ABSTRUCT

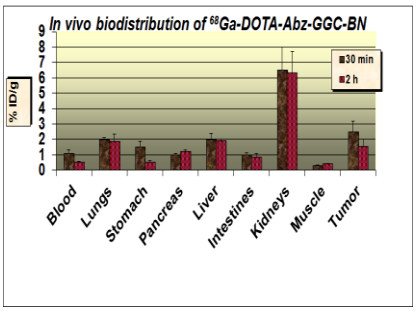
BACKGROUND: Translational research is changing the practice of modern medicine and the way in which health problems are approached and solved. Nowadays, the use of small-animal models in basic and preclinical sciences is considered a major keystone for research and development strategies in biosciences. It represents a bridge between discoveries at the molecular level and clinical implementation in diagnostics or therapeutics. Small animal imaging is being used in a wide variety of lines of research, especially in infection, inflammation, oncology, cardiology, neurosciences and oncology in molecular imaging. The aim of this study is to elaborate the importance of molecular imaging in the preclinical imaging through a case study.

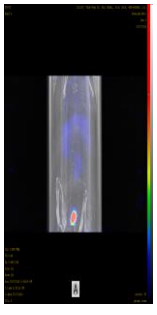
METHOD

(case study 1): Bombesin (**BN**), a small and linear 14 amino acid peptide initially isolated from the frog skin**.** Many human tumors (breast, prostate, gastric, renal, etc.) over express receptors for BN peptide and low-expression in normal tissues. Ga-68 was used as isotope for imaging it has the folowing properties. Half-life $T_{1/2}$ = 68 min, Positron branching 89% (PET nuclide), Available via a $^{68}Ge/^{68}Ga$ generator, Mother ^{68}Ge cyclotron produced ($T_{1/2}$ = 271 d). Short half-life useful for molecules with fast biokinetics. DOTA-coupled bombesin peptide was radiolabeled with 68Ga in the presence of 2.5M sodium acetate buffer. The 68Ga-labeled-DOTA-bomesin was then purified by C18 sep-pak cartridge and injected intravenously (~200 µCi in 150 µL saline) by tail injection into a nude mouse model bearing human breast tumor xenografts, MDA-MB-231. After 30 min post-injection, mouse was sedated by anesthesia and imaged using Nanoscan PET/CT animal imaging system (Mediso, Hungary). First CT image was acquired followed by PET image for 15 min.

RESULTS:

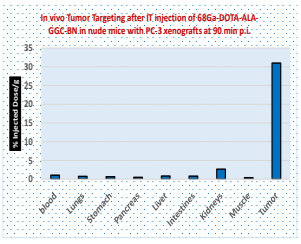
In vivo Tumor targeting of ^{68}Ga-BN in nude mice with MDA-MB-231

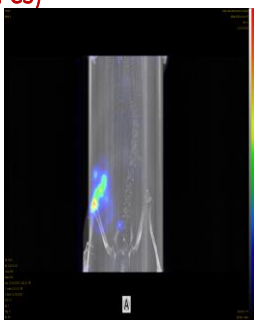




^{68}Ga-DOTA-Tris-ALA-GGC-BN (PC3)

Intratumoral injection





Conclusion: The molecular imaging plays an important role in the discoveries of new techniques using preclinical studies as shown in the case studied in King Faisal specialist

hospital on the advantage of intertumoral injection over intravenous injection using Ga-68 radioisotope in mice.