the earliest stages of product development to inform decisions about product design and its overall research agenda.
- While most early-phase clinical trials of new HIV prevention products are typically conducted in the United States or Europe, MATRIX intends to see that these kinds of studies are also conducted in sub-Saharan Africa to gain important insight into the safety and acceptability of new products in the populations that are most important.
- Through its North-South partnerships, MATRIX aims to recognize and strengthen the research and development capacity of African investigators in order to facilitate full and sustainable ownership of this work into the future.

The MATRIX Product Pipeline

- The MATRIX pipeline of products includes implants and injectables designed to protect against HIV for six months to one year; short-acting and on-demand vaginal products meant to be used around the time of sex; and other non-systemic vaginal products designed to provide protection from one to three months at a time. Importantly, six of these nine products are being designed to not only protect against HIV but also against other sexually transmitted infections – herpes simplex virus (HSV) and/or human papillomavirus (HPV) – and/or unwanted pregnancy. Such products are often referred to as an MPTs, short for multi-purpose technologies.
- The pipeline includes new formulations of existing methods, such as a vaginal film containing dapivirine that over the course of a month continuously releases drug as it slowly dissolves, and two longer-acting cabotegravir-based products – small implantable pellets and an injection given under the skin as opposed to deep into the muscle. Other products contain novel agents, such as a fast-dissolving insert with its active ingredient a protein derived from seaweed; and an MPT vaginal ring containing a peptide (a small fragment of a protein) that acts against HIV, HSV and HPV, and a small molecule that protects against pregnancy by inhibiting the movement of sperm and sperm's ability to penetrate and fertilize eggs.

	Product	Developer	Product Type	Active ingredient	How used	How long protected?	MPT?	Unique features	Status
1	 TAF/EVG Fast-dissolving insert	CONRAD (USA)	Fast-dissolving insert	TAF/EVG tenofovir alafenamide & elvitegravir (NRTI and integrase inhibitor)	On-demand (at the time of sex)	Up to 3 days	HIV and HSV	Could be used vaginally or rectally - as PrEP or PEP	First Phase 1 study in African women planned for 2023
2	 Griffithsin Fast-dissolving vaginal insert	Population Council (USA)	Fast-dissolving insert	A protein -Griffithsin Viral entry inhibitor	On-demand (at the time of sex)	4 hours	HIV and HPV HSV	Active ingredient derived from seaweed	Pre-clinical
3	 One month dapivirine vaginal film	Univ of Pittsburgh (USA)	Vaginal film	Dapivirine NNRTI	Women insert themselves	1 month		Releases drug until film completely dissolves	Placebo study being planned for 2023
4	 Non-ARV/ nonhormonal contraceptive multipurpose vaginal ring (LAMP-IVR)	Oak Crest Inst of Science (USA)	Vaginal ring	A peptide (protein fragment)- acts against HIV (& HSV/HPV) A small molecule Inhibits sperm's movement & ability to penetrate, fertilize eggs	Women insert themselves	1-3 months	HIV and HPV HSV pregnancy	Non-ARV and nonhormonal Could be used with or without contraceptive	Placebo study being planned for 2023
5	 Cabotegravir injectable depot	CONRAD (USA)	Injectable depot (storage bubble)	Cabotegravir Integrase strand inhibitor	Injection given under the skin	4-6 months		May be less burden on healthcare system and users	Pre-clinical
6	 Cabotegravir dissolvable pellets	CONRAD (USA)	Pellet implant	Cabotegravir Integrase strand inhibitor	Implanted under skin	9-12 months		Slowly dissolves over course of a year Can be removed after 1-2 mo if needed	Pre-clinical

Three products also to be developed as an MPT with the addition of a hormonal contraceptive



7
One month dapivirine vaginal film plus levonorgestrel (LNG)



8
Cabotegravir injectable depot plus LNG



9
Cabotegravir dissolvable pellets plus LNG

Clinical Trials and Placebo Studies

- MATRIX studies will be conducted in both the US and in sub-Saharan Africa, where partner sites include the Kenya Medical Research Institute (KEMRI); in South Africa, The Aurum Institute, Centre for the AIDS Programme of Research in South Africa (CAPRISA) and Wits Reproductive Health and HIV Institute (Wits RHI); and in Zimbabwe, Harare Health and Research Consortium.
- Three clinical trials are being planned for 2023, including MATRIX-001, a Phase 1 study that will evaluate the safety and acceptability of a fast-dissolving vaginal insert containing tenofovir alafenamide (TAF) and elvitegravir (EVG), as well as how and where these drugs are taken up in the body. The MARIX-001 study of the TAF/EVG insert, a product designed to protect against both HIV and HSV when used at or around the time of sex, is being evaluated in African women for the first time in MATRIX-001.



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