

Eravacycline as a treatment for pancreatic cancer

Drug repurposing using property ML-tools

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Technology

Prof. Shapira and Prof. Rokach developed ML-tools to identify drugs based on activity to target, rather than the common approach from target to activity. One of the tools developed named “drug activity predication”, allows to identify and to expend drugs designations (repurposing). The tools developed using the following: (1) fusion of multiple drug modalities from various sources, (2) recommender systems methods for modelling graph interactions, and (3) active learning with domain experts of Prof. Ben Shabat lab (medicinal chemists and pharmacologist). One of the outputs of the drug activity predication tool was Eravacycline as anti-cancer therapeutic agent. Eravacycline is an approved antibiotic drug belong to the tetracycline class. First, the tetracycline derivatives (Tigecycline, Omadacycline, Eravacycline) effect on cell proliferation were tested on human breast, lung, colon, and Pancreatic ductal adenocarcinoma (PDAC) cells. Treatment with Eravacycline for 72 hr suppressed the proliferation of human PDAC cells (BxPC-3, AsPC-1) in a concentration-dependent manner by up to 90–93%. Using wound healing Eravacycline displayed a significantly lower migration rate. To further assess the inhibition of Eravacycline on human PDAC cells *in vivo*, BxPC-3 cells were injected subcutaneously into nude mice to establish xenograft models. The results revealed that Eravacycline treatment significantly blocked tumor growth by 76%. They demonstrated that the molecule found to increase cancer cell apoptosis, increase expression of cleaved poly(ADP-ribose) polymerase I (cPARP1) in a cancer cell, decrease expression of DNA polymerase kappa (POLK) in a cancer cell, decrease expression of mutated p53 in a cancer cell, and decrease migration of a cancer cell. To summarize, the researchers identified **Eravacycline as potential therapeutic for pancreatic cancer**.

Application

Pancreatic cancer patients' survival rate is approximately five years at most. Chemotherapy, radiation, and surgery are widely used but do not significantly improve clinical outcomes. The lack of treatment options emphasizes the need for new approaches for treating and managing this deadly disease, such as offered here.

Advantages

- Driven from novel ML tools that allows identifying new drug properties
- Eravacycline is FDA approved – safe profile
- Novel drug candidate for pancreatic cancer
- Optional IV or oral administration
- Diverse mechanism of action against cancer cells

Patent

A patent covering the invention was filed by BGN technology