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Pirkle, 1977). One of these, batroxobin (from *Bothrops* venoms), has been cloned and sequenced (Itoh et al., 1987, 1988).

Peptide paranitroaniline (pNA)

Chemical Biochemical Corp. and Sigma

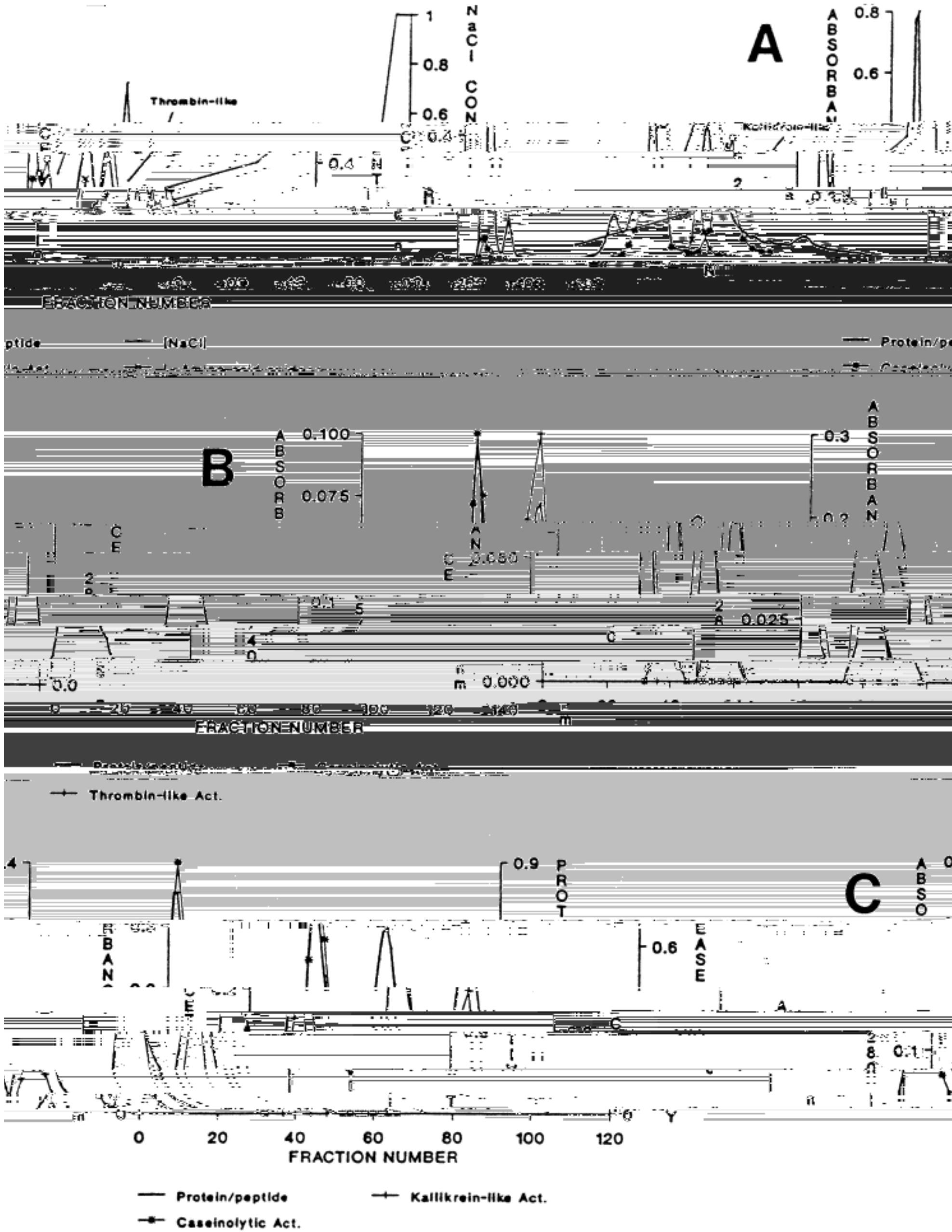
For substrate preference assays [illegible] For pH profiles, 10 μg enzyme in [illegible]

[illegible]
and for the pH 8.0 and applied to a 1.5 cm x 75 cm using ProPheArgpNA
g PheValArg Sephadex G-75 gel filtration column. Flow thrombin-like protease usin
ions pNA. An appropriate amount of substrate rate was 4.8 ml/hr with four fract
Fractions 50-60 containing was added to give a total volume of 675 µl collected/hr
[illegible]

protease coeluted with another caseinolytic

100 nM PPACK resulted in complete

(~0.5 nM) within one minute (Fig. 9).



[illegible] exchange column. B. Elution profile of combined fractions from the thrombin-like protease peak chromatographed on a 1.5 cm x 75 cm Sephadex G-75 gel filtration column. Thrombin-like activity was completely separated from caseinolytic activity. C. Elution profile of combined fractions from the [illegible]

Hydrolyzed

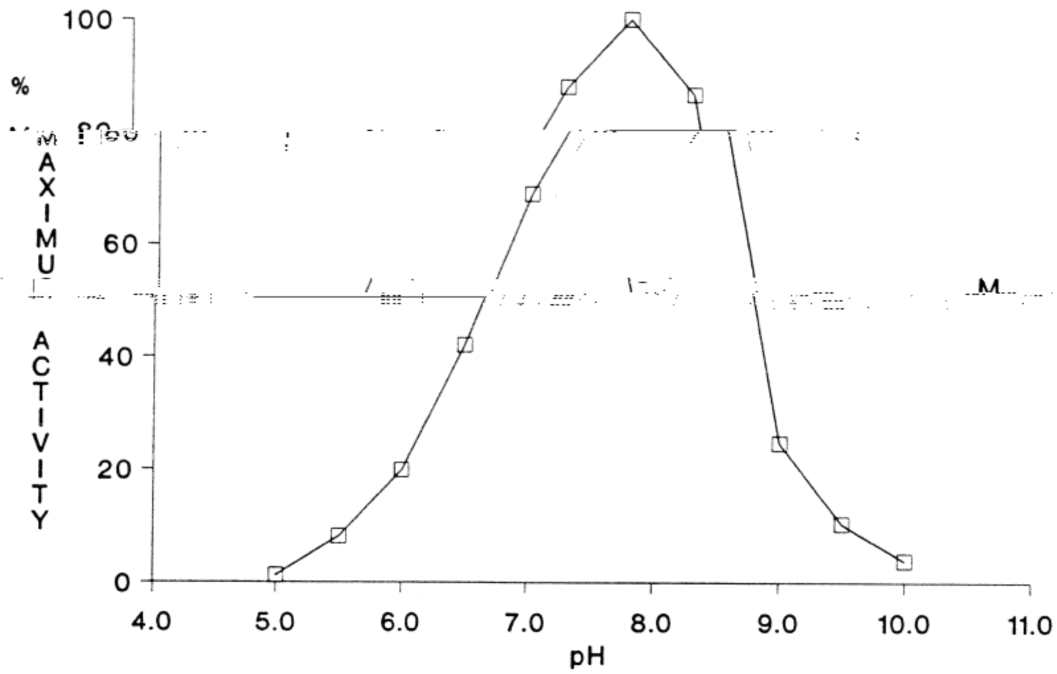


Figure 3. pH profile for the hydrolysis of ... N-Boc-L-Phe-L-Val-L-Arg-... the adult venom thrombin-like protease. % maximal activity is based on highest activity observed (at pH 8.0).

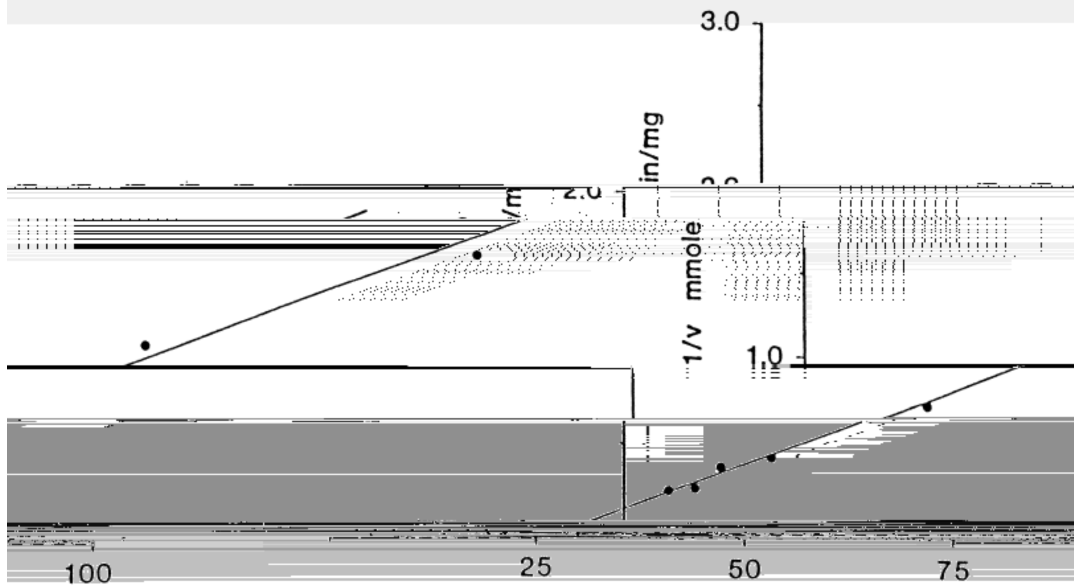


Figure 4. Double reciprocal plot of rate vs. substrate concentration for ... hydrolysis of ... thrombin-like protease. Estimated kinetic constants were Km = 222 µM, Vm = 1.143 µmol/min/mg.

The kallikrein-like [illegible]

[illegible] showed a high degree of specificity for [illegible]

hydrolyzed to a significant extent had [illegible] kallikrein substrate ProPheArg-pNA with [illegible]

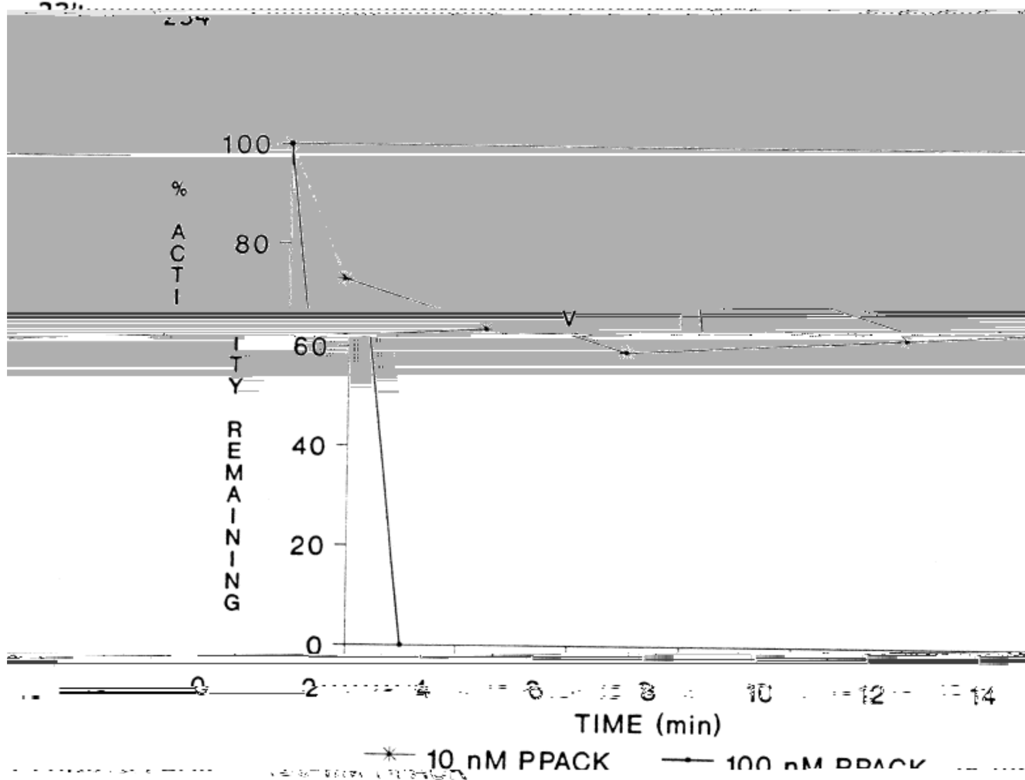


Figure 9. Inhibition of venom kallikrein-like activity by PPACK. 100 nM PPACK resulted in the complete inhibition of ~0.5 nM enzyme within one minute.

isolated from *Bitis gabonica* venom (Viljoen ... potential synergistic effects ... constituents. In order to understand the ... et al., 1979).

biological role of venoms as biological

Components

reassemble the summed effects of isolated

Rattlesnake venoms have two ... venom components. Rather than being treated as individual independent components ... major biological functions related to

analyzed for their potentially interdependent effects. Zeller (1977) has made the ... (Klauber, 1956; Russell, 1980; Kardong, 1986; Mackessy, 1988). In many species

biochemistry with the view that venoms ... primary importance and is accomplished by

in these venoms (Lee, 1979; Tu, 1988). In

cause circulatory shock. In humans, locally), impeding defense against

snake bites ... (Russell,

1980). In prey animals, with a much (Ownby, 1982), and the synergistic action

h of this tissue reaction is likely accentuated by venom may be responsible for muc

terest to note that the enzymes interfering with hemostasis. damage. It is of in

major metalloprot

mes as toxins. juvenile snake venoms (Mackessy, 1993),

and bites by smaller snakes rarely result in

Russell, Venom proteases may act as toxins local tissue necrosis

the course of envenomation. In the blood,

the thrombin-like and kallikrein-like

enzymes have relatively specific

of fibrinogen to both adult and juvenile venoms, and namely the hydrolysi

enzymes may also act initially as toxins may produce several in vivo effects

nd a precursor to the hormone cell cultures (Bar-Shavit et al., 1986) activities a

thrombin-like proteases may also have

enzymes effects other than the hydrolysis of The immediate action of

ase of potent fibrinogen. The relative abundance of as toxins is via the rel

radykinin and these two proteases also metabolites such as

precursors and change ontogenetically, suggesting that arachidonic acid from larger

capture is probably

blocking action (such as several snake

venom neurotoxins). The toxic action of

mes described above can these metabolites likely facilitates rapid The enzy

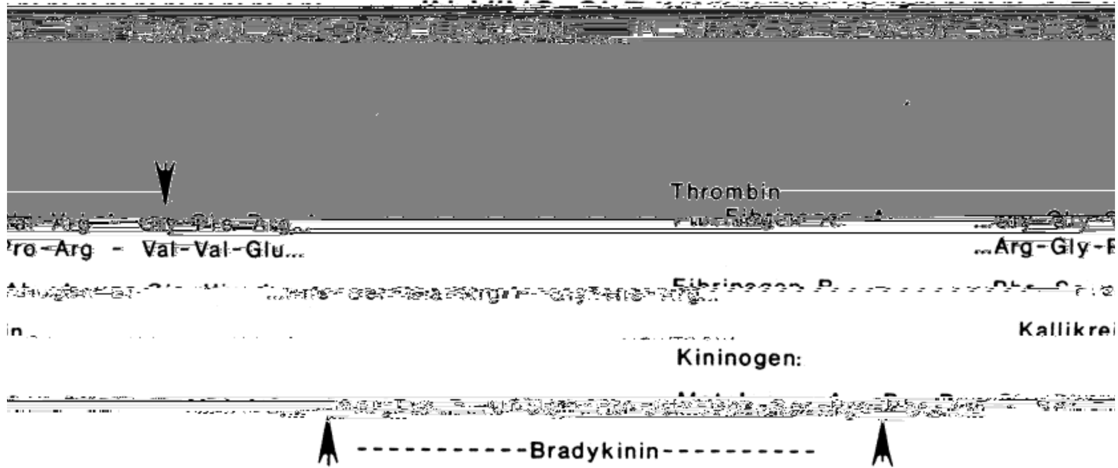


Figure 10. Several of the ... sequences.

Proteolytic ... beginning toward the elucidation of these roles.

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