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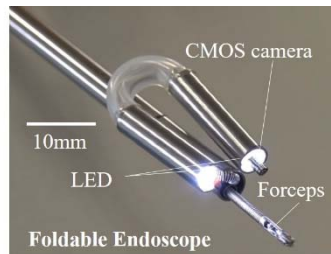
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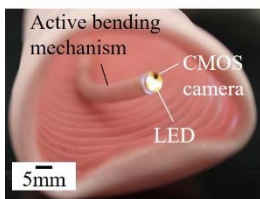
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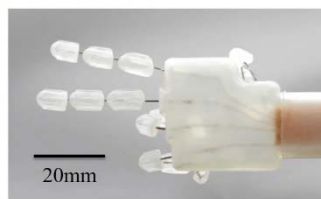
<http://www.medmems.bme.tohoku.ac.jp/>



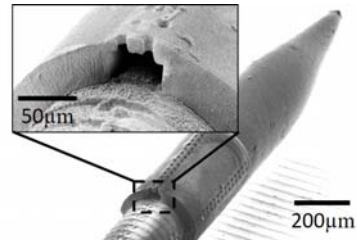
Foldable Endoscope



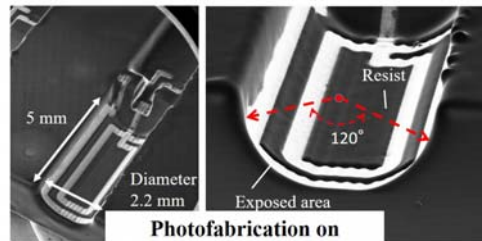
Active Bending
Endoscope Using Shape
Memory Alloy Actuator



Robot Hand Using Shape
Memory Alloy Micro Joints



Microperfusion Needle for Measurement of
Biological Substances in Subcutaneous



Photofabrication on
Concave Shaped Substrate

New minimally invasive medicine and health care devices realized by micro machines

Using microfabrication technologies including MEMS (Micro Electro Mechanical Systems) technologies novel and useful medical devices and health care devices can be realized with high-performance multi-functionalized systems including micro sensors, micro actuators and integrated circuits. More accurate diagnosis and safe therapy without large incisions and physical burden on the patient can be performed using the small high-performance multi-functionalized medical tools, for example endoscopes and catheters. Advanced diagnosis and therapy will be also realized using new high-performance multi-functionalized medical tools. Thin, soft and small wearable health care devices which is mounted on human body surface enable new useful measurement item in daily life, for example blood lactate, blood glucose and stress level. Basic fabrication technologies and fabrication processes required to realize these devices mentioned above have been also developed. Not only fabrication but also several evaluation and verification experiments are also performed with medical doctors and medical device manufacturers.

Development of high-performance high-functionalized minimally invasive diagnostic and treatment device

High-performance multi-functionalized minimally invasive medical tools have been developed using microsystem technologies. Next generation medical sensors, endoscopes and catheters have been developed to realize more precise inspection and effective treatment from inside human body with slight damage to patients. Ultra-thin intravascular fiber-optic blood pressure sensor, transformative endoscope, active bending robotic catheters and endoscopes using micro actuators have been developed for precise inspection and treatment.

Development of wearable health care devices

Thin and small wearable health care devices which are attached on body surface have been developed. Micro fluid channel is fabricated on the surface of metal needle of 200 µm diameter and is slightly inserted into skin surface which aim to realize measurement of biological substances, for example glucose, lactate, in daily life by sampling of subcutaneous liquid. Wearable cuffless blood pressure and other hemodynamics sensor have been also developed using ultrasonic array transducers. Acupuncture system without needle insertion is realized using focused ultrasonic stimulation.