Micromachined Passive Programmable Drug Delivery Systems

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BACKGROUND

The ability to deliver drugs locally to the site of need and over a prolonged period of time is important as a therapeutic method for many ailments and diseases. Many drugs are more effective if delivered at a specific site since they can be delivered in concentrated dosages at the point of interest, while maintaining an overall low dosage within the total body. Some drugs require delivery in places that are inconvenient for injection. For example, the highly invasive nature of the treatment and limitations in controlling an effective drug concentration in the eye for age related macular degeneration (AMD) over a prolonged period of time still leave these delivery methods far from ideal. Small, programmable drug delivery implants would be a highly valuable alternative. The current state of art does not provide a satisfactory way to construct a small device that can deliver a time dependent profile of drug dosing. A device that can be readily constructed to produce a desired time dosing profile would be desirable.

TECHNOLOGY DESCRIPTION

Researchers at the University of CA have developed a method and apparatus that can deliver preprogrammed quantities of drug over time without the need for external power or electronics. The invention is a small implantable drug delivery device capable of releasing drug in varying amounts at preprogrammed times. The device uses osmotic or diffusive forces to perform the timing of the delivery and actuate the release of drug. The device is enabled by micromachining technology which can pattern materials with very precise shapes, enabling control of chemical diffusion and swelling of different materials in an aqueous environment. The resulting device can be built to release chemicals into the local environment at predetermined times, either short or extended. Optionally, it can release the chemicals in a pulsatile manner. The invention does not require the use of batteries or other external power. Moreover, the invention can be manufactured by computer using lithographic methods or 2-D precision machining and does not require the integration of many different polymers to function properly.

APPLICATIONS

The device and method discussed above will have great utility for a variety of applications including, but not limited to: (1) controlled, sustained and programmable drug delivery; (2) controlled, sustained and programmable chemical treatments (e.g., for batch growth); and (3) controlled, sustained and programmable food delivery (e.g., for aquariums and other aqueous environments).

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,617,143	12/31/2013	2007-285

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OTHER INFORMATION

CATEGORIZED AS

- » **Medical**
  - » Delivery Systems
  - » Devices
- » **Nanotechnology**
  - » Other

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