

# Positron Emission Tomography (PET) With 18F-Fluoroazomycin Arabinoside (FAZA) to Assess Tumor Hypoxia in Non-Small Cell Lung Cancer (NSCLC)

Angela Lin <sup>1</sup>, Douglass Vines <sup>1</sup>, Brandon Driscoll <sup>2</sup>, Lisa W. Le <sup>3</sup>, Stephen Breen <sup>1</sup>, Alexander Sun <sup>4</sup>

1. Radiation Oncology, Princess Margaret Cancer Centre, Toronto, ON 2. TECHNA Institute, University Health Network, Toronto 3. Biostatistics, Princess Margaret Cancer Centre, Toronto, ON 4. Radiation Oncology, Princess Margaret Cancer Centre, Toronto / University of Toronto, Toronto, CAN

✉ **Corresponding author:** Angela Lin, angelalin.00@gmail.com

**Categories:** Radiation Oncology

**Keywords:** faza, hypoxia, lung cancer, imaging

## How to cite this poster

Lin A, Vines D, Driscoll B, et al. (2016) Positron Emission Tomography (PET) With 18F-Fluoroazomycin Arabinoside (FAZA) to Assess Tumor Hypoxia in Non-Small Cell Lung Cancer (NSCLC). Cureus 8(9): e.

## Abstract

**Background:** Tumor hypoxia is an adverse prognostic factor in many cancers. Hypoxia tracer <sup>18</sup>F-FAZA provides a non-invasive method of hypoxia imaging. This study aims to evaluate the feasibility and potential benefits of using FAZA-PET scans to assess NSCLC tumor hypoxia.

**Methods:** The initial 17 patients of an ongoing study with stage II–III NSCLC have been analyzed prospectively by imaging with FAZA-PET before initiation of a radical course of radiotherapy. The hypoxic volume (HV) was defined as all voxels within the tumor with standard uptake value (SUV) more than 1.2 times the aorta SUVmean. The Tmax/Bmean ratio (T/B) was defined as maximum tumor SUV divided by 1.2 times the aorta SUVmean. The hypoxic fraction (HF) was determined by dividing the HV by the entire gross tumor volume. Spearman correlation and Fisher's test were used to explore potential correlations among several variables.

**Results:** Median primary and nodal FAZA SUVmax were 1.7 (range: 1.0–3.8) and 1.7 (range: 1.0–3.3). Median primary and nodal T/B ratios were 1.4 (range: 1.0–2.5) and 1.3 (range: 1.0–2.2). Median primary and nodal HF were 3.9% (range: 0.0%–38.2%) and 0.6% (range: 0.0%–50.7%). The median time from diagnostic FDG PET to study FAZA PET scans was 28 days (range: 1–63). Median primary and nodal FDG SUVmax were 13.5 (range: 5.1–32.2) and 8.3 (range: 2.3–15.7). Larger primary tumor volume is correlated with higher T/B ( $p=0.01$ ) and higher HF ( $p=0.01$ ). Primary tumors with higher T/B also had higher HF ( $p<0.0001$ ). The same correlations also apply to nodal disease. Nodal FAZA SUVmax is correlated with primary FAZA SUVmax ( $p<0.0001$ ). When comparing FAZA-PET with FDG-PET, nodal FDG SUVmax is correlated with nodal FAZA T/B ( $p=0.01$ ) and nodal FAZA HF ( $p=0.01$ ). For each patient, the nodal station with the highest FAZA SUVmax correlates with the highest FDG SUVmax ( $p=0.02$ ).

**Conclusion:** Intra-lesional hypoxia in NSCLC primary and nodal tumors can be detected by FAZA-PET. Larger tumor volume is correlated with higher T/B and HF in both primary and nodal masses. In the nodal volume only, higher FDG activity is correlated with higher FAZA T/B and higher HF. Ongoing trial accrual and follow-up of our patient cohort will provide more

## Open Access

Published 09/14/2016

## Copyright

© Copyright 2016

Lin et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 3.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Distributed under

Creative Commons CC-BY 3.0

information with regards to the imaging and clinical value of FAZA-PET. This study may eventually lead to using FAZA-PET as a guiding tool to escalate dose to the hypoxic region of the tumor.

