Application of Neutron Capture Therapy to widespread tumours

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The Neutron Capture Therapy (NCT) is a new Radiation Therapy technique characterized by very high tumour selectivity. An element like ^{10}B (with a large neutron capture cross section) concentrate in tumours cells 4-5 times more than in the healthy tissues. The $^{10}B(n,\alpha)^{7}Li$ reaction induced by thermal neutron irradiation is lethal only to the cells with a high ^{10}B concentration; this is due to the very short range of α particles and ^{7}Li nuclei. BNCT is very powerful in the treatment of tumours that are widespread in the entire organ like lung or liver. For the first time in the world BNCT was applied at Pavia University to treat patients affected by liver metastases; after Boro-Phenyl-Alanine administration the organ was removed from the patient body, irradiated into a thermal column of a nuclear reactor and re-implanted into the patient. Now we are studying the possibility to extend BNCT to the lung tumours in a rat model. Results on both researches will be presented.