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IMAGE OF THE MONTH

Disclosing tumor biology by means of molecular imaging in a patient with malignant melanoma and chronic lymphocytic leukemia

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Figure

C-X-C motif chemokine receptor 4 (CXCR4) plays a major role in tumor growth and the process of metastasis and is thus a highly attractive target in oncology [1]. Non-invasive chemokine receptor imaging using positron emission tomography (PET) has demonstrated promising results, especially in hematologic malignancies including multiple myeloma or lymphoma [2]. Tumor detection in solid cancers is more heterogeneous (as compared to [^{18}F]-fluorodeoxyglucose ([^{18}F]FDG)) with many entities showing only low to moderate in vivo CXCR4 expression [3, 4].

A 73-year-old male with a history of Binet Stage B chronic lymphocytic leukemia (CLL), and lentigo maligna melanoma (UICC IA) presented for re-staging with a rapidly enlarging cervical mass as well as new liver lesions (detected by previous ultrasound). [^{18}F]FDG-PET/computed tomography (CT) displayed high uptake in the cervical mass and liver lesions. In addition, pulmonary and osteolytic bone lesions with intense [^{18}F]FDG accumulation could be detected (A). In contrast, CT showed various additional enlarged lymph nodes and splenomegaly with only minimal [^{18}F]FDG uptake (A). Thus, CXCR-directed imaging was added. Contrary to [^{18}F]FDG, [^{68}Ga]Ga-PentixaFor displayed intense tracer uptake -consistent with CLL- in the enlarged lymph nodes, bone marrow and spleen, and minimal uptake in the aforementioned [^{18}F]FDG-avid sites, suggestive of melanoma metastases (B). Immunohistochemical staining confirmed these findings showing high GLUT1 (C) and low CXCR4 expression (D) in an osteolytic melanoma lesion (arrows; SUV_{max} 14.0 vs. 2.2) as opposed to intense CXCR4 expression (E) in a site with osseous CLL infiltration (dotted arrows; SUV_{max} 2.6 vs. 9.1). Our case highlights the ability of molecular imaging to non-invasively phenotype disease and visualize tumor biology.

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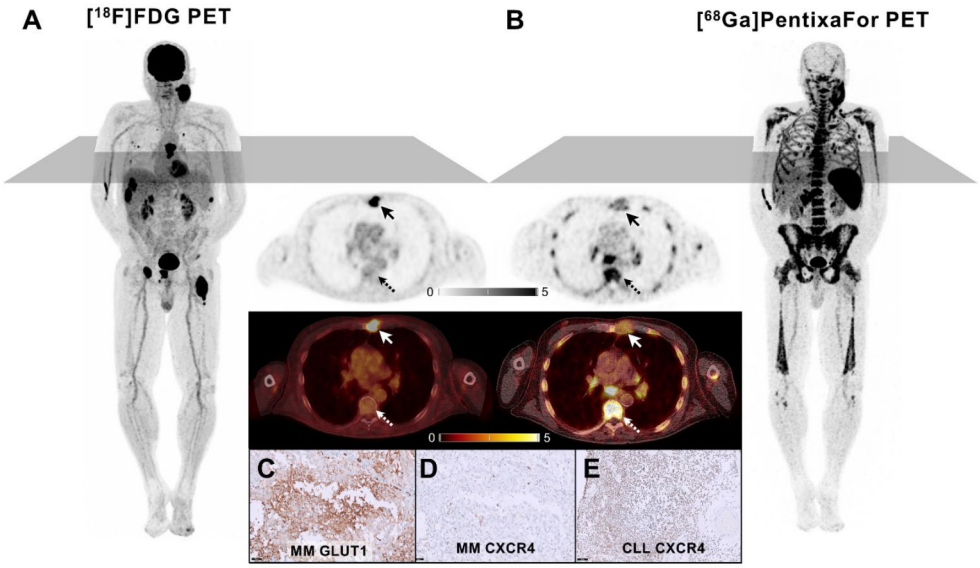

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Declarations

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from the patient reported in this case report.

Conflict of interest CL reports prior consulting activities for Blue Earth Diagnostics Ltd. (Oxford, UK) and Novartis. RAB is consultant for and has received speaker´s honoraria from Bayer Healthcare (Leverkusen, Germany), Novartis Pharma (Nürnberg, Germany) and Eisai GmbH (Frankfurt, Germany). All other authors do not report relevant conflicts of interest regarding this article.

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