

**GOVERNMENT OF INDIA
SCIENCE AND TECHNOLOGY
LOK SABHA**

UNSTARRED QUESTION NO:3669
ANSWERED ON:26.04.2012
NEEDLELESS DRUG DELIVERY DEVICE
Maadam Shri Vikrambhai Arjanbhai

Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

- (a) whether the scientists at the Indian Institute of Science (IISc) have designed a technology, a pen shaped needleless drug delivery device, that uses supersonic shock waves for the painless delivery of medicines into the body;
- (b) if so, the details thereof;
- (c) whether IISc is the only organisation that has developed such a device in the world using supersonic shock wave technology; and
- (d) if so, the extent to which it is likely to be beneficial?

Answer

MINISTER OF STATE IN THE MINISTRY OF PLANNING; MINISTER OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTER OF STATE IN THE MINISTRY OF EARTH SCIENCES (ASHWANI KUMAR)

(a) & (b) Yes, Madam. The scientists at Indian Institute of Science (IISc.), Bangalore have developed a needleless vaccine delivery system and successfully delivered Typhoid vaccine into mice in the laboratory. This new method has been developed based on the collaborative work between the Laboratory for Hypersonic and Shock Waves, Department of Aerospace Engineering and Department of Microbiology & Cell Biology, Indian Institute of Science. This new method of drug delivery is in its early stage of development and it needs to go through more scientific studies for device prototype development, clinical validation and regulatory approval before the device is commercially available for human use.

(c) & (d) Yes, Madam. IISc is the only organization which is using shock waves generated through micro-explosions that travel at supersonic speed for needleless drug delivery. This method utilizes the instantaneous mechanical impulse generated by micro-blast waves to achieve sub-cutaneous delivery of vaccines into mice. The micro-blast wave is generated inside a small disposable plastic tube (3 mm diameter) using negligibly small amount of chemical energy (few Joules). Appropriate mechanical fixtures (disposable) are used to transfer the mechanical impulse to push the liquid drug to depths of ~100 microns below the skin of the mice. The results in the laboratory are very encouraging opening up exciting possibilities of developing needleless drug delivery systems that may also be less painful, for commercial use in the coming years.