## Venom peptides: emerging biological tools for lung cancer imaging



Romain BAUDAT<sup>(1)</sup>, Evelyne BENOIT<sup>(1)</sup>, Mathilde KECK<sup>(1)</sup>, Pascal KESSLER<sup>(1)</sup>, Charles TRUILLET<sup>(2)</sup>, Denis SERVENT<sup>(1)</sup>

<sup>(1)</sup> Université Paris-Saclay, CEA, Institut des sciences du vivant Frédéric Joliot, Département Médicaments et Technologies pour la Santé (DMTS), Service d'Ingénierie Moléculaire pour la Santé (SIMoS), EMR CNRS/CEA 9004, Gif-sur-Yvette, France - <sup>(2)</sup> Université Paris-Saclay, CEA, Institut des sciences du vivant Frédéric Joliot, Service Hospitalier Frédéric Joliot (SHFJ), Laboratoire d'Imagerie biomédicale multimodale Paris Saclay (BioMaps), Orsay, France

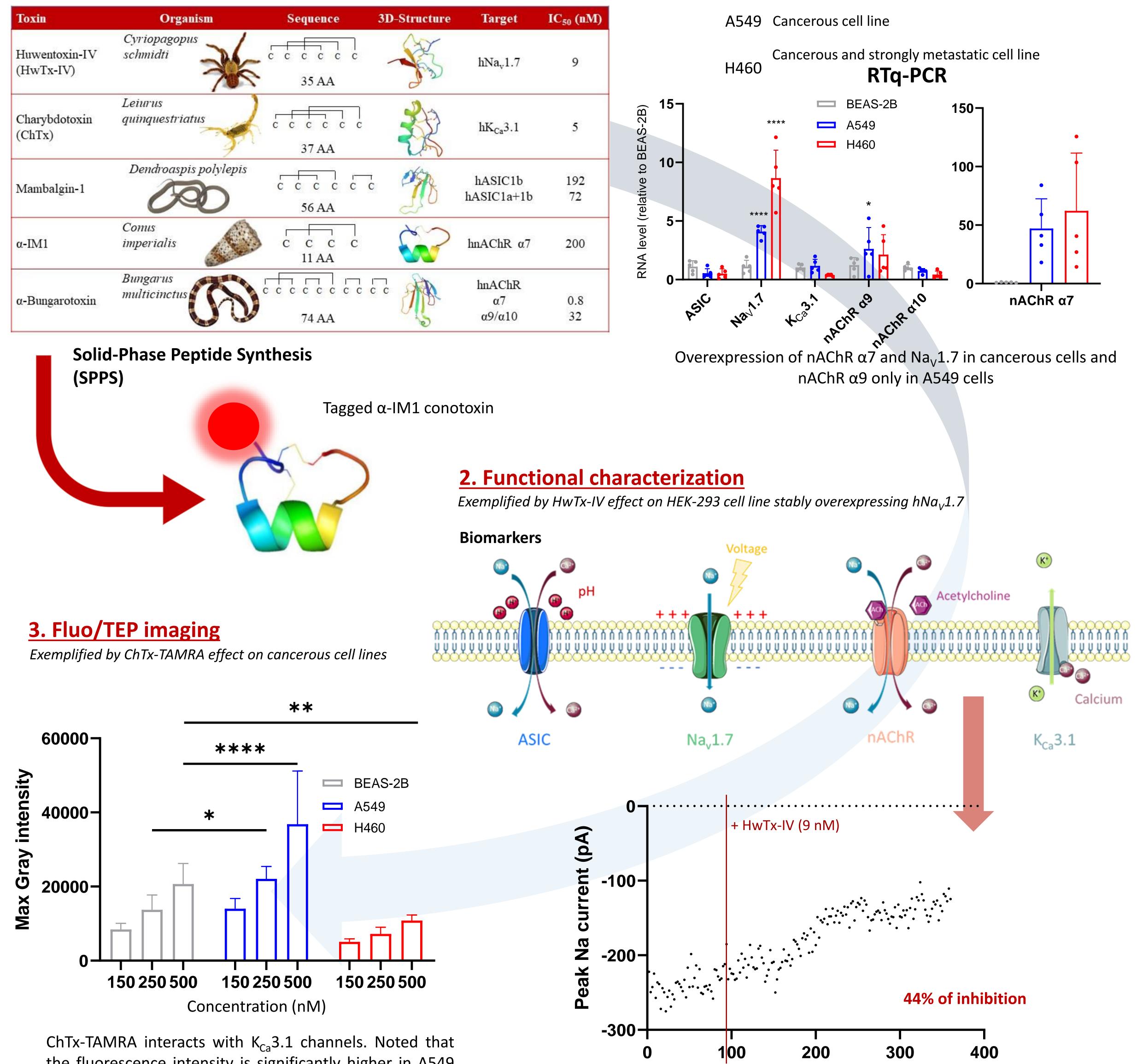


Many cancers, and the non-small cell lung cancer (NSCLC) in particular, are associated with significant overexpression of various ion channels such as certain subtypes of sodium, calcium and potassium channels, pH-sensitive channels (ASICs for acid sensing ion channels) or nicotinic acetylcholine receptors. Activation of these ion channels plays an important role in cancer cell aggressiveness and tumor invasion, their overexpression seeming to be correlated with the appearance of metastases. Although imaging approaches (radiography, CT-scan for computed tomography scanning, PET-scan for positron emission tomography) are commonly used in the anatomical characterization of lung cancer, some of their limitations require the development of new imaging probes more specific of overexpressed molecular targets in lung adenocarcinomas. Peptide toxins, which have unique pharmacological properties, are well known to act selectively and with high affinity on certain overexpressed ion channels in cancer cells. Therefore, a promising solution towards the development of new lung cancer biomarkers appears to be the chemical synthesis of these toxins allowing them to be labelled by "click" chemistry using various fluorescent or radioactive probes.

**Cell lines** 

BEAS-2B Non cancerous cell line

## **1. Peptide synthesis**



the fluorescence intensity is significantly higher in A549 cells and lower in H460 cells, compared to BEAS-2B cells.

Time (s)

HwTx-IV inhibited 44% of the peak  $Na_v 1.7$  current.

Certain ionic channels are overexpressed in lung cancer cell lines. These channels can be targetted with high affinity and selectivity by some venom toxins that are easily tagged with fluorescent or radioactive group. This study will participate to the development of new lung cancer biomarkers