Protein sequencing problems
Homework for video (2)
Solutions in video (3)

1. Based on the results provided, figure out as much as you can about the amino acid sequence of a peptide.

The composition of the peptide is (ile, tyr, ala, trp, arg, gly, lys, val).

Reaction with dansyl chloride gives no products, unless the peptide is first reacted with trypsin, in which case both dansyl-isoleucine and dansyl-alanine are formed with the compositions (val, ile, lys, tyr) and (ala, trp, arg, gly).

Reaction with chymotrypsin also produces two peptides, with compositions (tyr, val, ile, arg) and (trp, lys, ala, gly).

2.

You have isolated an octapolypeptide with antibiotic properties and have run a series of experiments in order to determine its amino acid sequence. Based on the results below, provide the amino acid sequence of the octapeptide (3-letter symbols of amino acids are sufficient--do not draw chemical structures).

a.   Complete acid hydrolysis of the peptide followed by amino acid analysis yielded asp, tyr, phe, leu, ser, val, arg2

b.   Treatment of the intact octapeptide with dansyl chloride yielded dansyl-val.

c.   Treatment of the intact octapeptide with trypsin yielded peptides with the compositions:
(ser, arg, val), (leu, phe, arg), and (asp, tyr)

d.   Treatment of the intact octapeptide with chymotrypsin yielded: aromatics
free asp, (arg, ser, phe, val), and (leu, arg, tyr)

3.

PROTEIN SEQUENCING PROBLEMS

Deduce the sequence of the peptide from the experimental data provided. The composition of the peptide is (lys, pro, arg, phe, ala, tyr, ser). Reaction with dansyl chloride gives no products, unless the peptide is first reacted with chymotrypsin, in which case both dansyl-serine and dansyl-lysine are formed with the compositions (ala, tyr, ser) and (pro, phe, lys, arg). Reaction with trypsin also produces two peptides, with compositions (arg, pro) and (phe, tyr, lys, ser, ala).

Note: chymotrypsin cleaves after tyr, phe, trp
trypsin cleaves after arg, lys
dansyl chloride derivatives identify N-terminus