Tick and Kissing bug versus Kunitz and Kazal type serine protease inhibitors.

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During the almost two decades, our group has been studied the structure - function relationship of protease inhibitors identified in arthropod hematophagous. During the first decade, we described a number of inhibitors with anticoagulant activities, such as Kazal type inhibitors: infestins, AaTI. In parallel, we found a huge number of protease inhibitors without clear function, among them Kunitz type inhibitors such as BmTIs, RmTIs, BmCI and HiTI. During this time, we also described new members of Trypsin-inhibitory like (TIL) or Ascaris family, the BmSI, Pacifastin-like inhibitors and several cysteine protease inhibitors belonging to cystatin family. More recently, we have been identified possible role of the Kazal type inhibitors from kissing bugs, RpTI (*R. prolixus* Trypsin Inhibitor) in the *R. prolixus-T. cruzi* interaction and infestin-1R (*T. infestans* elastase and subtilisin inhibitor) in *T. infestans* - *T. cruzi* relationship. Kazal and Kunitz type inhibitors from insects and ticks could be used in biotechnological research, for example, rBmTI-A was able to interfere in the emphysema pulmonary progressing, and infestin 3-4 has been used in the development of new anticoagulant (Chen et al. 2012; Xu et al. 2014) and HiTI and phage display showed to be powerful tool in the development of larvicide for *Aedes aegypti*.

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