Propositions belonging to the thesis

New Tools for Multimodal Imaging of Immune Cells

1. BL imaging (BLI) defined as a molecular imaging modality has become a widespread technique in research to "see" cells and molecules in action. (this thesis).

2. The sensitivity of bioluminescence imaging in animals is primarily dependent on the number of photons emitted by the luciferase enzyme at wavelengths greater than 620 nm. (this thesis and Hall, M. P. et al. Nat. Commun. **9**, 132 2018).

3. Dual-color BLI in the NIR window represents a promising approach for simultaneous visualization and quantification of two cell populations in deep tissue (this thesis).

4. The chemical structure of nanocarriers has a crucial impact on nanocarrier retention into specific organs/tissues and can prevent off-target interactions when introducing a targeting ligand (this thesis).

5. ^{19}F-based imaging lacks of background and the accumulation of ^{19}F-labelled immune cells generates specific "hot spots" signals (this thesis).

6. By leveraging disease-specific metabolic alterations in macrophages, immune cell sensor can detect tumors and used for early-stage tumor detection. (Aalipour, A., Chuang, HY., Murty, S. et al. Nat Biotechnol **37**, 531–539 (2019))

7. Developing successful therapeutic strategies using live cells could benefit from the ability to rapidly determine their in vivo biodistribution and persistence. (Chapelin F., Capitini M.C., Ahrens E.T., j. immunotherapy cancer **6**, 105 (2018)).

8. High infiltration of tumor-associated macrophages (TAMs) in tumors predicts unfavorable outcomes. The use of a fluorine-19 (^{19}F) imaging agent is a newly emerging technique for MRI cell tracking. (Makela, A. V, Gaudet, J. M. & Foster, P. J. *Sci. Rep.* **7**, 42109 (2017).

9. In the future, MRI-based cell tracking will be routinely used in the future for clinical trials and to monitor therapeutic cell delivery and inflammation. (Arhens E.T. and Bulte J.W.M., Nature **13**,755-763 (2013)).

10. "What if… we could image in different colors?" Sanjiv Gambhir (1962-2020). (Wu A.M., James M.L., Kodukulla M.I. Nature Biomedical Engineering **5,** 197-198 (2021)).

11. No one can do everything but everyone can do something.