



Texas Imported Fire Ant Research and Management Project

Final Progress Report - October 2001

Structure-Based Design of Fire Ant Inhibitors

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Major accomplishments to date:

Starting with a totally blank registry of sequences of digestive enzymes in the fire ant, we succeeded in determining the sequence of fire ant chymotrypsin isozyme (C1) and determining its structure (v.i.)

We thereupon determined the sequence of isozyme C3 and have determined its sequence. This enzyme proved to be extremely difficult to characterize; we have yet to identify a suitable peptide-based inhibitor and use it to obtain the structure of the molecular complex. The most promising candidate, ecotin, a bi-functional proteinase inhibitor (Protein Science (1996), 5: 2236- 2247), is now under investigation.

Goals achieved:

Two digestive enzymes from the 4th instar larvae sequenced and structurally elucidated.

Relevance to the Texas Imported Fire Ant Research Ant Management Project:

Due to the acute olfactory sense of the fire ant, various feeding trials with a variety of known and putative inhibitors proved to be unsuccessful. This means we did not get to try the right one.

Publications submitted/published; presentations/posters presented at national technical meetings/conferences:

“Feeding serine proteinase inhibitors to *SOLENOPSIS INVICTA*”, Erik Meyer, Sherry Ellison, S. Brad Vinson, Edgar F. Meyer submitted, *Southwestern Entomologist*

“The Structure of Fire Ant Chymotrypsin, C1”, Istvan Botos, Erik Meyer, MyHanh Nguyen, Stanley M. Swanson, David Russell & E. F. Meyer (2000); *J.Mol.Biol*, 298, (5). 895–901.

Presentations:

Southwest Entomological Society, San Antonio, Tx.