Cyclosporine targets PTEN-deficient cancer cells in a highly specific manner

Technology #2902

There is currently a lack of effective therapeutic drugs that specifically target cancerous cells without damaging the surrounding normal tissue. One strategy is to target gene pathways that are sensitized in cancerous cells but not in normal cells. Mutations on the tumor suppressor gene, phosphatase and tensin homolog (PTEN), are found across a large subset of cancers making PTEN-deficient cancers a key therapeutic target. Gene expression screens identified cyclophilin A (CypA) as a gene critical for the survival of PTEN-deficient cells but not for the survival of normal cells. This technology is a method for treating PTEN-deficient cancers with cyclosporine, a drug that targets CypA. PTEN-deficient cancer cells displayed a 10-fold greater sensitivity to cyclosporine treatment over normal cells. Thus, cyclosporine is a promising drug that specifically attacks PTEN-deficient cells and minimizes damage to normal cells.

Cyclosporine specificity for PTEN-deficient cancer cells minimizes damage to normal cells

Mutations causing a deficiency in the tumor suppressor gene, phosphatase and tensin homolog (PTEN), is found in high frequency across a large subset of cancers. Yeast screens were used to identify cyclophilin, a yeast gene equivalent to human CypA, as a drug target for PTEN-deficient cancer cells. This technology demonstrates that PTEN-deficient cancer cells are highly sensitive to cyclosporine, an immunosuppressive drug that targets CypA. An advantage of this technology is that cyclosporine can be administered such that it is toxic to PTEN-deficient cancer cells but nontoxic to normal cells.

PTEN negative cancer cell lines displayed a 10-fold increased sensitivity to cyclosporine compared to normal cells.

Lead Inventor:

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Applications:

- Cancer treatment in PTEN-deficient cancers
- Cancer treatment to be used in combination with other cancer therapeutics
- Research tool for studying PTEN-deficient cancers
- Research tool for studying CypA
- Cyclosporine is an immunosuppressive drug, currently used in transplant patients.

Advantages:

- Offers a cancer therapeutic that is cancer-specific and minimizes damage to normal cells
- Offers a therapeutics agent that specifically targets PTEN-deficient cells
- Utilizes a therapeutic agent that is already used in the clinical setting

Patent information:

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Related Publications:


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