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Artificial, Multivalent Fibronectin-Binding Ligands for the Targeting of Bladder Tumor Cells

Engineered multivalent targeting peptides utilize bacterial strategies for enhanced tumor cell binding and uptake, offering a novel delivery mechanism for therapeutics to treat bladder, skin, and lung cancers.

Bladder carcinomas are among the more frequent and highly recurrent cancers. In spite of its high impact on public health and its increasing burden to the health budget, available therapies are still of limited efficacy. Bladder instillation of nontargeted therapeutics is rendered inefficient by dilution of the agent by urine influx and elimination of the agent by the periodic voiding of the bladder content.

Researchers at Purdue University have developed a family of artificial multivalent targeting peptides that show improved protein solubility/stability, greater binding potential, and a very high rate of uptake by tumor cells. This design is based on the strategies utilized by different bacteria, such as the therapeutically used Bacillus Calmette Guerin (BCG), to bind and to be internalized by tumor cells without causing patient hypersensitivity, morbidity, and risk of infection. Further, this technology has the potential for use as a targeting agent for the delivery of therapeutics to treat bladder cancer by having this technology formulated into pharmaceutically suitable carriers and administered into the lumen of the bladder. This revolutionizes bladder cancer treatment and can lead to therapeutic innovations in the treatment of other cancers such as skin and lung cancer.

Advantages:

-Greater protein stability, solubility, and tumor cell binding properties

-Fast and efficient uptake by tumor cells

-No infection risk or hypersensitivity developed

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Category

Biotechnology & Life Sciences/Synthetic Biology & Genetic Engineering

Pharmaceuticals/Drug Delivery & Formulations

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Potential Applications:

-Bladder cancer treatment

-Potential skin and lung cancer treatment

Related Publications:

Coon, B. G., S. Crist, A. M. Gonzalez-Bonet, H. K. Kim, J. Sowa, D. H. Thompson, T. L. Ratliff, and R. C. Aguilar. Fibronectin attachment protein from bacillus Calmette-Guerin as targeting agent for bladder tumor cells. International Journal of Cancer, 2012, 131 (3): 591-600. doi: 10.1002/ijc.26413.

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Intellectual Property:

Provisional-Patent, 2014-06-10, United States | Provisional-Patent, 2016-03-04, United States | Utility Patent, 2017-03-03, United States

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