

From Biomaterials and Tissue Engineering to Biomedical Engineering and From Crisis Management to Proactive Medicine

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Department of Biomedical Engineering at Tampere University of Technology, Tampere Finland has wide expertise on materials science; especially on biomaterials, medical imaging, signal analysis and telemedicine based information technology, and on biological and health care systems based electrical engineering. Thus, our know-how provides possibilities to widen the on biomaterials and tissue engineering based research on i.e. preventive health care. Reason why this should be done is the fact that in developed countries major part of the health care costs goes to treatment of symptoms caused by diseases at their late stage. Yet, most of the diseases causing a major part of deaths, like cancers, cardiovascular diseases, Alzheimer, could be detected years before their cause symptoms. For this, a new kind combination of technologies and know-how should be established. As an example of the possibilities, new better resolution low energy demanding 3-D body scanners could be developed. Micro sized sensors working in situ and using energy created by mini sized environmental friendly biobatteries are already almost existing medical devices. What else could we do by combining our forces and technologies in order to move from crisis management of diseases to proactive medicine? Also, why not manufacture DNA microarray chips for analyzing of tumors for expression of genes associated with good response to various anti-cancer drugs. You visit your clinician, undergo genetic testing, and then you are handed a miniature hard drive

containing your personal genome sequence, which is subsequently uploaded onto publicly accessible databases. In theory, all this could be possible we already know so much about our genes and gene related diseases. Naturally and unfortunately, whatever is done some individuals will have some disease at some stage. With individual gene maps the development of Personalized Medicine could be possible: Gene expression profiles can be developed that will make patients more likely to respond to certain drugs. As a whole, personalized health care is “a system in which doctors, pharmacists and other health care providers customize treatment and management plans for individuals.

