

PATHKINEX UPDATE

PathKinex™ : A Brief History

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PathKinex™ is United Animal Health's pathogen surveillance platform that also serves as an innovation engine for our microbial research. PathKinex™ involves both a molecular and a culture-based approach spanning swine, poultry, and ruminants. In the molecular surveillance approach, FTA cards are spotted with animal-origin samples to stabilize DNA and the cards are then shipped to Microbial Discovery Group (MDG), where microbial DNA is extracted, and pathogen gene markers are quantified. In the culture-based approach, live pathogens are first isolated from culture swabs taken from swine, poultry, and ruminants. The pathogens then undergo antimicrobial susceptibility testing (AST) to investigate the extent of inhibition by ProVent® ECL, Novela® ECL, and Strateris® *Bacillus* strains. The PathKinex™ process you see today has been honed over the last eight years since its inception with numerous key upgrades to efficiency and scope along the way.



History of PathKinex™ Molecular Surveillance

The PathKinex™ molecular surveillance platform was officially launched in 2016 with a focus on *E. coli*, *Clostridium perfringens*, *C. difficile*, and *Salmonella* (Figure 1). In its infancy, the process involved low-throughput pathogen gene quantification as each target had to be measured separately in its own assay. Over time, gene targets for additional species were added due to customer needs and research advancements in the pathogen field. In 2017, *Aspergillus flavus*, *A. fumigatus*, and *C. chauvoei* gene targets were added for dairy projects, as well as *Streptococcus suis* for swine.



Figure 1: Timeline of PathKinex™ molecular surveillance updates.

A significant update came in 2018 when a high-throughput method was implemented. This method yields 14 times more information by quantifying 28 different pathogen gene targets from 48 samples simultaneously.

That’s 1,344 tests at once!

Genes for *Campylobacter*, the parasite *Eimeria bovis*, and rotavirus were also integrated during this time. In 2019, the detection capabilities were expanded further to include:

- *Mycoplasma bovis*
- *Mycobacterium avium* subsp. *paratuberculosis*
- *Fusarium* spp.
- *Cryptosporidium parvum*
- *Ostertagia* spp.
- *Enterococcus cecorum*
- *Enterococcus faecalis*
- *Staphylococcus aureus*
- *Eimeria tenella*
- *Eimeria maxima*
- *Eimeria acervulina*

2019 also marked the year the first PathKinex™ surveillance meta-analyses were performed to deliver insights to the industry through conferences and publications. PathKinex™ officially expanded to a worldwide platform beginning in 2021, with USDA permits allowing international FTA card shipments to MDG. Since then, PathKinex™ pathogen surveillance has been conducted in a total of 18 countries and 33 U.S. states (Figure 2).

Just recently in 2023, the gene targets for *Fusobacterium necrophorum* in cattle and *Brachyspira* in poultry were also added to the gene panel.



Figure 2: World map depicting the countries and individual U.S. states where PathKinex™ molecular surveillance samples have been collected.



History of PathKinex™ AST

The culture-based approach of PathKinex™ was also launched in 2016, focusing on *E. coli*, *C. perfringens*, and *Salmonella* isolated from swine, poultry, and ruminants (Figure 3). From 2016 to 2018, the pathogen culturing capabilities were expanded for AST. Depending on project needs, ECL products could be additionally tested against *C. difficile*, *Campylobacter*, and *Streptococcus*. Culturing of *Enterococcus* was explored due to its opportunistic role in various poultry diseases, and in 2020, the ability to test *E. faecalis* and *E. cecorum* on a per-project basis was added.

To gain more resolution into MDG's growing *Salmonella* isolate libraries, a molecular method for *Salmonella* serotyping was implemented in early 2024. This new capability ensures our ECL products are tested across *Salmonella* serotypes that are representative across geography and time. Check out our previous [Salmonella 201 PathKinex™](#) update for more information!



Figure 3: Timeline of PathKinex™ antimicrobial susceptibility testing (AST) updates.

Going Global with PathKinex™ Live

In 2024, a key update allowed us to begin showcasing the efficacy of our ECL products on an international scale—the introduction of PathKinex™ Live. This new global AST platform allows customers to understand the power of our ECL products against pathogens isolated from their own regions. PathKinex™ Live is a key differentiator for our platform and currently encompasses the Asia-Pacific region, the Middle East, and Africa, with implementation beginning in Latin America.



Key Takeaways

Throughout the eight years that PathKinex™ has been in action, we have updated to high-throughput methods, added numerous gene targets and pathogen culturing capabilities, and broadened our reach to a global scale. These updates have reduced PathKinex™ reporting time for a typical project from five to six weeks to as little as two to three weeks, while also increasing the scope of information in the report.

Beyond individual PathKinex™ projects, the collective wealth of information from the gene surveillance and AST database serves as a center of future research and innovation. Through these ever-growing databases, we have helped dozens of clients and provided valuable industry insights into the relationships between gene quantities and health, coinfection, and much more. As always, the PathKinex™ platform continues to be refined and expanded to help us maintain our position as leaders in the pathogen space.



Question to consider:

Do you have any ideas for new pathogen targets that will bring PathKinex™ into the future?

RESPOND TO MDG

**For more information about the PathKinex™ platform,
check out these materials on Seismic!**

[United Animal Health Product Guide 08.01.2024](#)
[GSM 23 - Microbial Cross Species Insights](#)



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