Docket #: S24-415

HIPK4 Degraders for Oral, Reversible, Non-Hormonal Male Contraceptives

Stanford researchers have developed a first-in-class, non-hormonal male contraceptive that works by targeting a protein found only in developing sperm cells. This oral drug candidate is designed to temporarily block sperm production without affecting hormones or other body systems.

Most male contraceptives today are either condoms, which can fail, or vasectomy, which is often permanent. Hormonal drugs for men can cause side effects like mood changes, metabolic issues or testicular atrophy, while other non-hormonal approaches may impact important body functions beyond fertility. This technology solves these problems by focusing on a protein called HIPK4, which is only present in the cells that become sperm. The Stanford team discovered small molecules that selectively degrade HIPK4. By eliminating this protein, the drug safely and reversibly stops sperm from maturing, providing effective contraception. The approach is designed to be taken orally, and fertility is expected to return once the drug is stopped.

Stage of Development
Proof of concept - in vitro data

Applications

- Non-hormonal male contraception
- Research tool for studying spermatogenesis and male fertility
- Platform for developing other testis-specific therapeutics

Advantages

- First-in-class: addressing a major unmet need in global reproductive health

- Reversible: fertility is restored after discontinuation
- Oral administration: convenient, user-friendly dosing
- Non-hormonal: avoiding side effects
- Testis-specific: minimizing off-target risks

Publications

- Crapster, J. A., Rack, P. G., Hellmann, Z. J., Le, A. D., Adams, C. M., Leib, R. D., ... & Chen, J. K. (2020). HIPK4 is essential for murine spermiogenesis. eLife, 9, e50209.

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