



## Synthesis of peptide probes for rapid identification of Zika virus

Ronei Messias Silva Souza (IC), Guilherme de Souza Alves (PG), Anita Jocelyne Marsaioli (PQ)

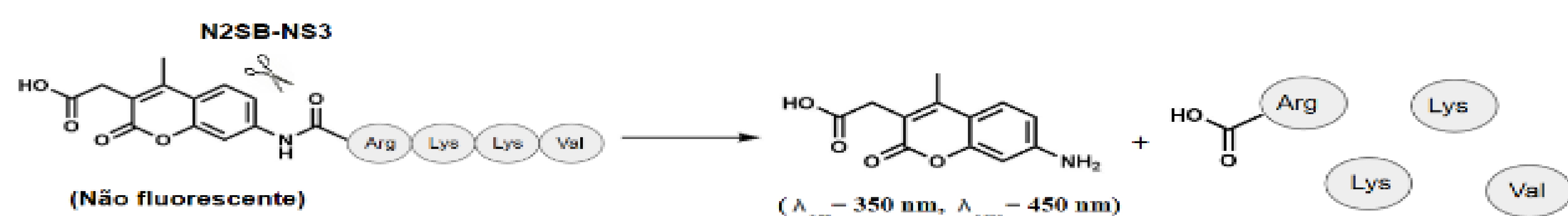
Supervisor: Profa. Dra. Anita Jocelyne Marsaioli

UNICAMP, Campinas

### INTRODUCTION

Neglected tropical diseases and tuberculosis persist mainly for socioeconomic reasons and, although one in six people suffer from these diseases, there is a low availability of drugs for their treatment. The World Health Organization (WHO) has a list with 17 neglected diseases, including dengue and chikungunya, both transmitted by the *Aedes aegypti* mosquito, which is also a vector for the Zika virus. The infection caused by Zika virus was declared by WHO as a public health emergency in the international market, in view of its rapid proliferation, magnitude and its consequences.

Currently, the Zika virus is diagnosed using the PCR (Polymerase Chain Reaction) technique and by isolating the virus in blood samples or in the patient's urine by amplifying the genetic material, the RNA. This methodology is able to detect the presence of the virus in the first 7 days of infection. However, after this period, the patient may show negative results for tests, which does not exclude ZIKV infection.

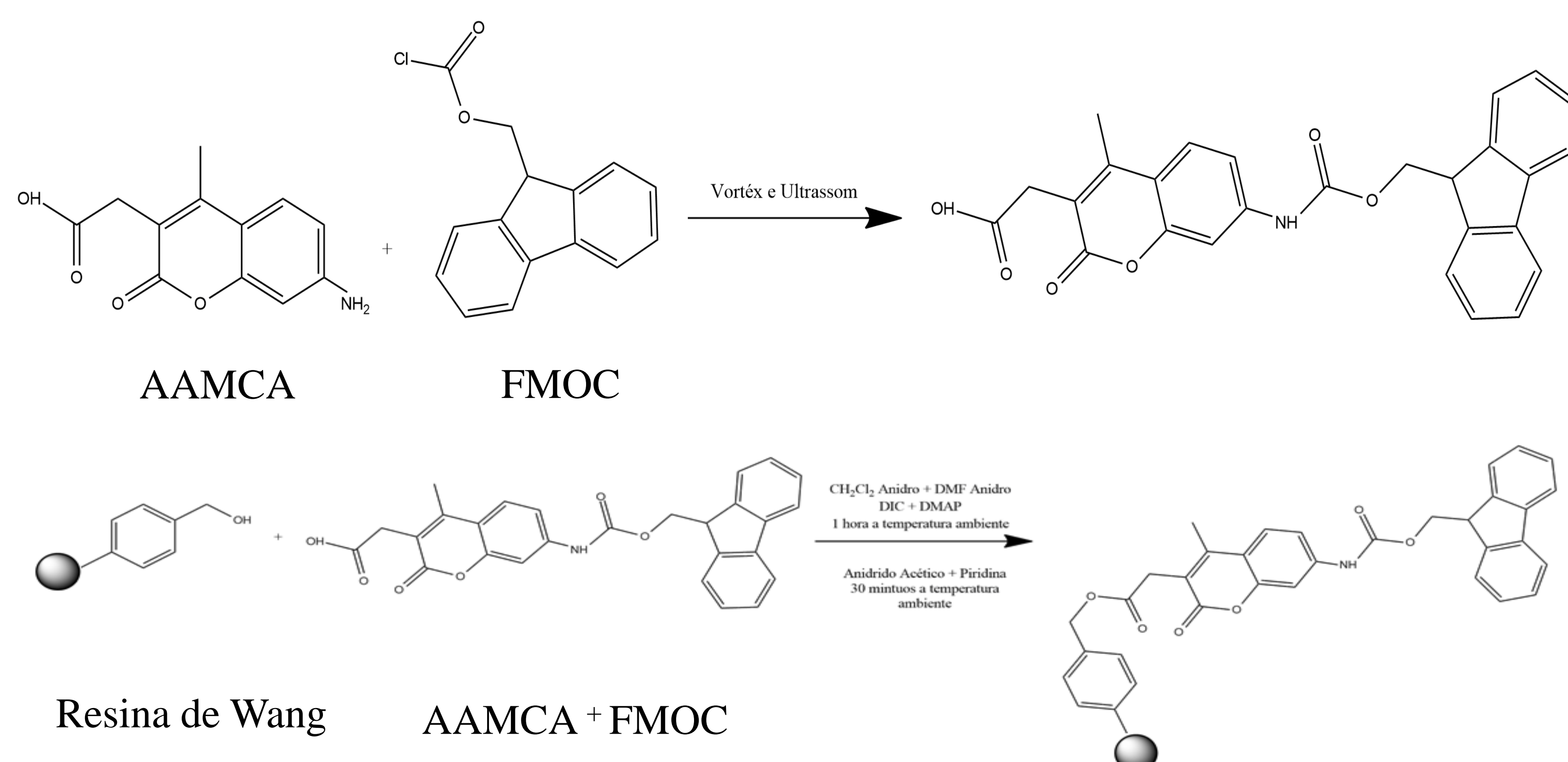


**Figure 1.** Mechanistic proposal for the cleavage of fluorogenic probe by the enzyme NS2B-NS3.

### OBJECTIVES

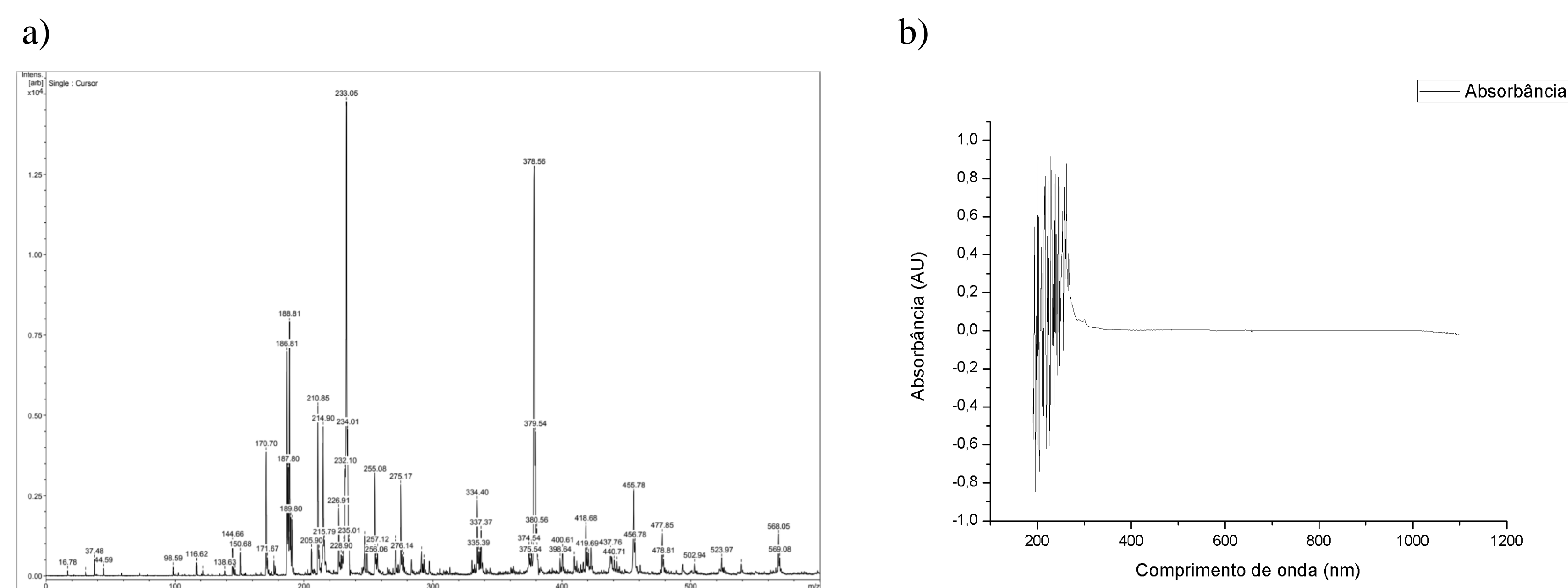
The main objective of this project is to synthesize a fluorogenic probe based on 7-amino-4-methyl-3-coumarinylacetic acid (AMCAA), which has never been used for this purpose before, and is presented with great potential and versatility. In addition, using solid-phase peptide synthesis (SPPS), the sequence Val-Lys-Lys-Arg will be coupled to it.

### EXPERIMENTAL PART



### RESULTS AND DISCUSSIONS

The first step was to protect AAMCA with the Fmoc group, whose synthesis was carried out using a solvent free route and the characterization carried out by MALDI-TOF. The signal at 477, 12 u confirms the success of the synthesis. This value corresponds to the sum of the molecular mass of the compound of 455.14 u (AAMCA + Fmoc) plus the sodium mass, as seen in Figure 1, however a low yield was obtained. Subsequently, the product obtained previously is coupled to the resin and the result is verified through UV-VIS in which a signal is observed at 260 nm that corresponds to the wavelength emitted after the cleavage of the Fmoc group. The signal was obtained in a high-noise region and, therefore, it is necessary to carry out further analyzes to confirm the success of the reaction.



**Figure 3.** a) Mass spectrum of protected 7-amino-4-methyl-3-coumarinylacetic acid b) UV-VIS spectrum of 7-amino-4-methylcoumarinylacetic acid protected with the Fmoc group coupled to Wang resin.

### CONCLUSIONS AND PERSPECTIVES

The next steps are to execute the synthesis from a new route in which there is greater yield and to carry out the previous tests again. In addition to proceeding with the last step of coupling the Val-Lys-Lys-Arg amino acids through solid phase synthesis and performing the characterization using MALDI-TOF.

### REFERENCES

- 1 - [http://www.who.int/neglected\\_diseases/diseases/en/](http://www.who.int/neglected_diseases/diseases/en/) (accessed 08/2018).
- 2 - - SBPC/ML. Posicionamento oficial da Sociedade Brasileira de Patologia Clínica/Medicina Laboratorial referente ao diagnóstico laboratorial do Zika vírus. Sociedade Brasileira de Patologia Clínica Medicinal Laboratorial (2016).

### ACKNOWLEDGMENTS

