

# **Positron Emission Tomography/Computed Tomography with Gallium-68-labeled Prostate-specific Membrane Antigen Detects Relapse After Vascular-targeted Photodynamic Therapy in a Prostate Cancer Model**

Submitted by St phanie Pinot on Thu, 09/19/2019 - 12:10

Titre	Positron Emission Tomography/Computed Tomography with Gallium-68-labeled Prostate-specific Membrane Antigen Detects Relapse After Vascular-targeted Photodynamic Therapy in a Prostate Cancer Model
Type de publication	Article de revue
Auteur	Alvim, Ricardo [1], Nagar, Karan [2], Das, Sudeep [3], Lebdai, Souhil [4], Wong, Nathan [5], Somma, Alexander J [6], Hughes, Christopher [7], Thomas, Jasmine [8], Monette, Sebastien [9], Scherz, Avigdor [10], Kim, Kwanghee [11], Grimm, Jan [12], Coleman, Jonathan A [13]
Editeur	Elsevier
Type	Article scientifique dans une revue � comit� de lecture
Ann�e	2019
Langue	Anglais
Date	18 Juin 2019
Titre de la revue	European urology focus
ISSN	2405-4569

**BACKGROUND:** Evaluating the efficacy of focal therapy for prostate cancer is limited by current approaches and may be improved with biological imaging techniques.

**OBJECTIVE:** We assessed whether positron emission tomography/computed tomography with gallium-68-labeled prostate-specific membrane antigen (Ga-PSMA PET/CT) can be used to predict relapse after vascular-targeted photodynamic therapy (VTP).

**DESIGN, SETTING, AND PARTICIPANTS:** A total of 1×10 LNCaP cells were grafted subcutaneously in the flanks of 6-8-wk-old SCID mice. Of 24 mice with measurable tumors 6 wk after tumor implantation, 20 were treated with VTP (150mW/cm) to ablate the tumors. Blood prostate-specific antigen (PSA) levels were assessed, and <sup>68</sup>Ga-PSMA PET/CT images were performed 1 d before VTP and 1 and 4 wk after.

**OUTCOME MEASUREMENTS AND STATISTICAL ANALYSIS:** Local tumor relapse was evaluated by histology, and tumors were analyzed by prostate-specific membrane antigen (PSMA) and PSA immunohistochemistry. T tests and Kruskal-Wallis tests were used to determine significance.

**RESULTS AND LIMITATIONS:** Four weeks after VTP, 11 (65%) mice had complete responses and six (35%) had tumor relapses confirmed by histology (hematoxylin and eosin, and PSMA immunohistochemistry). All mice with local relapse had positive Ga-PSMA PET/CT findings 4 wk after VTP; all complete responders did not. One week after VTP, the relapse detection sensitivity of Ga-PSMA PET/CT was 75%, whereas the sensitivity of PSA was only 33%. Compared with controls, relapsed tumors had a three-fold reduction in the number of cells with strong PSA staining by immunohistochemistry (1.5% vs 4.5%; p=0.01).

**CONCLUSIONS:** In a preclinical prostate cancer model, we show that Ga-PSMA PET/CT can identify and predict relapse earlier than blood PSA level. These findings support further testing in clinical trials.

**PATIENT SUMMARY:** Positron emission tomography/computed tomography with gallium-68-labeled prostate-specific membrane antigen may be used to follow and evaluate treatment outcomes in men who receive focal therapy for prostate cancer.

Résumé en anglais

URL de la notice	<a href="http://okina.univ-angers.fr/publications/ua20226">http://okina.univ-angers.fr/publications/ua20226</a> [14]
DOI	10.1016/j.euf.2019.06.008 [15]
Lien vers le document	<a href="https://www.eu-focus.europeanurology.com/article/S2405-4569(16)(19)30163-4/fulltext">https://www.eu-focus.europeanurology.com/article/S2405-4569(16)(19)30163-4/fulltext</a>
Titre abrégé	Eur Urol Focus
Identifiant (ID) PubMed	31227464 [17]

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## Liens

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[13] <http://okina.univ-angers.fr/publications?f%5Bauthor%5D=32955>

[14] <http://okina.univ-angers.fr/publications/ua20226>

[15] <http://dx.doi.org/10.1016/j.euf.2019.06.008>

[16] <https://www.eu-focus.europeanurology.com/article/S2405-4569>

[17] <http://www.ncbi.nlm.nih.gov/pubmed/31227464?dopt=Abstract>

Publié sur *Okina* (<http://okina.univ-angers.fr>)