

Applications of magnetic meso-technology in Cardiology.

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We argue that for diagnostic and predictive cardiology, the crucial notion is "stable" and "unstable" plaque. The miniaturization of thermometers permitted catheter based measurement of the temperature of unstable plaque: they are about 1-2 °C warmer than blood. We describe how the new modality of LEMF- MRI permits reliable detection/imaging of unstable plaque.

Due to high risk of heart attack/stroke, the detection of large unstable plaques is usually followed with the angioplasty and placement of stents in stenosis site. Currently, the stents are either naked or drug eluting. However, they are not "individualized" and the drug eluting properties can not be triggered/controlled from exterior. We propose the use of "magnetic knife" and "magnetic micro-syringe" to implement the "pharmacy on stent" concept.

The angioplasty is a complex , man-power intensive *ergo* very expensive operation (In USA ca. \$20-50,000). We propose how the modern material sciences can lead to much simpler and less costly (< \$5,000) angioplasty. The concepts such as:

- a) self- inflating balloons;
- b) self-deploying stents;
- c) magnetic navigation based angioplasty;
- d) Archimedes forces angioplasty are introduced.