

To SIA BIOSAN  
President  
Vasilijs Bankovskis

## Report

From 13.02.2018 to 13.10.2018, approbation of the following equipment produced by BioSan was conducted in SIA Kodolmedicīnas Klīnika radiopharmacy laboratory within the framework of the scientific project *Development and introduction in clinical practice of innovative methods of diagnostics and therapy of malignant tumours using molecularly targeted radionuclides produced in Latvia*: (1) laboratory centrifuge LMC-3000 with R12/10 rotor; (2) programmable mini-shaker Multi Bio 3D with PDM holder; (3) S-Bt Smart BioTherm compact CO2 incubator. This equipment has been used for standard in vitro test for the purpose of proving ability of mammal cancer cell lines to bind molecularly targeted radionuclides: S-Bt Smart BioTherm compact CO2 incubator has been used for keeping and incubating mammal cancer cell cultures, mini-shaker Multi Bio 3D for provision of mixing components of more uniform reaction, and laboratory centrifuge LMC-3000 for sedimentation and washing of cell suspension at various stages of reaction. All additions of reagents were performed by using BioSan automatic pipettes and disposable tips.

### *Specific circumstances of using the equipment:*

1. **LMC-3000**: Centrifuging has been running 3 minutes with 300 g or 900 g 15 ml Sarstedt in vials with screw caps. Speed provided by the equipment is suitable for cell experiments. It works perfectly, gathers speed fast, and also stops sufficiently fast. R12/10 rotor type suits needs of cell biology research.
2. CO2 Incubator **S-Bt Smart Biotherm**. Cells for experiments have been incubated for four or more hours at 37°C and in 5% CO2 atmosphere. Experiments used Sarstedt plastics suitable for mammal cell cultures flasks and 6 or 12 well plates. Equipment is operating well, keeps stable temperature within +/- 0.2°C. Chamber humidity during incubation has not been measured; water bath has been used during incubation.
3. **Biosan pipette** volume scope 0/5-10 ul, 2-20 ul, 20-200 ul, 100-1000 ul. Matched all our needs. Convenient in use, suitable tips.
4. **Multi Bio 3D** after adding the active substance, cells have been mixed in 6 or 12 well plate mode 10 rpm orbital rotation and 5° tilt change (vibro) mode. Using this equipment, we have conducted repeated in vitro test series three times (number of replicates for samples n=3), using five cancer cell lines. Obtained results have shown perfect replicability (degree of obtained data among individual replicates of analyzed objects was 94%) and reproducibility (experiments were conducted by different people at different times using the same equipment, match of data obtained in different experiments achieved 89%). No operation faults of used equipment have been observed in course of conducting experiments.

Member of the Board  
Andrejs Grīnbergs

<signature>



**SIA BIOSAN**  
**prezidentam**  
**Vasīlijam Bankovskim**

### **Atzinums**

Laikā no 13.02.2018 līdz 13.10.2018 SIA Kodolmedicīnas klīnika Radiofarmācijas laboratorijā zinātniska projekta "Inovātīvu metožu attīstīšana un ieviešana klīniskajā praksē ļaundabīgo audzēju diagnostikai un terapijai, izmantojot Latvijā ražotus molekulāri mērķētus radionuklīdus" ietvaros tika veikta sekojoša BioSan ražotās aparatūras aprobācija: (1) LMC-3000 laboratorijas centrifūga ar rotoru R12/10; (2) programmējams mini-kratītājs Multi Bio 3D ar PDM turētāju; (3) S-Bt Smart BioTherm, Compact CO2 inkubators. Dotā aparatūra tika izmantota standarta *in vitro* testiem, ar mērķi pierādīt zīdītāju vēža šūnu līniju spēju saistīt molekulāri mērķētus radionuklīdus: S-Bt Smart BioTherm, Compact CO2 inkubators tika izmantots zīdītāju vēža šūnu kultūru uzturēšanai un inkubācijai, mini-kratītājs Multi Bio 3D – vienmērīgākas reakcijas maisījuma komponentu sajaukšanās nodrošināšanai, bet LMC-3000 laboratorijas centrifūga – šūnu suspensijas sedimentēšanai un mazgāšanai reakcijas dažādos posmos. Visi reaģentu pievienošanas soļi tika veikti, izmantojot BioSan automātiskās pipetes un vienreizlietojamus uzgaļus.

### **Izmantotās aparatūras lietošanas specifiskie apstākļi:**

1. **LMC-3000:** Centrifugācija tika veikta 3 minūtes pie 300g vai 900g 15 ml Sarstedt stobros ar skrūvējamu vāciņu. Šūnu eksperimentiem aparatūras nodrošinātie apgriezieni ir piemēroti. Strādā teicami, apgriezienus uzņem ātri un apstājas arī pietiekami ātri. Rotoru tips R12/10 piemērots šūnu bioloģijas pētījumu vajadzībām.

2. **Smart Bioterm CO2 inkubators.** Šūnas eksperimentiem tika inkubētas četras un vairāk stundas pie 37°C un 5% CO<sub>2</sub> atmosfērā. Eksperimentos izmantota Sarstedt zīdītāju šūnu kultūrām piemērota plastika – flaski un 6- vai 12-bedrīšu plates. Aparatūra darbojās labi, temperatūra noturas stabila +/- 0.2°C robežās. Mitrums kamerā inkubācijas laikā netika mērīts, inkubācijas laikā tika izmantota papildīta ūdens vanna.

3. BioSan pipešu tilpuma diapazons - 0.5-10ul, 2-20ul, 20-200ul, 100-1000ul. Atbilstošs visām mūsu vajadzībām. Lietošanas ērtums un uzgaļi arī atbilstoši.

4. **Multi Bio 3D** - Šūnas pēc aktīvās vielas pievienošanas tika maisītas 6- vai 12-bedrīšu platēs režīmā 10 RPM orbitālā rotācija un 5° slīpuma izmaiņa (vibro) režīms.

Izmantojot doto aparatūru, trīs reizes tika veiktas atkārtotas *in vitro* testu sērijas (replikātu skaits paraugiem n=3), izmantojot piecas vēža šūnu līnijas. Iegūtie rezultāti uzrādīja teicamu atkārtojamību (iegūto datu sakritības pakāpe starp analizējamo paraugu atsevišķiem replikātiem bija 94%) un reproducējamību (eksperimentus veica atšķirīgi cilvēki, atšķirīgos laikos, bet izmantojot to pašu aparatūru, iegūto datu sakritība starp dažādiem eksperimentiem sasniedza 89%). Visā eksperimentu veikšanas posmā netika novēroti izmantotās aparatūras darbības traucējumi.

Valdes loceklis  
Andrejs Grīnbergs





KODOLMEDICĪNAS KLĪNIKA, SIA

Reģ.Nr: LV40103852116 Adrese: Patversmes iela 25, Rīga, LV-1005 Mob.t.: +371 29 514690

**e-Poster prezentācija Eiropas Kodolmedicīnas Asociācijas 18.konferencē EANM18  
Diseldorfā, Vācijā 12.-17.10.2018.**

**EANM 18 / EP-0701**

Personalized medicine: method of in vitro determination of receptor binding for Lu-177 radio-pharmaceuticals therapy efficacy estimation

**Congress:** EANM 18

**Poster No.:** EP-0701

**Type:** Scientific e-Poster

**Keywords:** Clinical -> Therapy study -> Other treatments -> Local radionuclide treatment, 806 Local Radionuclide Treatment, 8. Radionuclide Therapy & Dosimetry

**Authors:** Z. Kalnina<sup>1</sup>, **T. Kusins**<sup>2</sup>, K. Svirks<sup>2</sup>, E. Rubena<sup>1</sup>, R. Kovaldins<sup>2</sup>, G. Kizane<sup>3</sup>, A. Berzina<sup>4</sup>, A. Grinbergs<sup>2</sup>; <sup>1</sup>Latvian Biomedical Research and Study centre, Riga, LATVIA, <sup>2</sup>Kodolmedicīnas klinika, Riga, LATVIA, <sup>3</sup>Institute of Chemical Physics, University of Latvia, Riga, LATVIA, <sup>4</sup>Riga East University Hospital, Clinical Department of Nuclear Medicine, Riga, LATVIA

**Aim**

Lu 177 -PSMA and Lu 177 -DOTA-TATE are currently used for the treatment of metastatic prostate cancer (mPC) and metastatic neuroendocrine tumours (mNET) when other therapeutic approaches fail, while their Ga 68 analogues help to precisely trace metastatic tumour spread. However, there is an interindividual heterogeneity of the targeted receptor expression levels even of a specific cancer type - e.g., among patients with mPC, in 5-10% there is no profound PSMA



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**Authors:** Z. Kalnina<sup>1</sup>, **T. Kusins**<sup>2</sup>, K. Svirks<sup>2</sup>, E. Rubena<sup>1</sup>, R. Kovaldins<sup>2</sup>, G. Kizane<sup>3</sup>, A. Berzina<sup>4</sup>, A. Grinbergs<sup>2</sup>; <sup>1</sup>Latvian Biomedical Research and Study centre, Riga, LATVIA, <sup>2</sup>Kodolmedicīnas klinika, Riga, LATVIA, <sup>3</sup>Institute of Chemical Physics, University of Latvia, Riga, LATVIA, <sup>4</sup>Riga East University Hospital, Clinical Department of Nuclear Medicine, Riga, LATVIA

**i Disclosure 2 – Receiving Support (for details click on „i”)**

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Valdes loceklis  
Andrejs Grinbergs