

# Clinical and Translational Science Seminar Series

## "Development of Nanobody-Based Immunotargeted Tools for Non-Invasive Tumor Diagnosis and Treatment"

Online seminar

**Speaker: Dr. Alberto J. Schuhmacher, PhD.**

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The ongoing revolution in cancer "omics" has uncovered a variety of clinically relevant alterations in that have yet to be incorporated into clinical practice, due in part to the absence of reliable biomarkers for non-invasive imaging. A promising innovation is immunotargeted imaging, which combines the precision and specificity of antibodies directed at tumor markers with advanced non-invasive imaging technologies like PET and SPECT. This approach, known as ImmunoPET/SPECT, enables non-invasive, real-time diagnosis and monitoring of patients over extended periods, functioning like a whole-body, 3D, in vivo, and quantifiable immunohistochemistry. Like a "virtual biopsy".

Through bioinformatic analysis of patient data from individuals with glioma or pancreatic ductal adenocarcinoma, we have identified molecular targets whose expression correlates with lower survival rates

and poorer treatment outcomes. To create imaging agents specific to these targets, we employ nanobodies (Nbs)—small, highly stable antibody fragments—derived from Nb libraries generated by immunizing dromedaries with human tumor cells, using an *E. coli* display system. These selected nanobodies are thoroughly characterized in vitro, radiolabeled for PET or SPECT detection, and validated in xenografted mouse models. Nanobodies offer a unique advantage by facilitating the simultaneous attachment of multiple imaging tracers, positioning them as multimodal, multifunctional, and theranostic agents. These Nb-based immunotracers could revolutionize the diagnosis, monitoring, and treatment of a wide range of tumors and other diseases, providing significant clinical impact in terms of precision diagnostics and personalized therapies.

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Note: Free seminar. Certificates of attendance are available by registering in advance sending an email to Paloma García.