

3rd International Conference and Exhibition on **Biosensors & Bioelectronics**

August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

Optical capsule: The secure molecular transporter

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Static and dynamic optical tweezers have been widely investigated and the interesting results obtained in recent years. They have become the promising tools for atom/molecule trapping and transportation, where recently the use of optical tweezers for drug delivery into the body and living cells has been realized and confirmed. To make this technique more reliable for drug delivery applications, therefore, we recommend the use of an orthogonal soliton pair for drug trapping and delivery. The orthogonal soliton pair is known as an "optical capsule", which can be widely used for drug trapping and delivery, especially, for security purpose. To form the optical capsule based orthogonal soliton pair, light from a semiconductor laser is input into the nonlinear device system called a "PANDA" ring circuit, in which the Gaussian soliton like pulses can be generated and localized within the system by controlling the other input of the PANDA ring. By using this proposed technique, drug molecules can be securely trapped and transported by the optical capsules into the body and living cells via the optical waveguide, which can be fabricated to be a thin and tiny device by a thin film technology. Moreover, the long distance drug delivery and transportation within the small scale networks is also available by using the optical carrier modulation and demodulation (filtering) methods. Similarly, drug molecules can also be stored in an optical storage system for reservation purpose. This technique is also available for small scale electronics and communications, for instance, molecular electronics, molecular communications and computing applications, which will be discussed in details. The novel concept of optical capsule generation using the orthogonal solitons is also presented.

Biography

Preecha P Yupapin received his PhD in electrical engineering in 1993 from City University, London and postdoctoral studies from European University Collaboration in 1994-1995. He is an Optical Society of America (OSA) advisory board member. He has published more than 350 papers in reputed journals and serving as an editorial board member of reputed journals.

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