

Electrostatically modulated peptide-based drug delivery against resistant cancer

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<https://doi.org/10.17952/37EPS.2024.P2240>

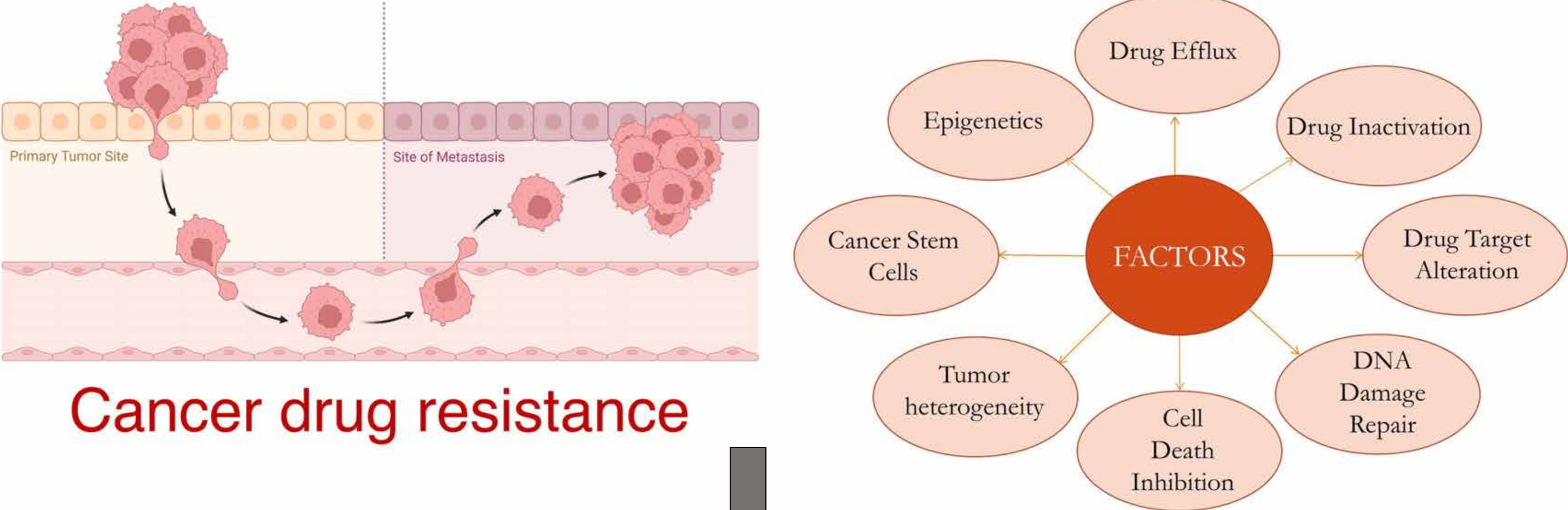


37th EPS Symposium
European Peptide Symposium

14th IPS Symposium
International Peptide Symposium

BACKGROUND AND MOTIVATION

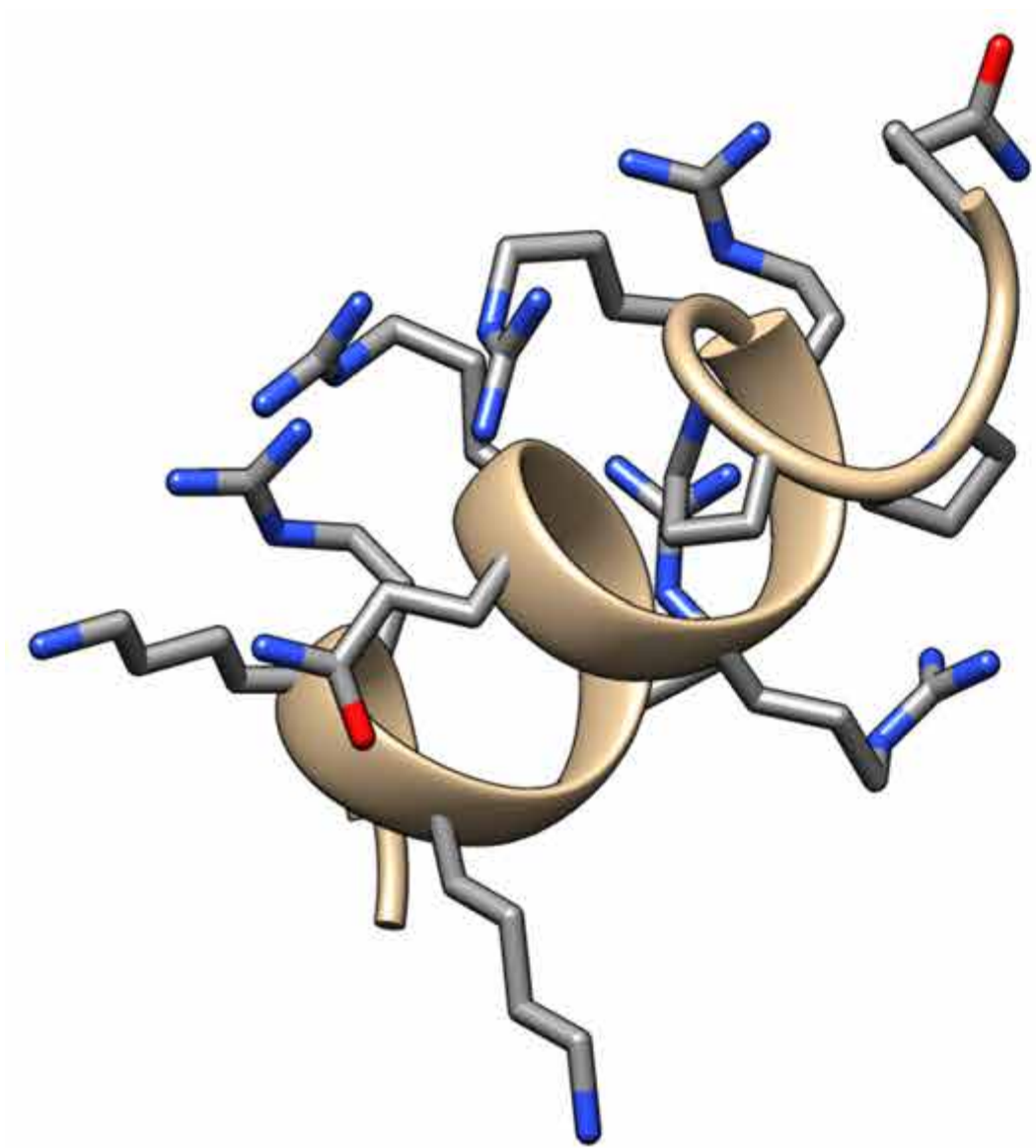
Problems of cancer drug resistance and side-effects of conventional therapies



Why the need for drug delivery vehicles??

Specificity ↓ Dosage reduction

Cell-penetrating peptides (CPPs)



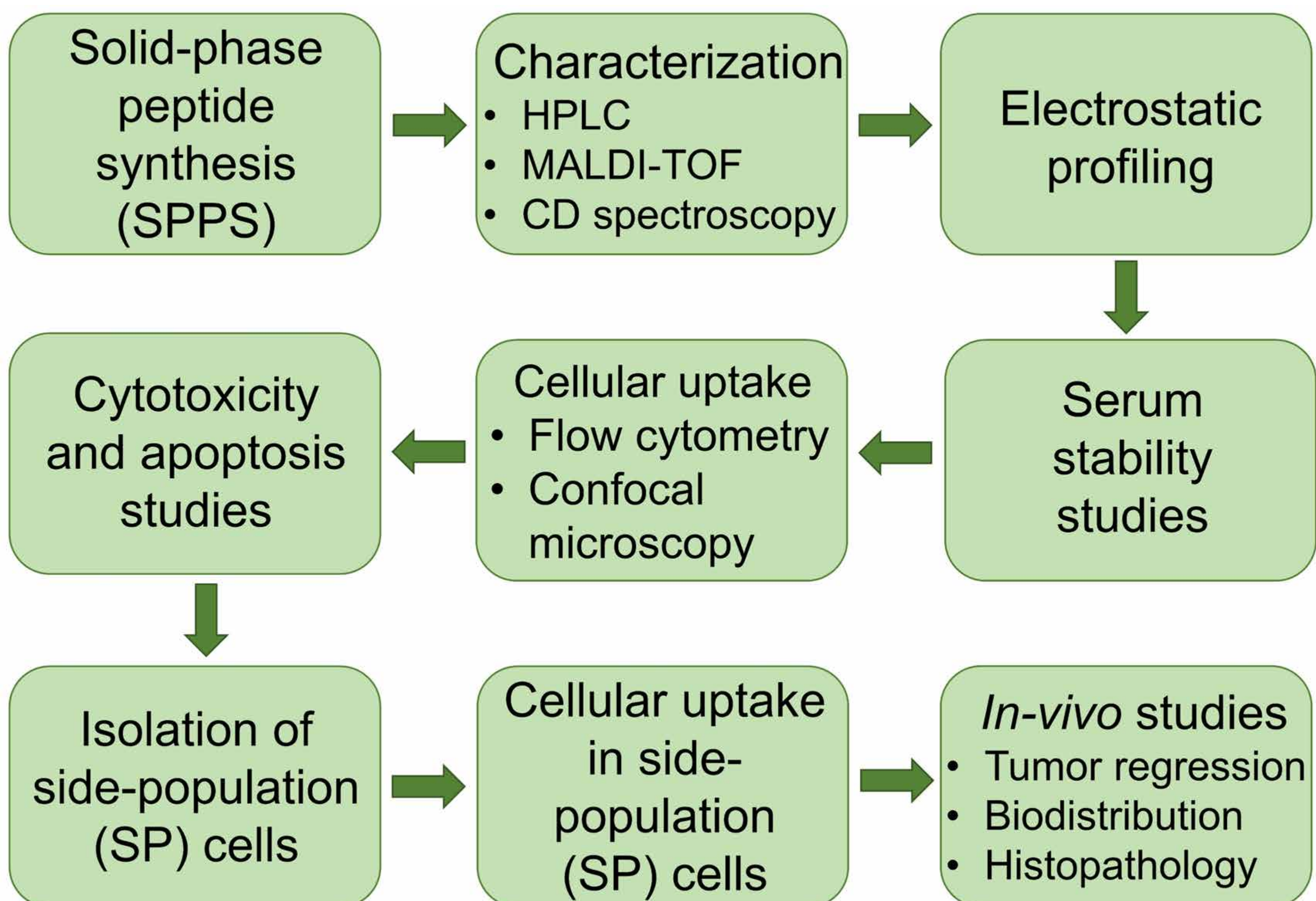
Pros

- ✓ Internalize efficiently
- ✓ Biocompatible
- ✓ Easy to synthesize
- ✓ Wide variety cargo
- ✓ Non-toxic

Objectives:

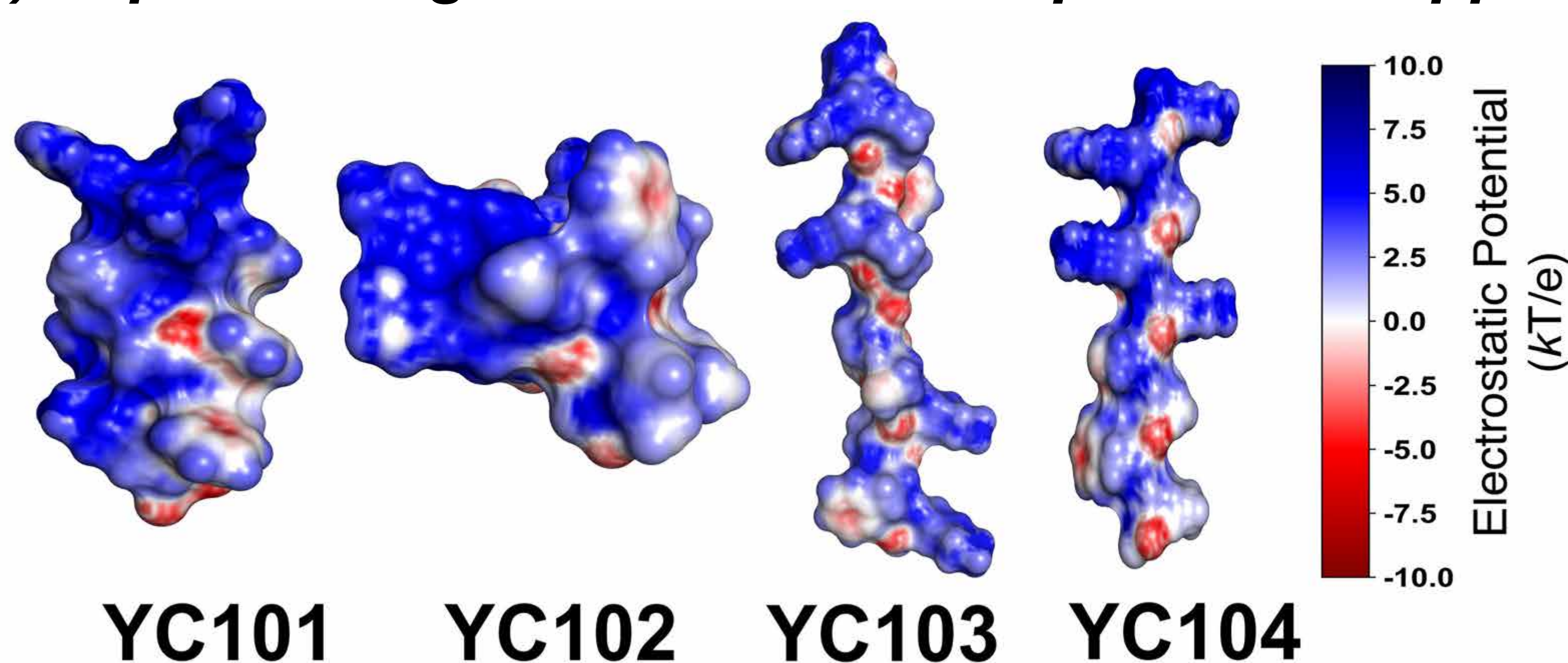
- Designing novel and stable CPPs for drug delivery
- Tuning the electrostatics and structure of the peptides for specificity to cancerous cells
- Developing peptide-based drug delivery targeting cancer drug resistance

METHODOLOGY

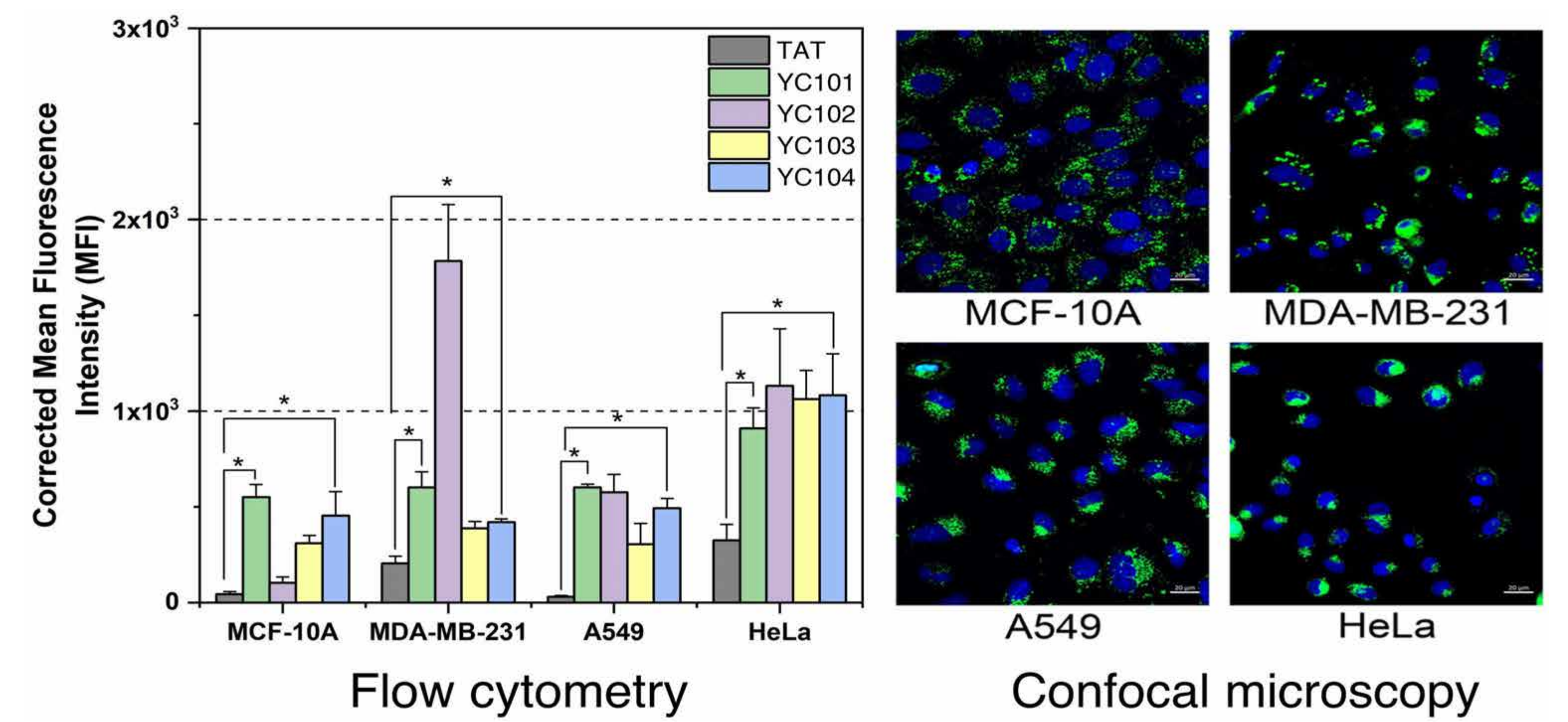


RESULTS

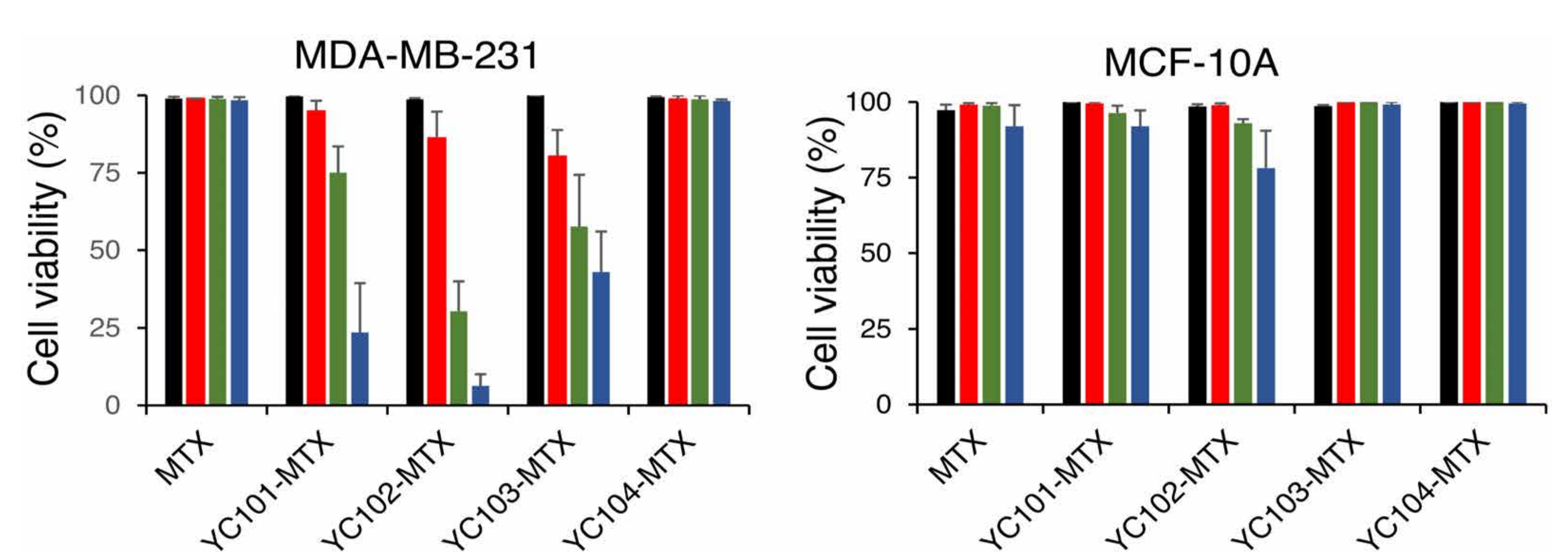
(a) Peptide design and electrostatic potential mapping



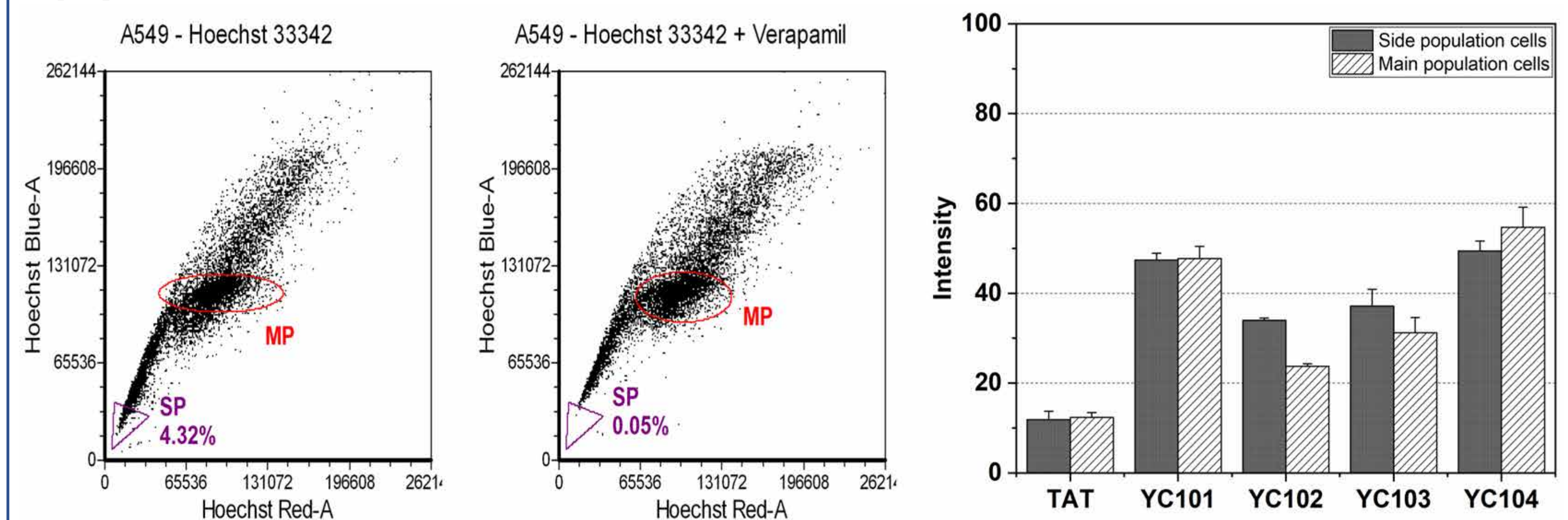
(b) Cellular uptake of peptides



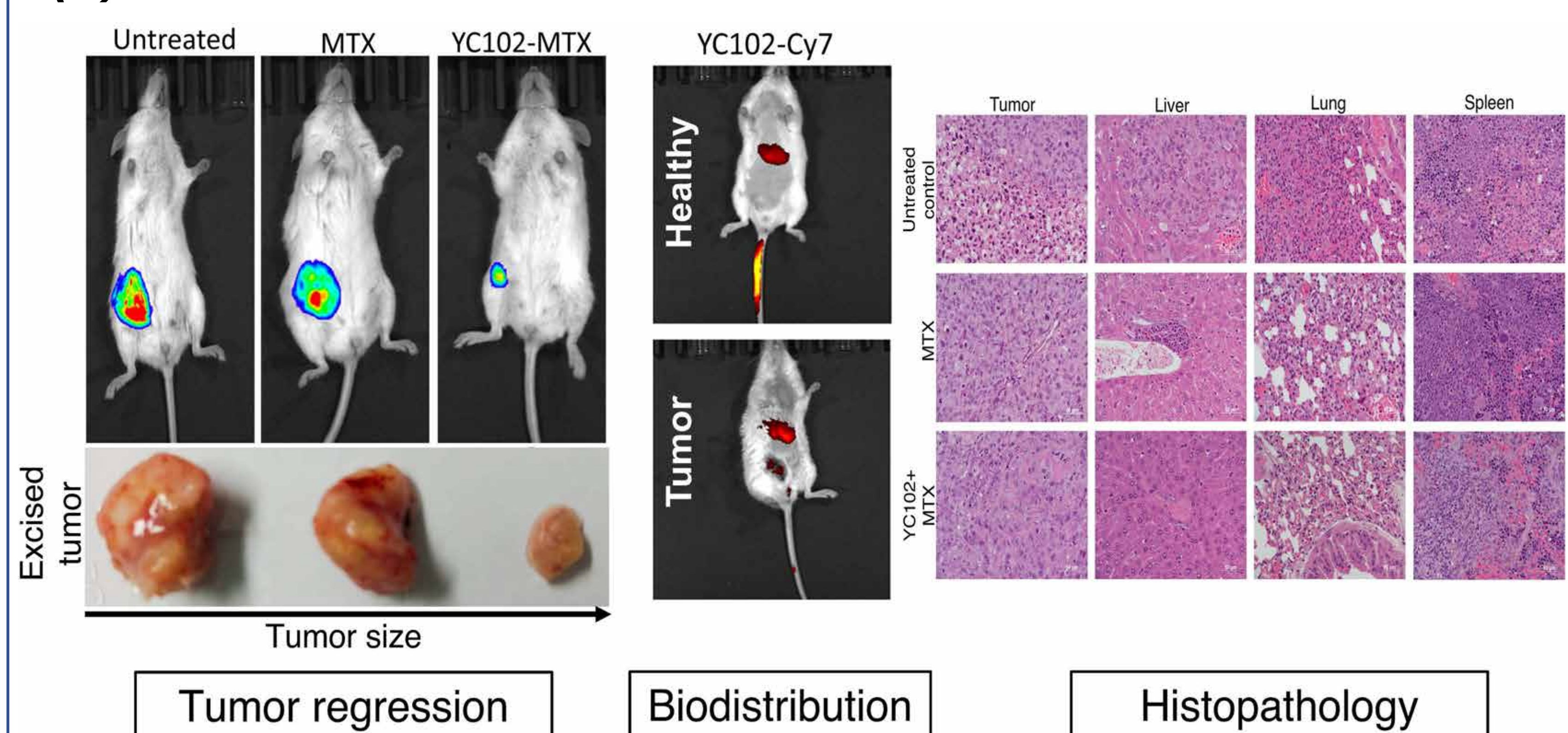
(c) Cytotoxicity of peptide-drug conjugates



(d) Isolation and cellular uptake in SP cells



(e) In-vivo mice model studies



SUMMARY

- Peptides are stable and covalently conjugated to methotrexate (MTX) drug
- Varying electrostatic signatures of the peptides causes differential cellular uptake
- Enhanced cytotoxicity to cancer cells
- Comparable cellular uptake in side-population (SP) and main-population (MP) of tumor cells
- Significant tumor reduction in mice models

ACKNOWLEDGEMENTS



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