

## Is There a Future for DNA-Based Molecular Devices in Diabetes Management?

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### Abstract

We provide a thought experiment in advanced molecular engineering leading to the construction of a molecular robot acting as a DNA-based closed-loop device for the management of diabetes mellitus. The key components of this robot are nucleic acid enzymes regulated allosterically by glucose. In the presence of glucose above a threshold level the robot moves, releasing insulin from a lawn covered with insulin, but stops in its tracks whenever glucose decreases to a level below threshold; thus, the robot could provide an insulin release response to spikes in glucose concentration in real time.

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**Abbreviations:** (2D) two dimensional, (3D) three dimensional

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