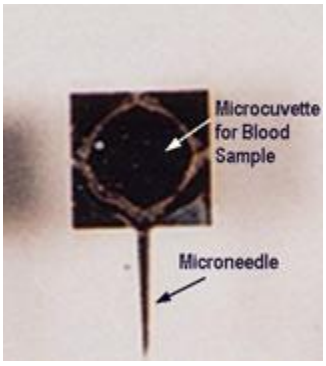
Medical and Biotech Developments, Inc.

Silicon MicroNeedle Chip Overview



The silicon microneedle was engineered to mimic the painless bite of the mosquito. In the majority of mosquito bites, the target is unaware of being bitten. The bite itself typically causes no pain – irritation, redness, and swelling are caused by enzymes injected by the mosquito to thin the blood. The microneedle was designed with consultation from a leading entomologist at the National Institutes of Health (NIH). The process to make a silicon microneedle chip is, in most aspects, identical to the manufacturing of computer chips, except that the resultant silicon micro-device may contain three dimensional structures (such as a microfluidic network) and integrated electronic networks. Such chips are known as micro-electrical mechanical systems (MEMS).

Unlike conventional finger lancets or heel sticks that are designed for obtaining a blood sample only, the microneedle draws blood (or other liquid) by capillary force into an internal chamber within the disposable microchip. Because only a very small blood sample is drawn, sampling can be done on the arm or other less painful site. This is of great advantage when dealing with a neonate's or small laboratory animal's limited blood supply. When an assay is integrated into the chamber, one-step sampling and assay can be performed by the user without the need for manual blood transfer. The present microneedle chips offered here are for sampling or dispense only.

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HIGH STRENGTH STRUCTURAL SILICON MICRONEEDLES

- Miniature - Roughly the cross-section of a human hair.
- Capillary Flow - The MicroNeedle draws blood (or other liquid) flow by capillary force into the disposable microchip.
- No Pain..BIG Gain - The miniature MicroNeedle has been proven in clinical trials to be pain free.
- Strong - Single crystal silicon needles are stronger than steel, and will not break during skin penetration.

- Finite element analysis is used to design the silicon MicroNeedle.

MicroNeedle Chip -Applications:

- Single use disposable assay chips for medical diagnostics or home monitoring of health status.
- Blood sampling from neonates.
- Sampling of blood, bodily fluids and tissue.
- Field sampling and analysis of environmental pollutants.
- Precise dispense of small volumes of therapeutics.
- Drug delivery to the eye, neck, and skin.
- Self applied vaccination.
- Manipulation of or introduction of materials into cells.

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