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Discovery of third category of bionanomotor by revolution mechanism without rotation and development of high efficient antibacterial drug targeting to biomotors

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Biomotors have been classified into two categories: Linear and rotation motor. For decades, viral DNA-packaging motors have been believed to be the rotation motor. Recently, we discovered a third type of biomotor using the revolution mechanism without rotation. It was found that many dsDNA translocation biomotors use a common revolution mechanism. Rotation is similar to the Earth rotating around its own axis, while revolution is like Earth revolving around the Sun. Acquired drug resistance has become a major threat for bacterial infection. To combat the evolution of drug resistance, new approached in drug design are highly desired. Many biomotors contain a high stoichiometrical number, such as displaying as a hexamer, of components. Our study revealed that drugs targeting a biomotors holding high stoichiometry could cause an exponentially stronger inhibitory effect than targeting complex with low stoichiometry. Bacteria contain many biomotors that can serve as excellent target for the development of high efficient antibacterial drugs. The new methods in drug design reported here can accelerate next generation of potent drugs to remedy drug-resistant of bacterial infection.

Biography

Peixuan Guo received his PhD in Microbiology with training in biophysics from the University of Minnesota in 1987. He obtained Postdoctoral training at NIH before joining Purdue University as an Assistant Professor in 1990, received Tenure in 1993, Full Professor in 1997, and was honored as a Purdue Faculty Scholar in 1998. He was recruited to University of Cincinnati in 2007 as the Dane & Mary Louise Miller Endowed Chair of Biomedical Engineering, and Director of the NIH Nanomedicine Development Center located at the University of Cincinnati. He received the Pfizer Distinguished Faculty Award in 1995; the Purdue Faculty Scholar Award in 1998; the Purdue Seed Award in 2004, 2005, and 2007; the Lions Club Cancer Research Award in 2006; and COV Distinguished Alumni of the University of Minnesota in 2009. He is an Editor or board member of five nanotechnology journals. He was a member of two prominent National Nanotechnology Initiatives sponsored by NIST, NIH, NSF and National Council of Nanotechnology; panelist of DOD medical assessment workshop; Director of one NIH Nanomedicine Development Center from 2006 to 2011, member of the NIH NDC Steering Committee from 2006-2010.

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