# ABSTRACT

Integrative structural biology employs not only high-resolution techniques for the determination of the structure of biomolecules. Information about dynamical and heterogeneous assemblies is hardly achievable with conventional approaches. Therefore, low-resolution techniques are being utilized. As mass spectrometry (MS) is sensitive, specific, and versatile, there are a lot of structural techniques based on MS established. Native mass spectrometry is an approach that uses non-denaturing solvents for nanoelectrospray ionization, thus preserving tertiary and quaternary structures in the gas phase. Therefore, information on the composition of native biomolecules is obtained. Moreover, employing ion mobility (IM-MS) also provides structural insight. Using MS, we can directly analyze biomolecules perturbation, such as by variable-temperature nanoelectrospray ionization (vT-nESI).

The aim of this master's thesis was to characterize the thermal stability of the protein-DNA complexes of TEAD1 and FOXO4 transcription factors DNA-binding domains. Complexes were studied using native MS and IM-MS employing an in-house developed vT-nESI source. First, vT-nESI was used to determine the melting temperatures of double-stranded DNA, which were in correspondence with those theoretically calculated and experimentally assessed. Furthermore, the thermal denaturation of the DNA-binding domains TEAD1 and FOXO4 was described. Finally, vT-nESI characterized the thermal stability of the TEAD1-DBD interaction with various orientations of the M-CAT motif. Moreover, a difference between the TEAD1 and FOXO4 complexes was observed. The TEAD1-DNA complexes retained their conformation upon heating, and a distinctive stabilization of the protein by binding to the DNA was observed. However, by the FOXO4-DNA complex, the stabilization of the protein was negligible, and structural changes were observed upon perturbation.