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«Μέτρον άνθρωπος;» ΠΕΡΙΒΑΛΛΟΝ ΥΓΕΙΑ

Nanomedicines in the Fight Against Cancer: the Present and the Future

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According to official epidemiological data from the World Reasearch Cancer Fund International, cancer patients amounted to more than 12.7 million worldwide in 2008, a number expected to reach 21 million patients until 2030[1]. Medication for patients with cancer is limited to costly therapies which delay but do not stop the course of the disease. The diagnostic methods are of restricted range. As such, the need for the pursuit of innovative research and development applications, such as the ones provided by nanotechnology[2], is deemed urgent.

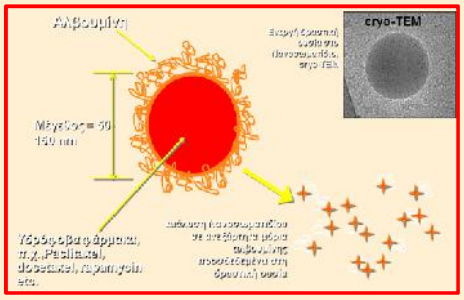

Fig 1: Albumin loaded nanoparticle device for faster, effective direct targeting of lung cancer. FDA Approved. Abraxis Bioscience Inc., Abraxane SPC, 2012.

Fig 2: NO loaded nanoparticle drug delivery device reducing child cancer 5 fold. Boyer et al.(2012), *Chemical Communications;* istock photo®

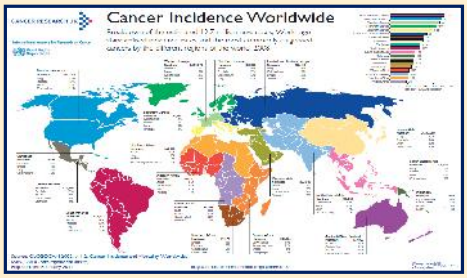

Fig 3: Incidence Rates for Cancer Worldwide, Percentages of newly diagnosed cancer cases worldwide, Cancer Research UK, 2012®

The idea for the design of nanodrugs originates from the fact that existing therapies have limited efficacy and increased toxicity[2,3]. Novel anticancer drugs which are approved for circulation, already use existing active substances which may possibly in the future be able to be administered to patients via drug delivery 'vehicles' created by a nanotechnological method (*targeted nanodrugs*). By the administration of targeted nanodrugs, patients enjoy a faster, more efficient and safer therapy. As such, patient survival rates increase by at least 10 years and their quality of life is improved[2]. Presently nanotechnology is applied to the fight against cancer with the design of nanoparticles which can either be attached to drugs or to imaging substances and target directly cancer tumours. In the future it is planned to be applied via special medical micro devices and in the detection of biochemical cancer 'signals'. The main objectives of nanotechnology for the treatment of cancer are: (a) earlier diagnosis of the disease and (b) more effective cancer treatment[3].

The present review explores the therapeutic benefits of nanotechnology drug delivery applications and their drawbacks concerning the patients, the health system and the society as a whole. In our study we use examples of already approved drugs or compounds very close to approval, which fully comply with the pharmacological profile, approval requirements and cost-effectiveness demands for the fight against one of the most impactful challenges of modern medicine. We pursue bioethical issues generated by the advent of nanotechnology, a novel scientific sector aiming to improve human life.

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