

# Antibody-guided Molecular Imaging of *Aspergillus* Lung Infections in Leukemia Patients

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24 **PATIENT POPULATION**

25 Subjects underwent  $^{64}\text{Cu}$ -NODAGA-hJF5-PET/MRI on a compassionate use basis according  
26 to German Medicinal Products Act (AMG §13.2b). Scientific analysis was approved by the  
27 institutional review board (#206/2020BO2). Written consent was obtained from all patients.

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31 **DISCLOSURES**

32 C.T. is Director of ISCA Diagnostics Limited. No other potential conflicts of interest relevant  
33 to this article exist.

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35 Invasive pulmonary aspergillosis (IPA) caused by the fungus *Aspergillus fumigatus* (Figure  
36 1A) is a life-threatening lung disease of acute myeloid leukemia (AML) patients, with  
37 diagnosis currently reliant on invasive, slow, or non-specific procedures including chest CT  
38 (1). Here, we showcase the first-time use in humans of an *Aspergillus*-specific radiotracer (2–  
39 3), administered to AML patients diagnosed with no IPA or with IPA according to consensus  
40 definitions of the disease. Uptake of the tracer (Figure 1B) in pulmonary lesions, following  
41 intravenous injection with 196-287MBq, was determined 15-18 h post-injection using  
42 PET/MRI (Figure 1C). In Patient 1, no tracer uptake in the lung lesion (SUVmax 2.5,  
43 SUVmean 1.1; size (CT) 1.3x1.2x1.6 cm) above background levels (SUVmeans: liver 5.9,  
44 blood-pool 6.5, lung 0.9) was observed, concordant with no IPA. Patient 2, diagnosed with  
45 IPA, showed pronounced uptake of the tracer in the pulmonary lesion of the right lower lobe  
46 (SUVmax 5.94; size (CT) 6.2x4.0x4.1 cm; SUVmeans: liver 6.1, blood-pool 7.0, lung 0.8;  
47 MIP, Figure 1D). This first-in-human study shows the potential of antibody-guided PET for  
48 non-invasive IPA detection.

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50   **REFERENCES**

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**Figure 1.**

A. Inhaled spores of the opportunistic fungal pathogen *Aspergillus fumigatus* (inset) can lead to IPA in AML patients.

B. The *Aspergillus*-specific radiotracer  $^{64}\text{Cu}$ -NODAGA-hJF5.

C. ImmunoPET/MRI of Patient 1 (no IPA), with no tracer uptake in the lung lesion (arrowheads); Patient 2 diagnosed with IPA, with enhanced tracer uptake in the pulmonary lesion of the right lower lobe (arrowheads). CT scans were acquired 1 week before PET/MRI.

D. Maximum intensity projection of  $^{64}\text{Cu}$ -NODAGA-hJF5 in Patient 2 (arrowhead indicates pulmonary lesion).

