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NANOROBOTS FOR CARDIOLOGY

Adriano Cavalcanti
CEO Research Scientist
CAN Center for Automation in Nanobiotech
www.canbiotechnems.com

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Cardiovascular problems are generally correlated with the obesity, human sedentary lifestyle, or hereditary characteristics. Heart problem is the world biggest killer.[1] The use of microdevices in surgery and medical treatments is a reality which brought many improvements for clinical procedures in the last years. The catheterization has been used as an important methodology for many cardiology procedures.[2]

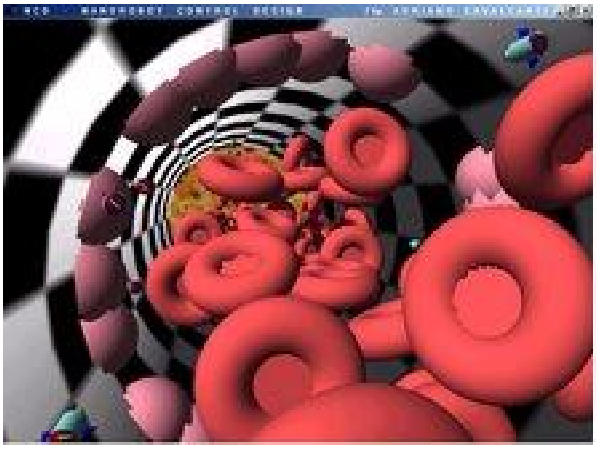
In the same way as the development of microtechnology has lead on the 80's to new tools for surgery, now nanotechnology will equally permit further advances providing better diagnosis, and new devices for medicine through the manufacturing of nanoelectronics.

The advent of nanotechnology is expected to enable automated molecular machines with embedded nanoscopic devices providing new tools for medical procedures.[3] It is just a matter of time for the initial uses of nanorobots for health to become part of every day surgical procedures.[4] An important possible feature of medical nanorobots will be the capability to cardiology treatments.

Nanorobots can be applied to atherosclerotic lesions in stenosed blood vessels, particularly in the coronary circulation, and treat them either mechanically, chemically or pharmacologically.[5]

A nanorobot can be equipped with the necessary devices. Depending on the case, different gradients on temperature, concentration of chemicals in the bloodstream, and electromagnetic signature, are some of relevant parameters when monitoring patients.

Computing processing, energy supply and data transmission capabilities can be addressed through embedded integrated circuits, using advances on technologies derived from VLSI design. CMOS VLSI design using deep ultraviolet lithography provides high precision and a commercial way for manufacturing nanodevices and nanoelectronics. The CMOS industry may thrive successfully the pathway in the assembly process of manufacturing nanorobots, where the jointly use of nanophotonic and nanotubes may even accelerate further the actual levels of resolution ranging from 248nm to 45nm devices. To validate designs and to achieve a successful implementation, the use of VHDL has become the most common methodology utilized in the industry of integrated circuits.



The atherosclerotic lesion was reduced due nanorobots activation

Integrated nanothermoelectric sensors could be implemented as CMOS devices with promising uses for pattern identification. Such approach may permit a large production of infrared thermal sensors applied into different ranges of wavelength. Nanorobots using temperature sensors open new medical possibilities for clinical diagnosis, as well as for ubiquitous data collection, with pervasive patient monitoring. Nanowires are suitable for fabricating CMOS based on integrated nanoelectronics. Carbon nanotubes are able to improve performance with low power consumption for nanosensors.

CMOS sensors using nanowires as material for circuit assembly can achieve maximal efficiency for applications regarding chemical changes, enabling medical applications. Due resistivity characteristics, nanocrystallites and mesoscopic nanowires performance is impressive if compared with larger sensors enabled technologies. Altogether, it is turning feasible 90nm and 45nm CMOS devices as an actual breakthrough in terms of technology devices into products that can be utilized strategically.

Nanoelectronics manufacturing methodologies may advance progressively. Thus, the use of computational nanomechatronics and virtual reality may also help in the process of transducers and actuators investigation for the advance of manufacturing nanorobots. Patients with heart problems will benefit directly from advances on medical nanorobotics.

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