

**EANM '09, Annual Congress of the European Association of Nuclear Medicine, October 10-14, 2009, Barcelona, Spain.**

**Radionuclide therapy/dosimetry: biological and long-term effects / animal and in-vitro studies.**

Tuesday October 13, 2009 16:00h - 16:30h  
Room: Poster Exhibition Hall

**P619 New modality of curietherapy with holmium oxyde submicronic particles**

J. TALEB<sup>1</sup>, B. MUTELET<sup>1</sup>, L. MACIOCCO<sup>2</sup>, D. KRYZA<sup>3</sup>, S. HUMBERT<sup>4</sup>, O. TILLEMENT<sup>5</sup>, E. HILTBRAND<sup>4</sup>, C. LOUIS<sup>6</sup>, M. F. JANIER<sup>3</sup>, S. Roux<sup>5</sup>, K. Abbas<sup>2</sup>, F. Simonelli, P. PERRIAT<sup>7</sup>, **C. BILLOTEY<sup>3</sup>**;

<sup>1</sup>Université Claude Bernard Lyon1, Villeurbanne, FRANCE, <sup>2</sup>Advanced Accelerator Applications, Saint Genis Pouilly, FRANCE, <sup>3</sup>Université Claude Bernard Lyon1, Hospices Civils de Lyon, LYON, FRANCE, <sup>4</sup>CERMA, Archamps, FRANCE, <sup>5</sup>Université Claude Bernard Lyon1, CNRS, Villeurbanne, FRANCE, <sup>6</sup>NanoH, Saint-Quentin Fallavier, FRANCE, <sup>7</sup>INSA, Villeurbanne, FRANCE.

**Introduction** : Arguments of radioactive particles using such as curie therapy agent is to obtain a more homogeneous and intense radio effect and consequently improve anti-tumoral effect and decrease ratio of relapse. The aim of this study is to demonstrate that sub-micronic holmium oxide particles (NanoH™) could be activated without alteration of particle structure, could be directly injected in a tumour, with a high intra-tumour permanence, without overall adverse effect, and with anti-tumour effect.

**Materials and Methods:** The tumour model is double xenograft of murine breast cells (1372 MAT B III cell lineage) in Fischer rats. 10<sup>6</sup> cells were injected under isoflurane anaesthesia by sub-cutaneous route at both thigh of 13 rats. 300nm sized particles containing about 90% of holmium oxide were synthesized, dessicated and then activated in neutron reactor. <sup>166</sup>Ho particles were suspended in a solution of PVA and 10% ethanol to obtain a solution with a specific activity of 56.5 MBq/100µl and mass particle concentration of 7.7 %. Each 8-10 mm diameter tumour of 10 rats were injected at 7 days post-tumour graft with an activity of 15 to 200 MBq, either with a hypodermic syringe either a high kinetic injection system (CERMA™) in 7 rats (14 tumours). Volume of tumours were daily calculated in all rats. Animals were sacrificed at 14 days post xenograft.

**Results** : In witness rat population, mean of tumour volume at 7, 11, and 14 days is respectively : 0.012 cm<sup>3</sup>(SD = 0.038), 1.5 cm<sup>3</sup>(SD = 0.98), 4.84 cm<sup>3</sup>(SD = 2.97) and 8.8 cm<sup>3</sup>(SD = 4) with mean ratio of a increased volume between d7 and D11 = 46%. One rat was death at D10 due to anaesthesia problem. In treated rat mean of tumour volume at 7, 11, 14 and 16 days is respectively : 0.95 cm<sup>3</sup>(SD = 0.43), 0.98 cm<sup>3</sup>(SD = 0.51) and 1.3 cm<sup>3</sup>(SD =

0.37) with mean ratio of a increased volume between d7 and D11 = 9.9%. In 9/12 tumours, growth of tumour after injection of holmium particles at D11 is inhibited (mean of increasing volume tumour ratio= -9%, -43% to + 27%). In 3/12 tumours, growth of tumour was observed (mean of increasing volume tumour ratio= 71 %, 41% to + 113%), maybe related to a bad injection (without the tumour).

**Conclusion :** Curietherapy with submicronic holmium oxyde particles are promising new agent for curietherapy by direct intra-tumor injection, with perspectives of additional treatment in glioblastoma.