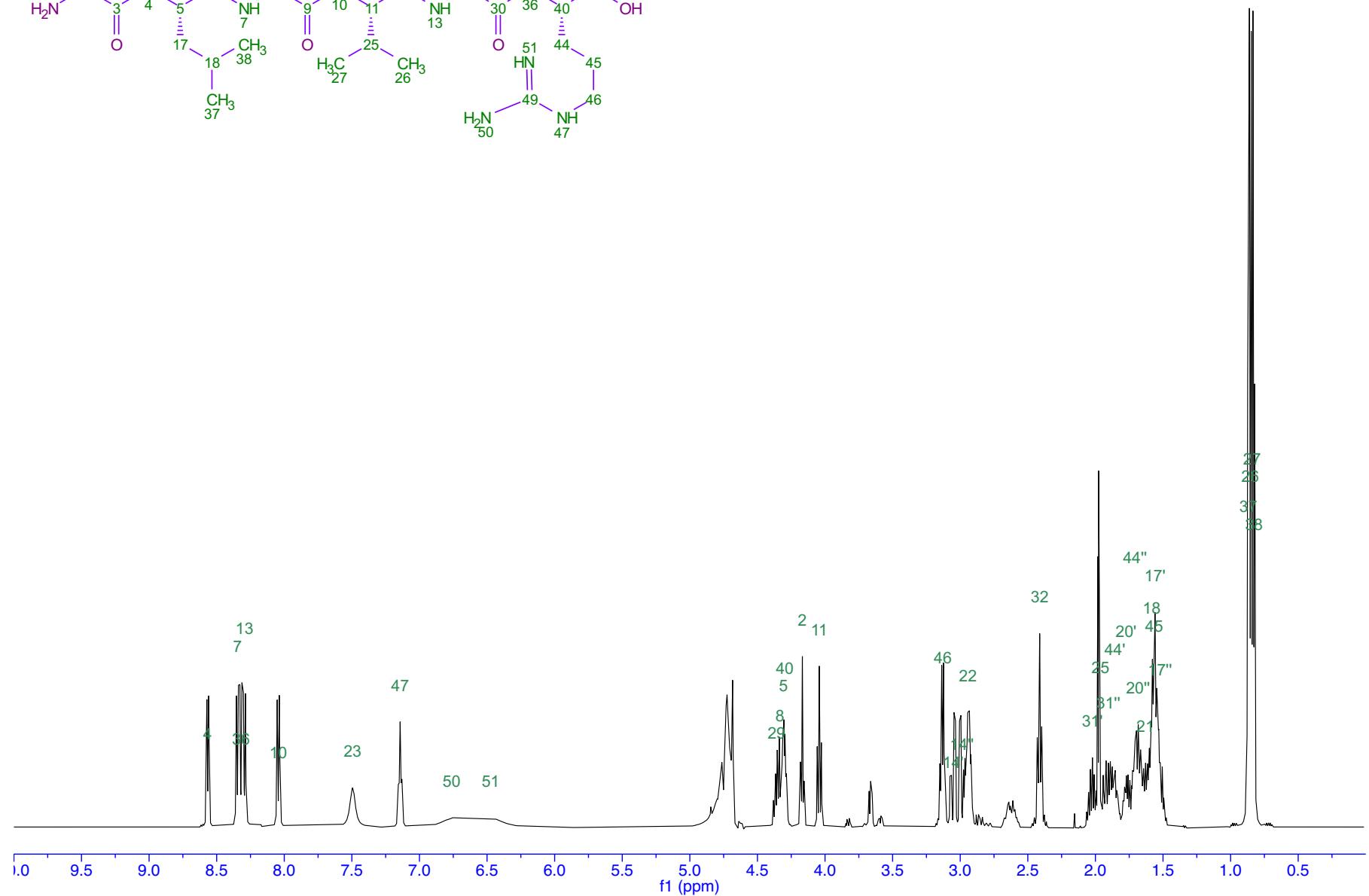
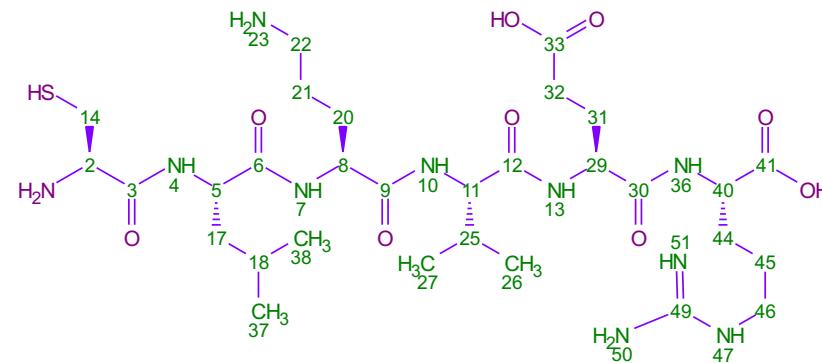


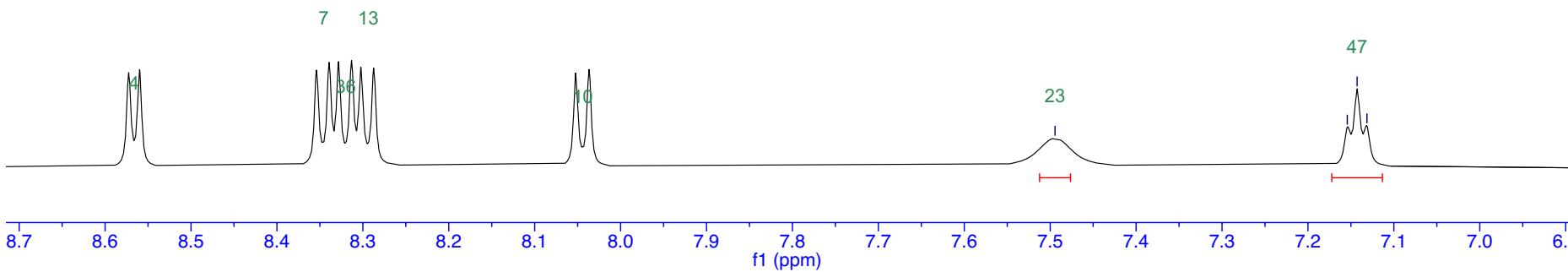
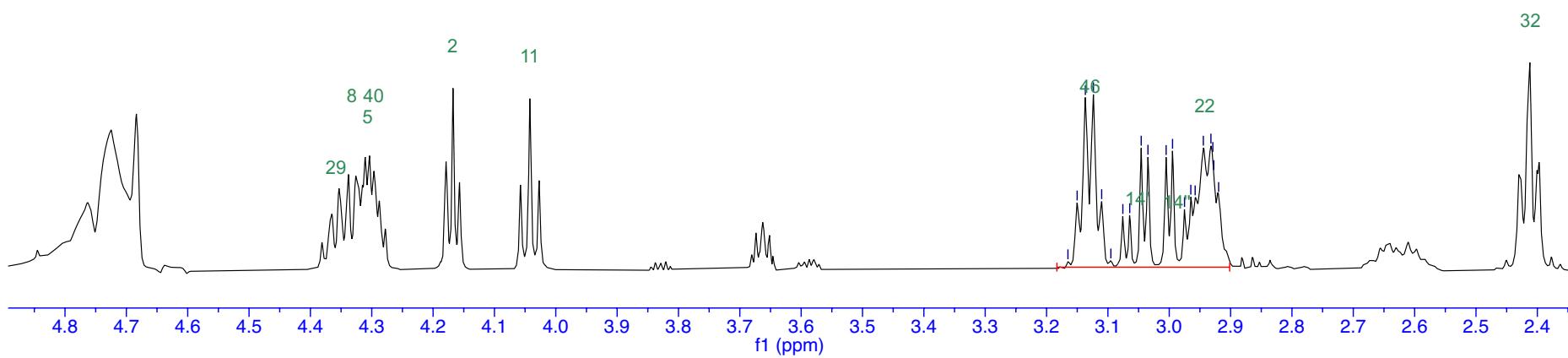
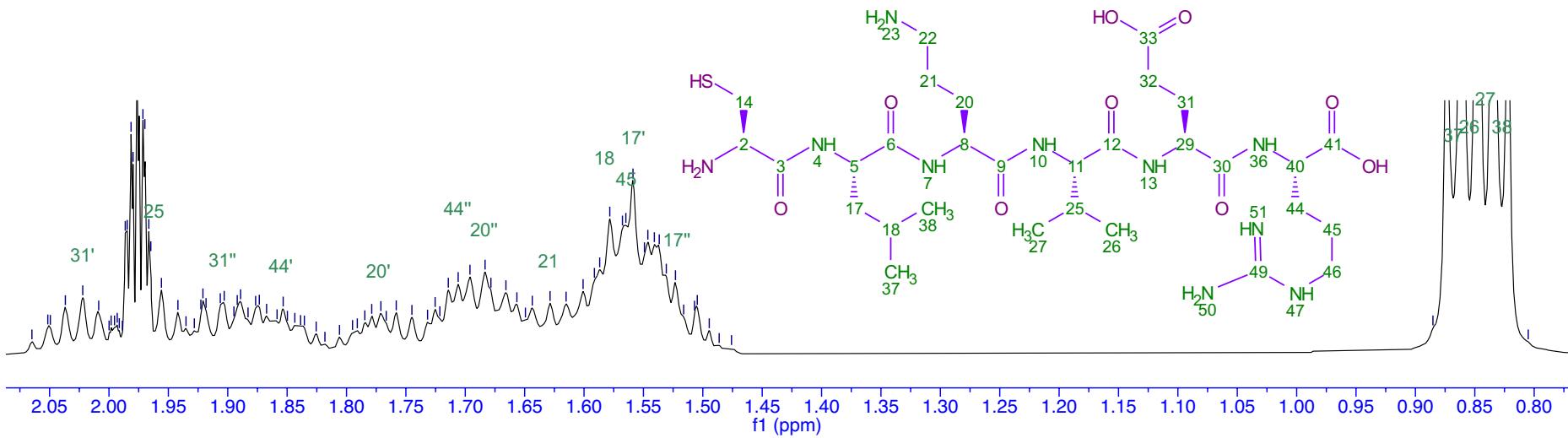
NMR Sequence: CLOVER

By Alexie Clover

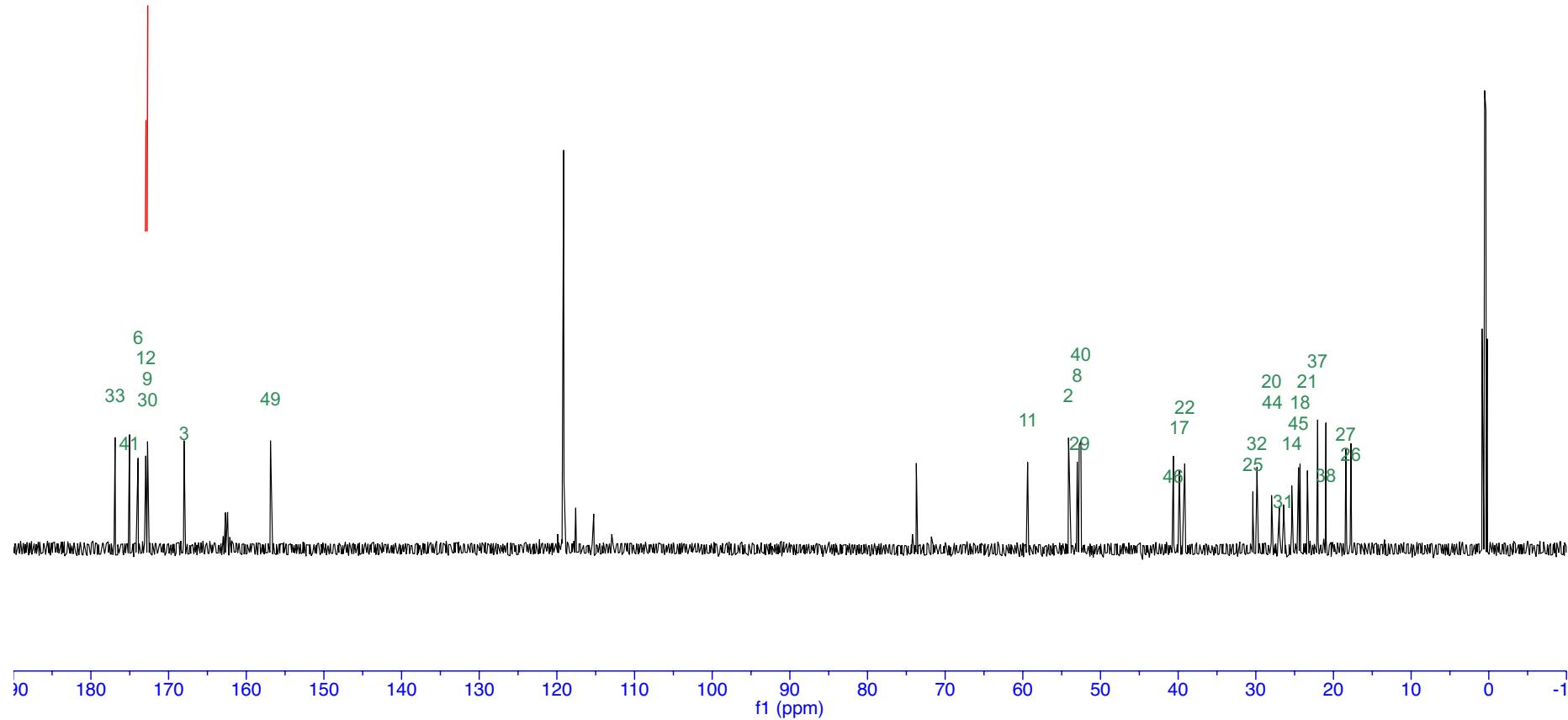
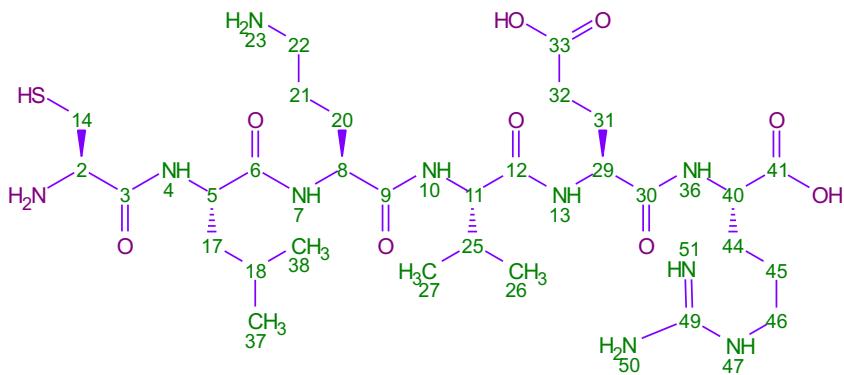
Presat



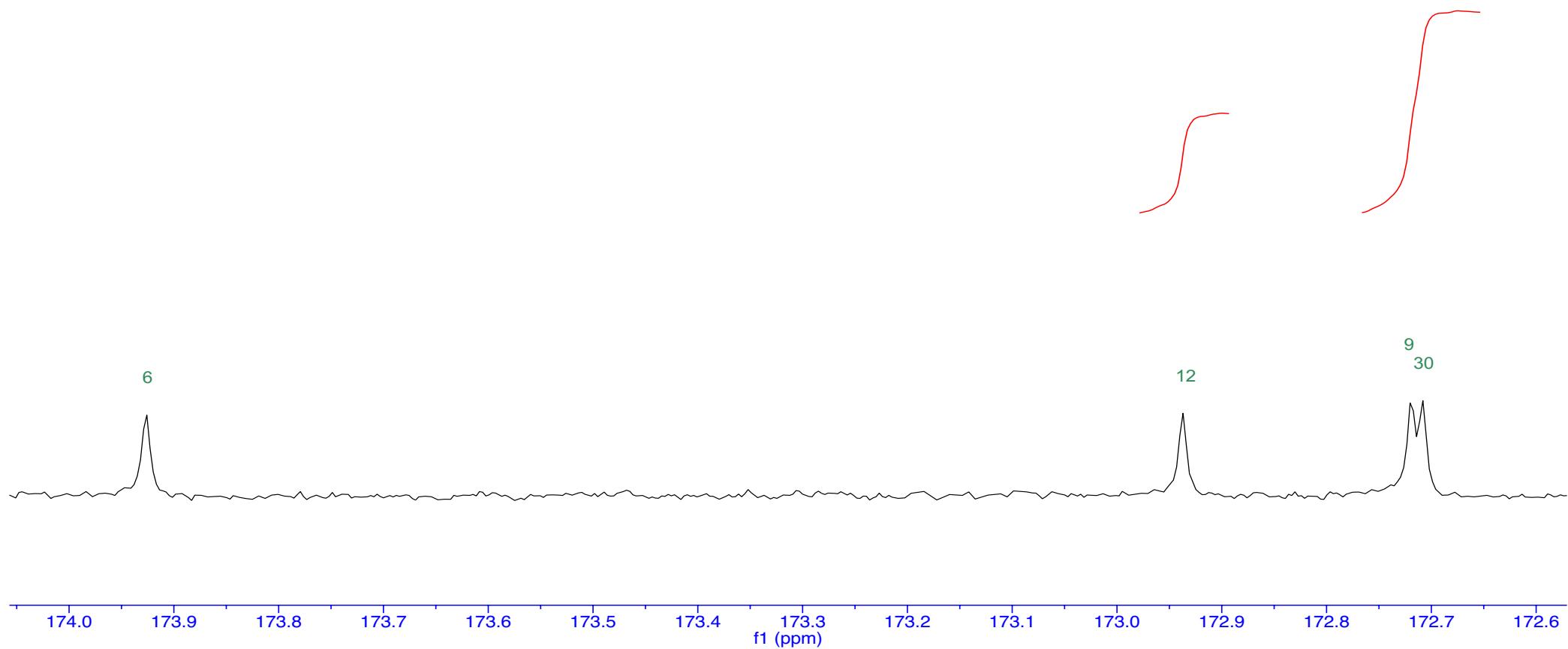
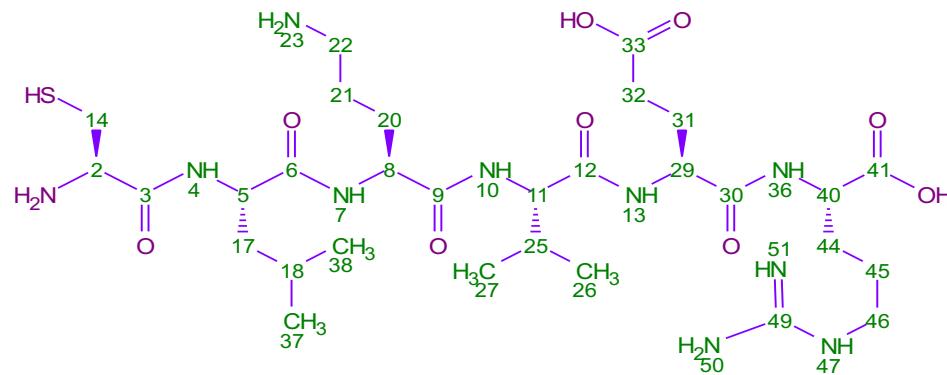
Presat

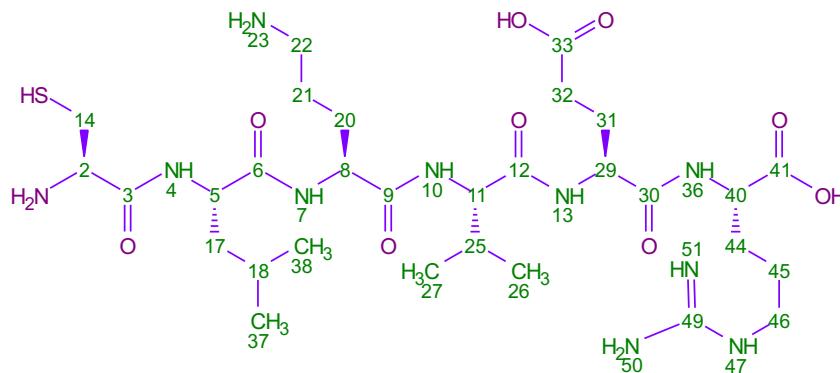


Carbon

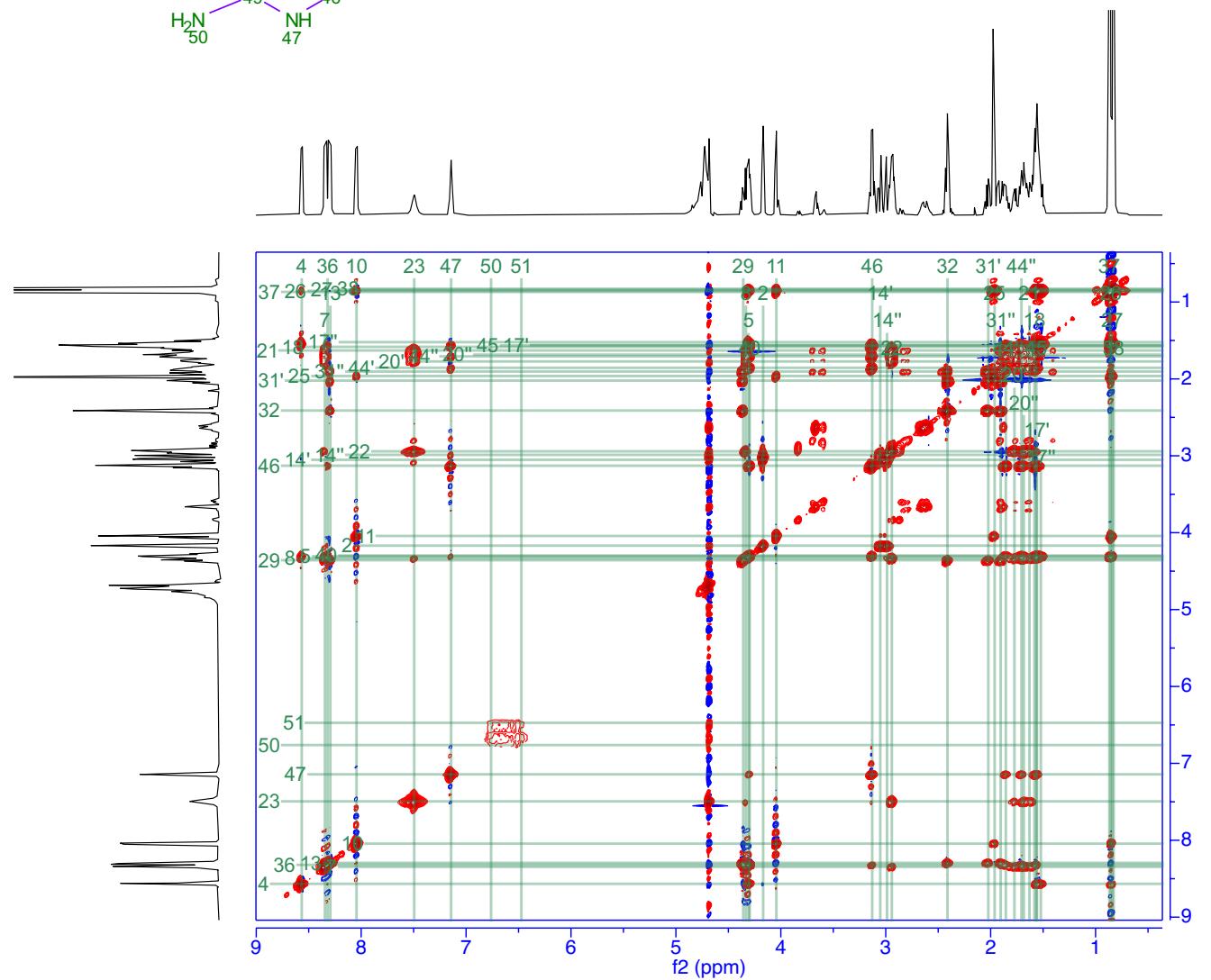


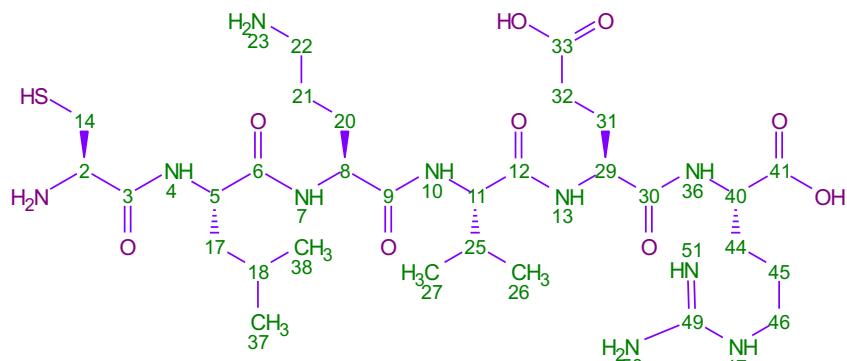
Carbon



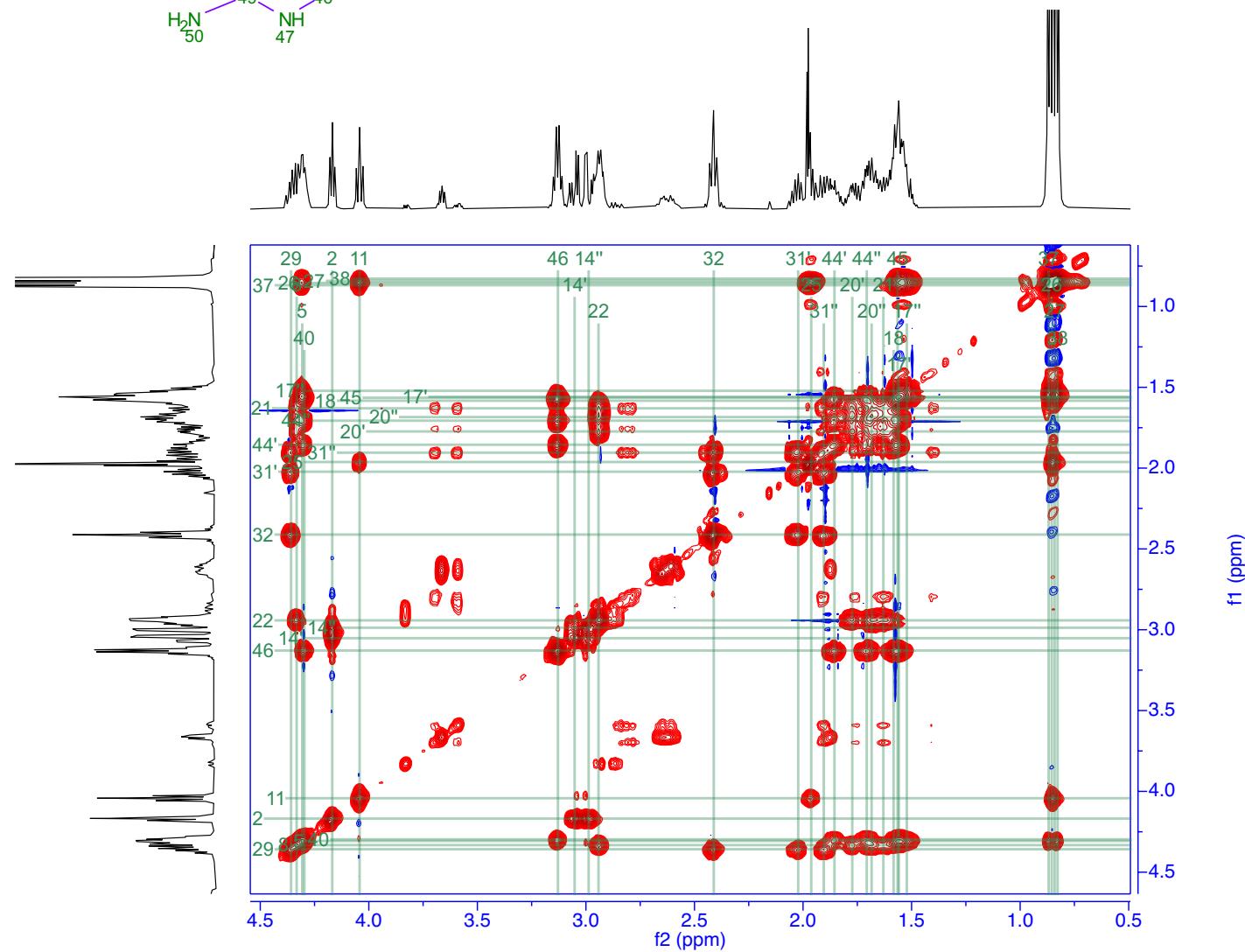


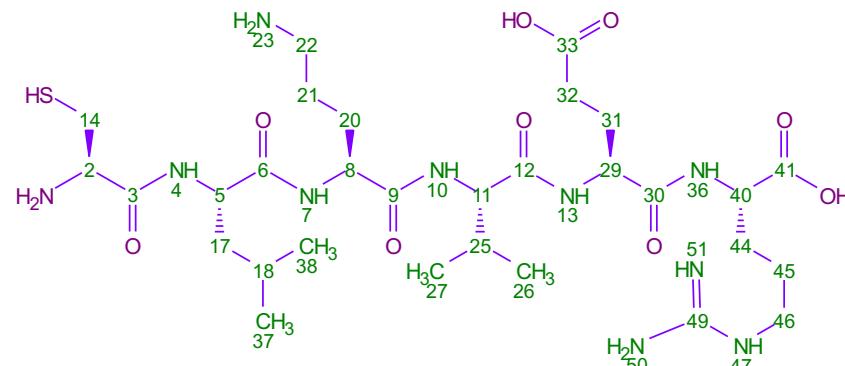
ToCSy



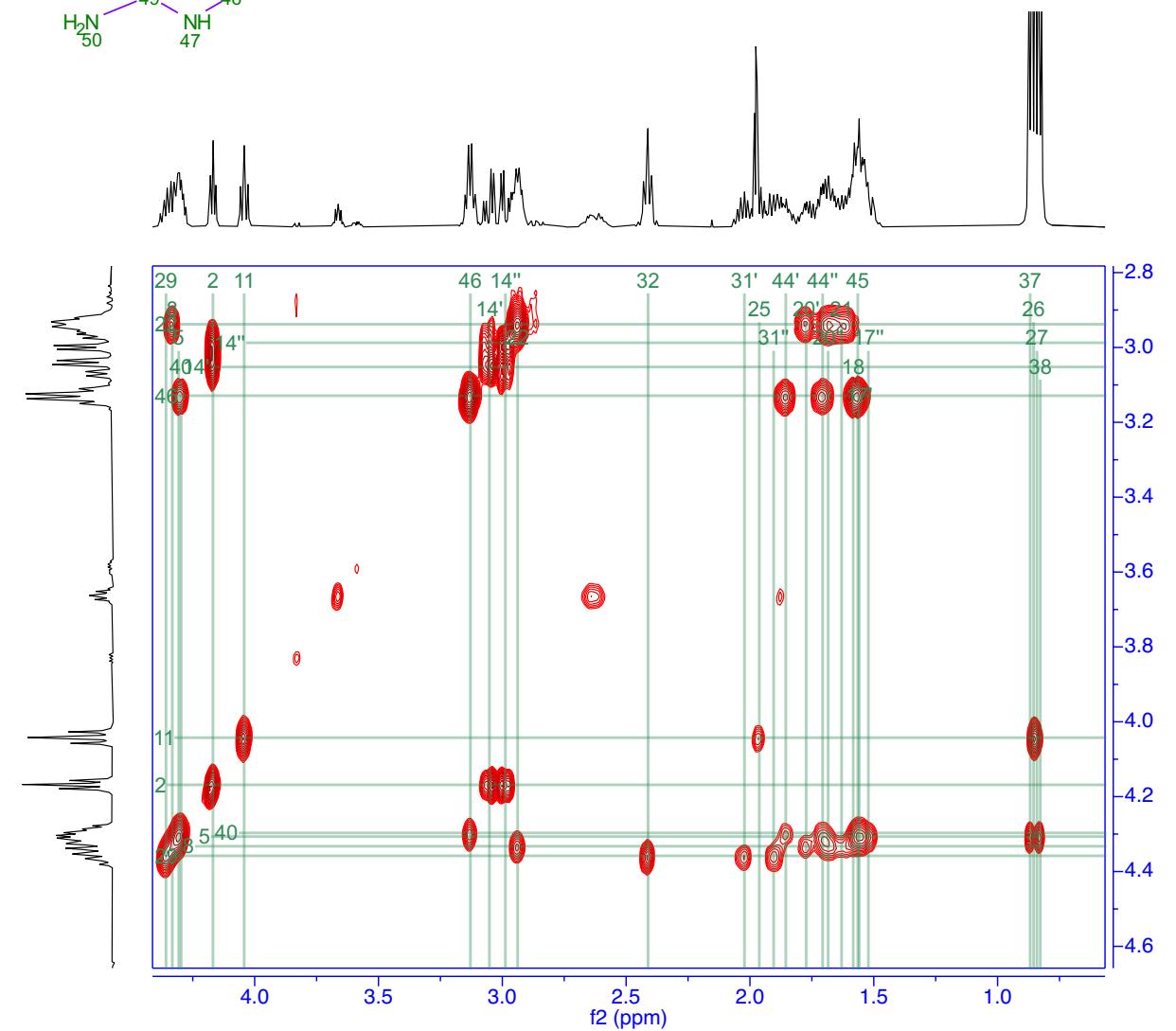


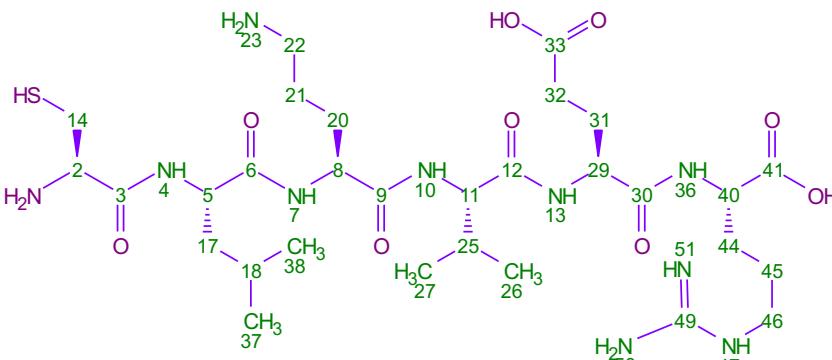
Toocsy





ToCSy

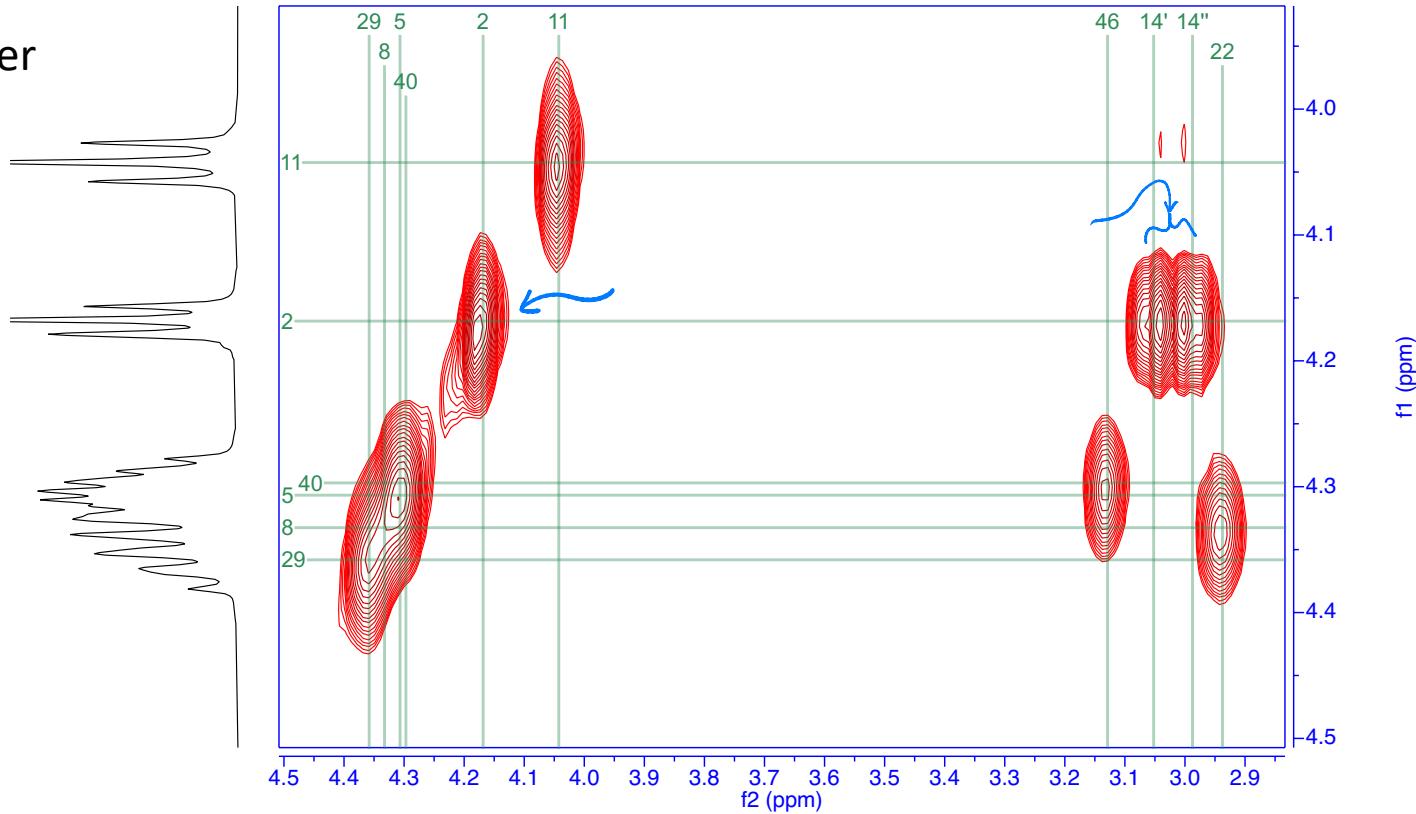


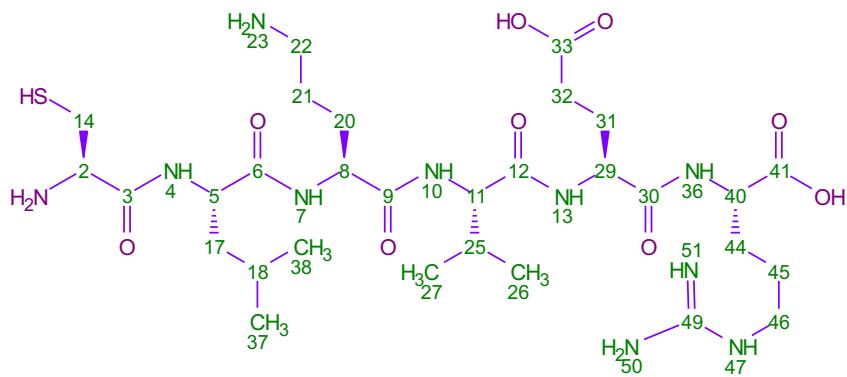


ToCSy

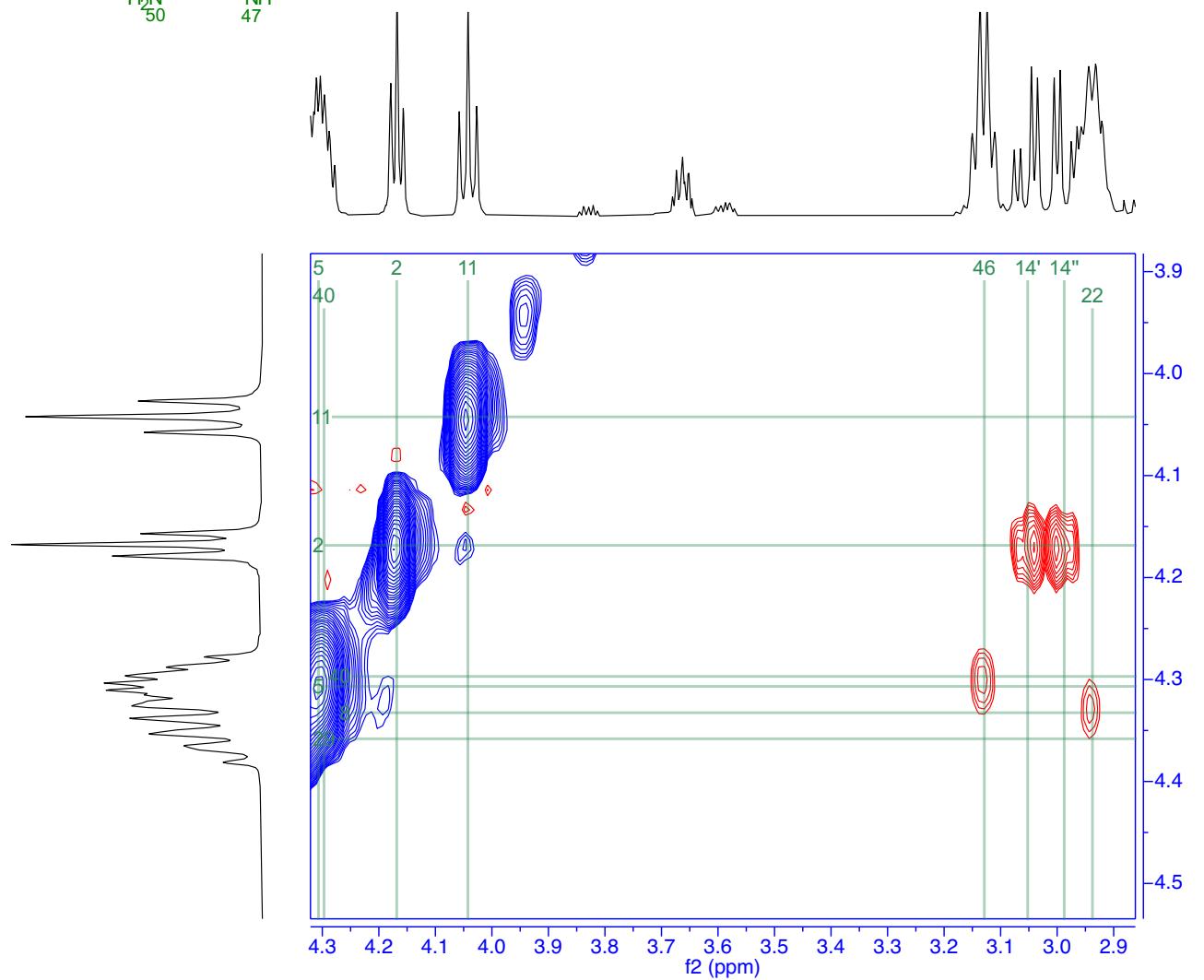
Cysteine (Cys)

- Only has an α and a β proton.
- Whereas all the other amino acids have longer side chains.



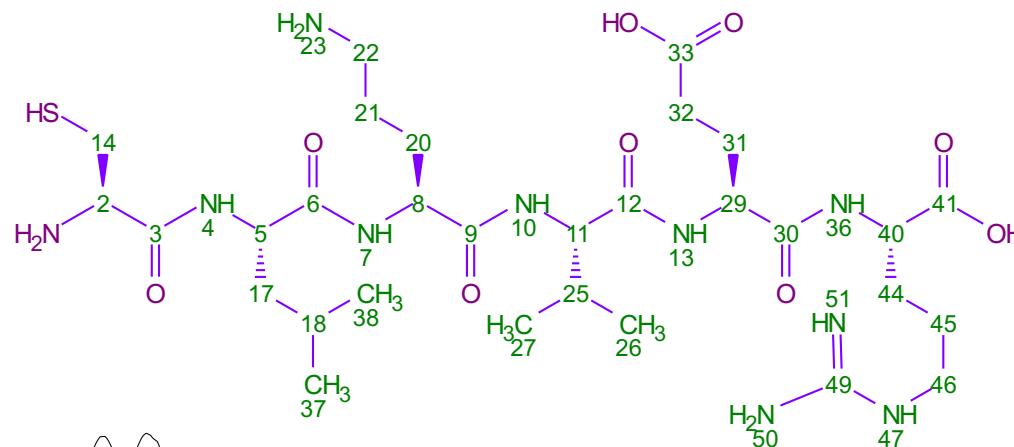
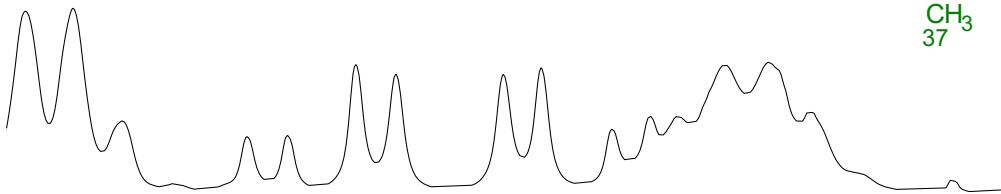


Roesy



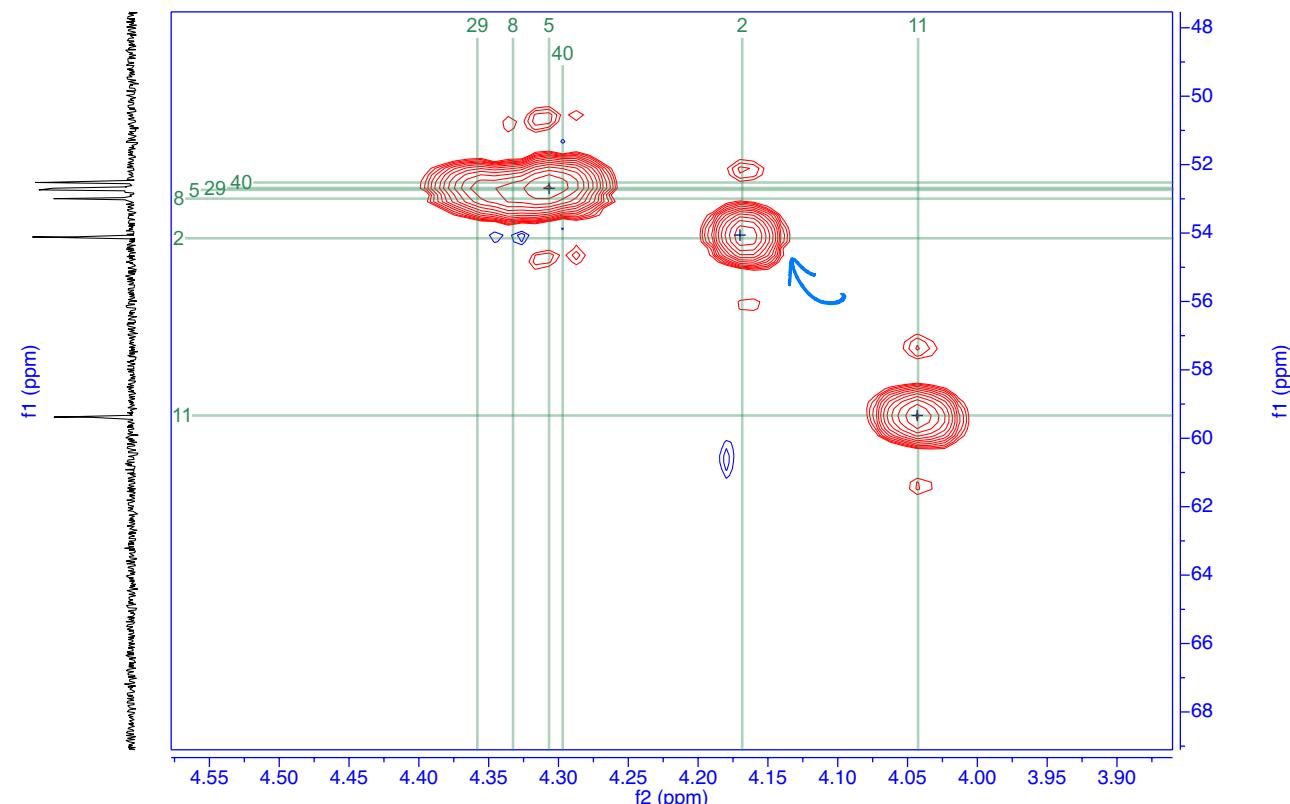
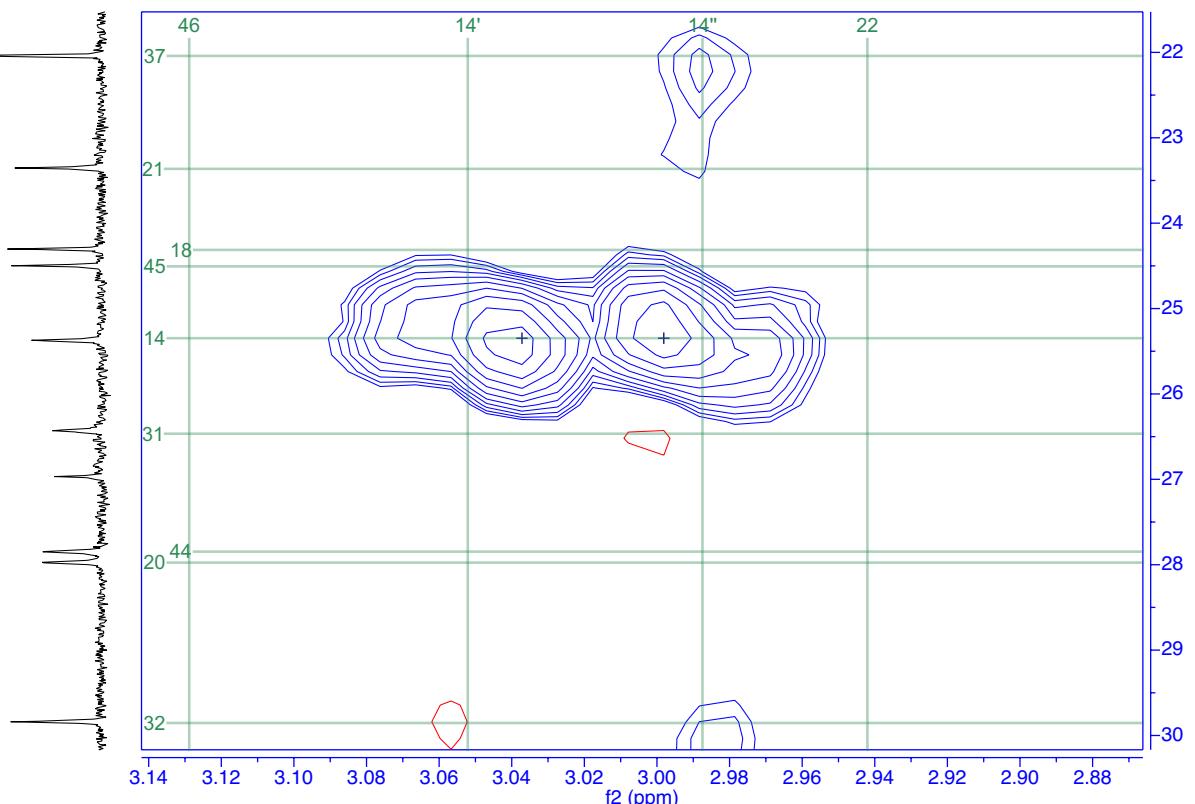
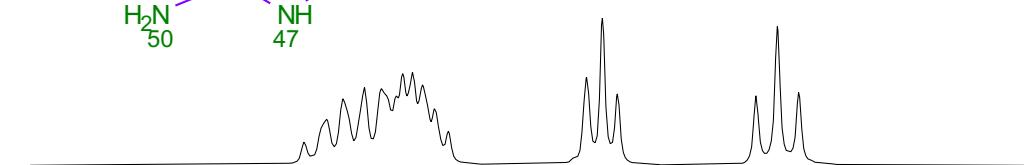
HSQC

14 can see 14!



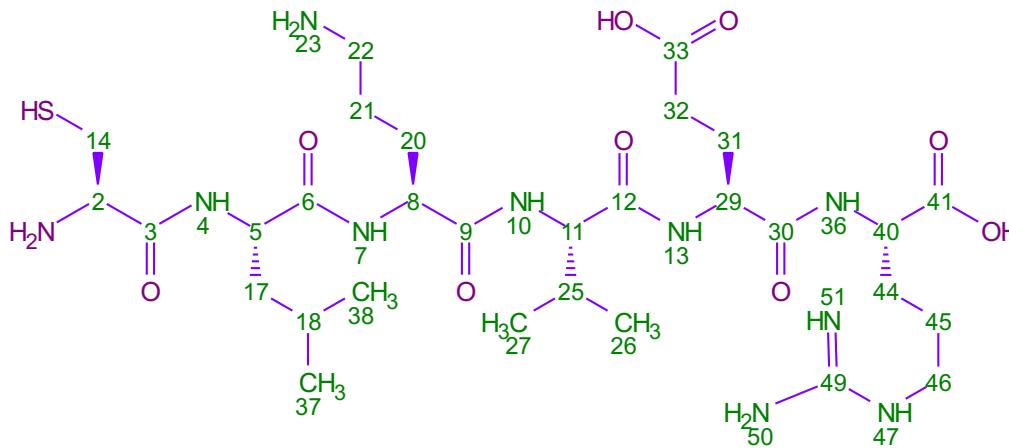
HSQC

2 can see 2!

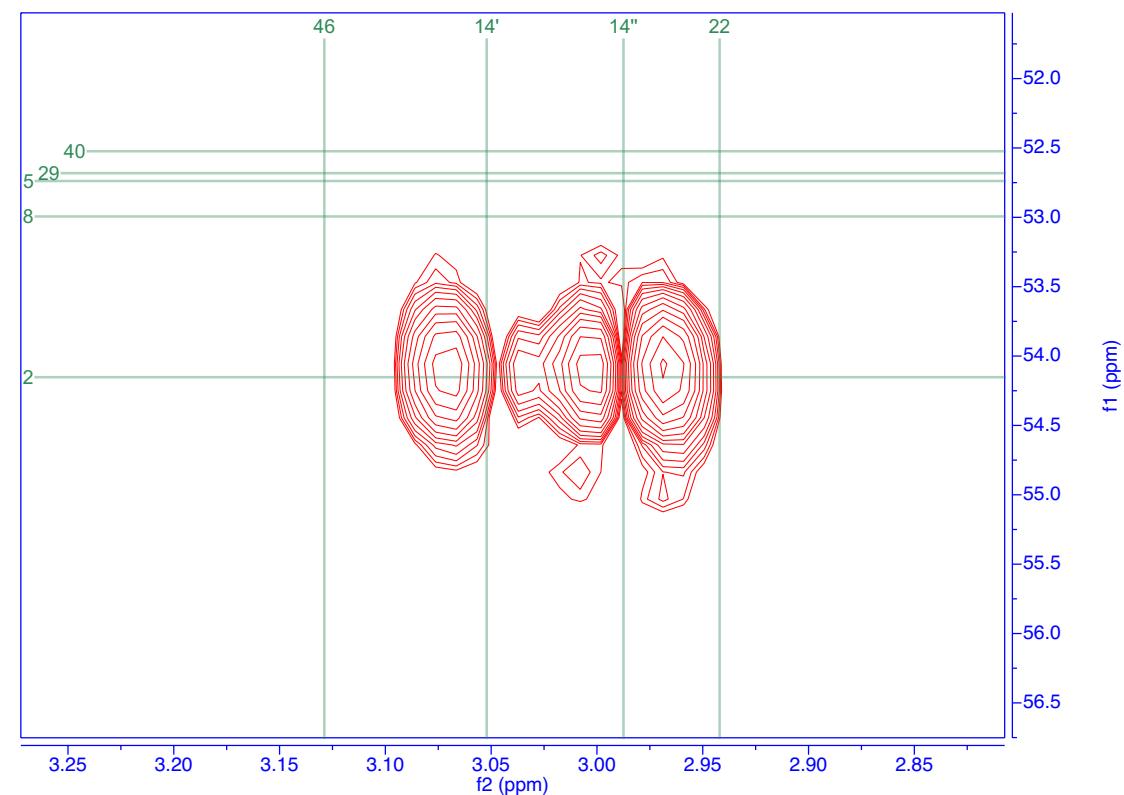
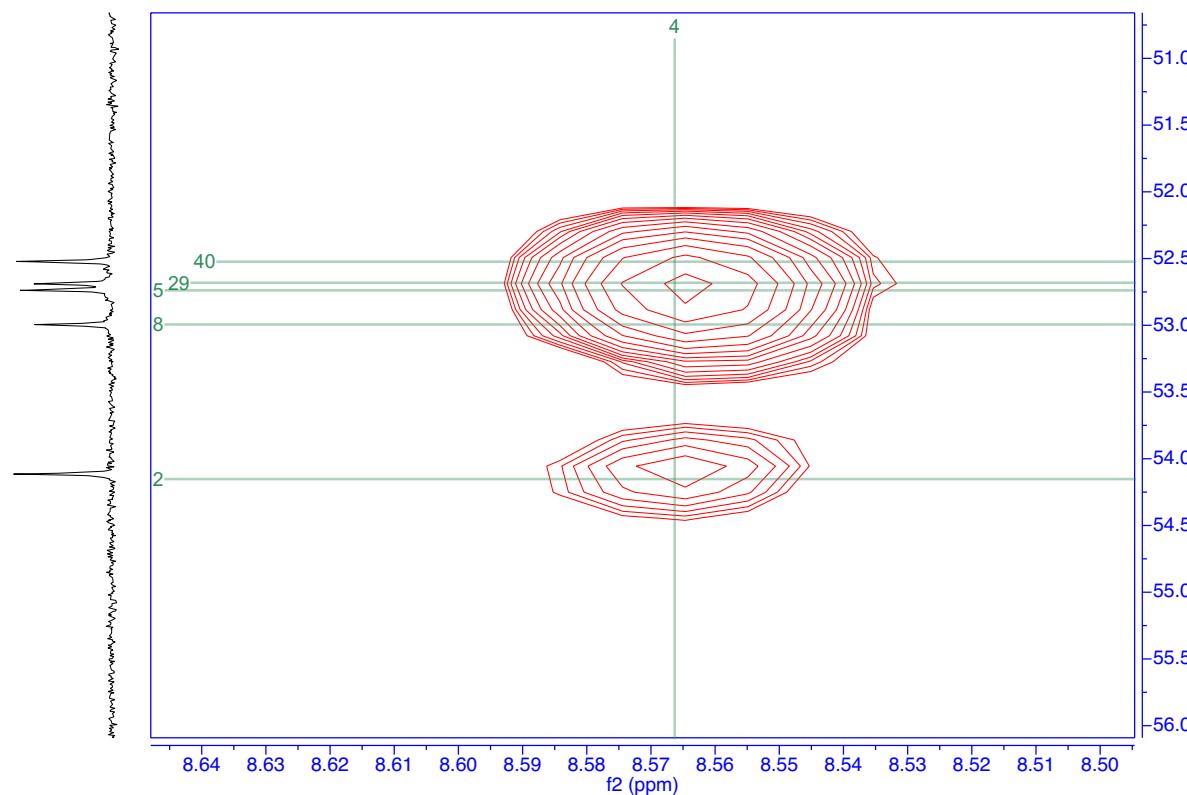
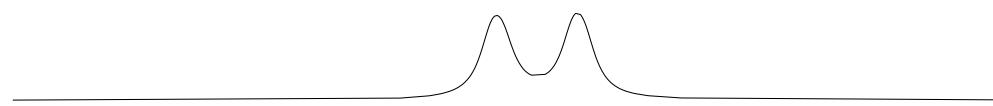


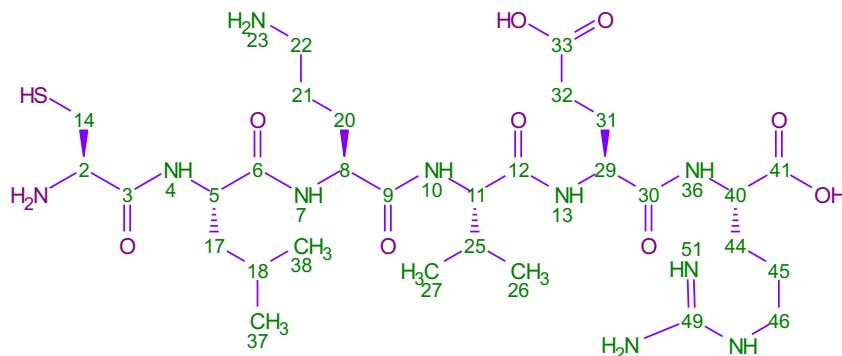
HMBC

Amine region

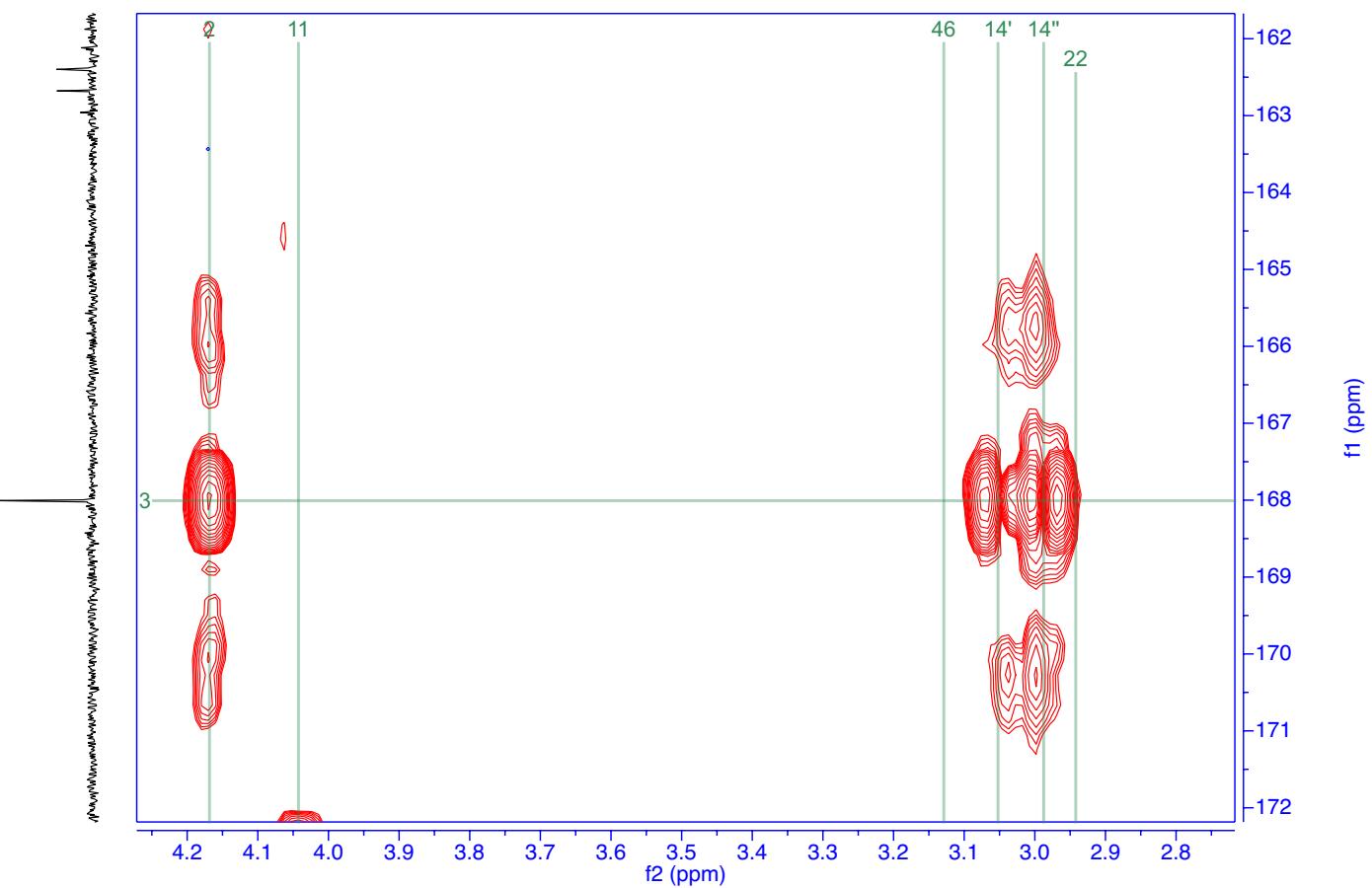


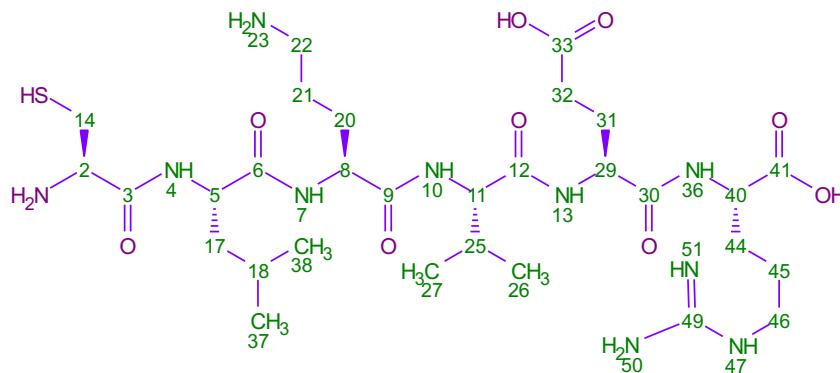
HMBC



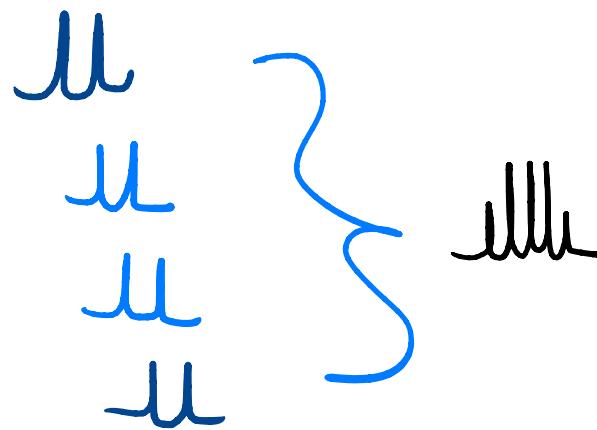


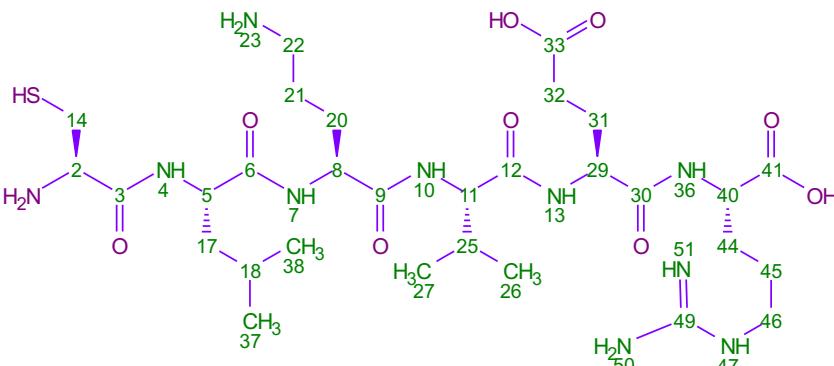
HMBC



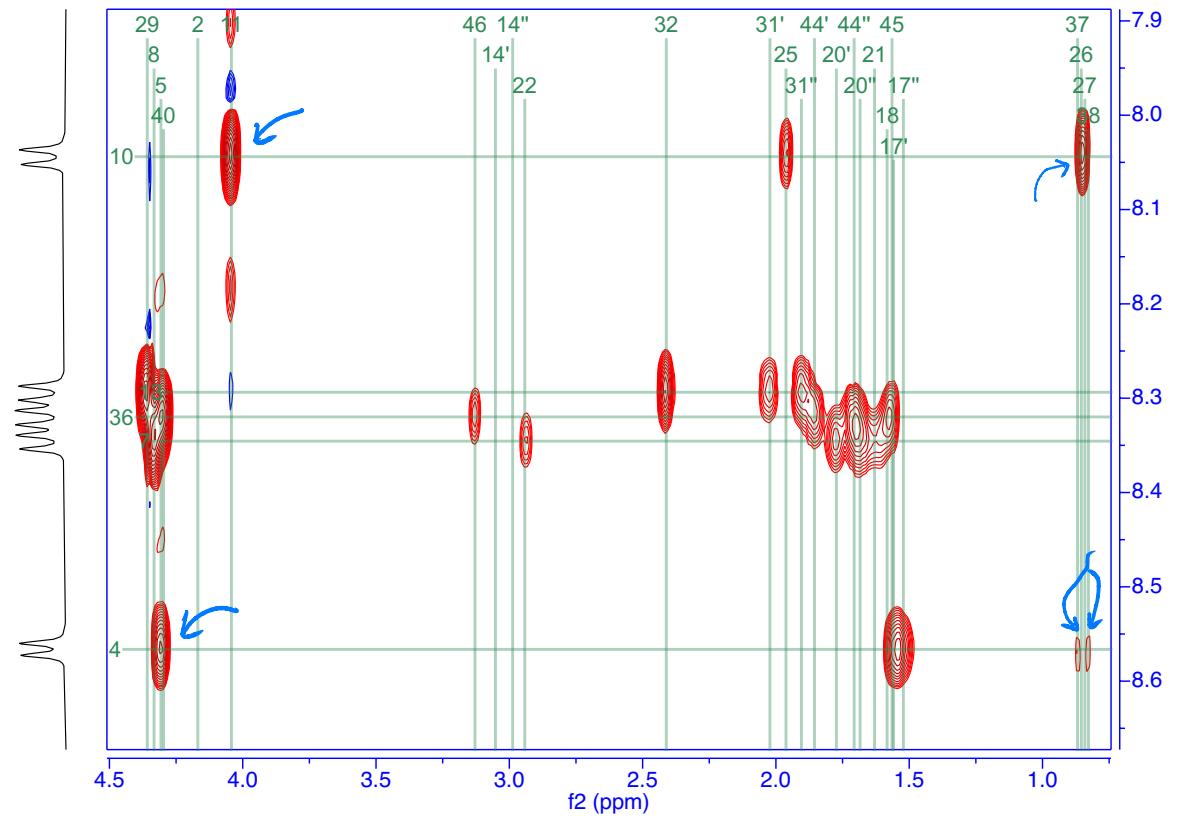
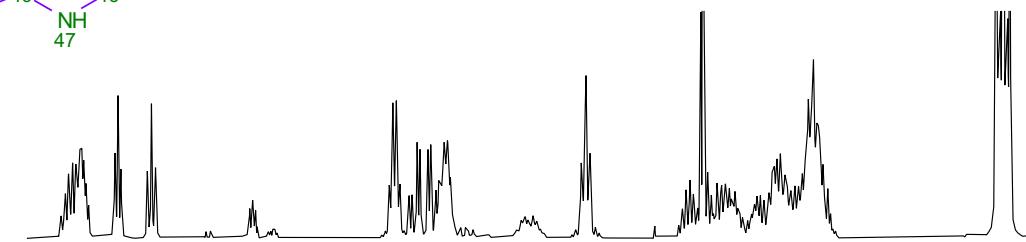


This large peak is Leucine
(Leu) and Valine (Val)

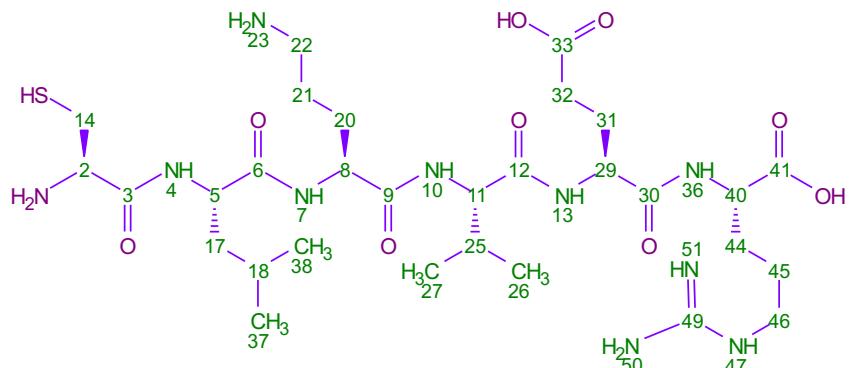




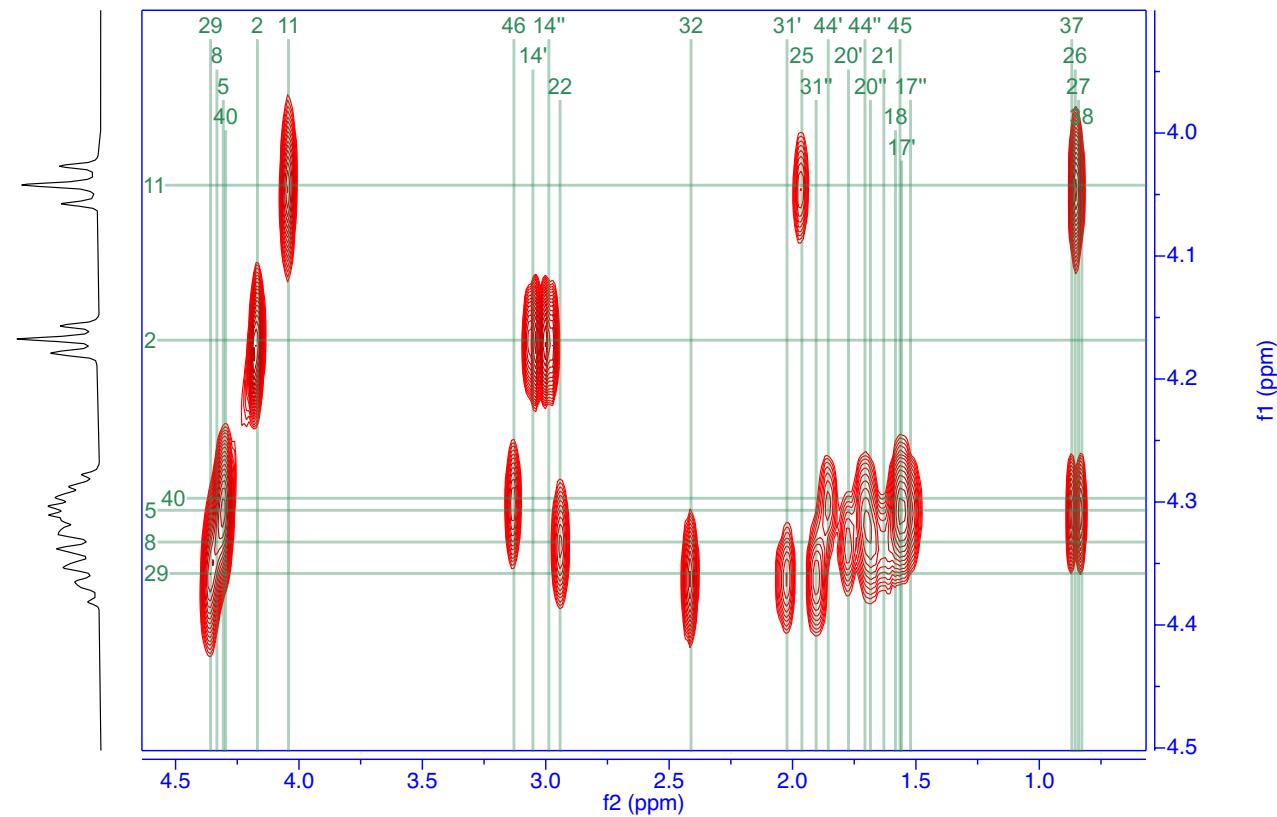
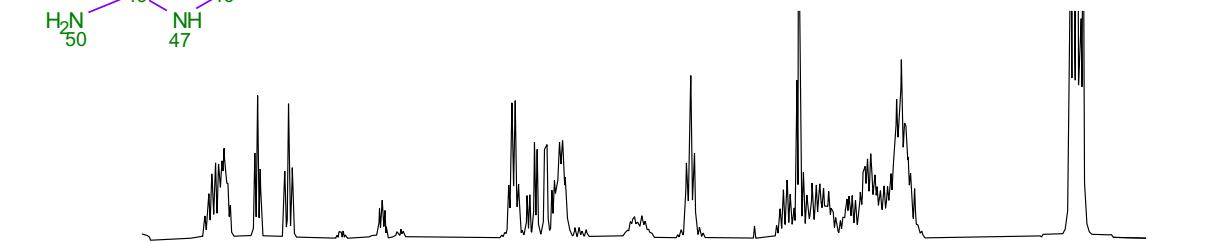
ToCSY

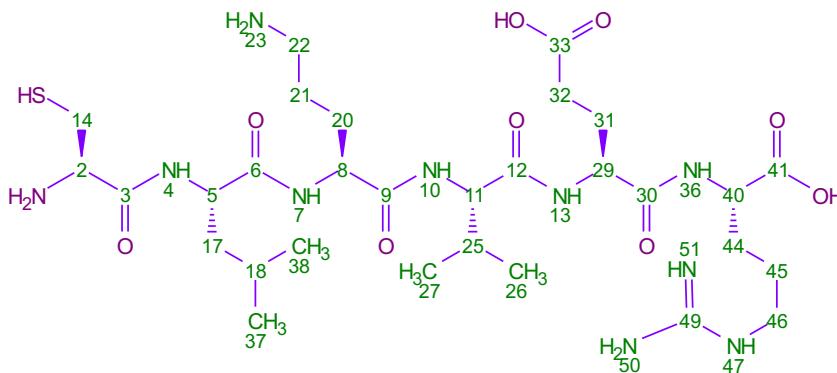


There is correlation between the top amide and the bottom amide to the large peak at ~0.9 ppm



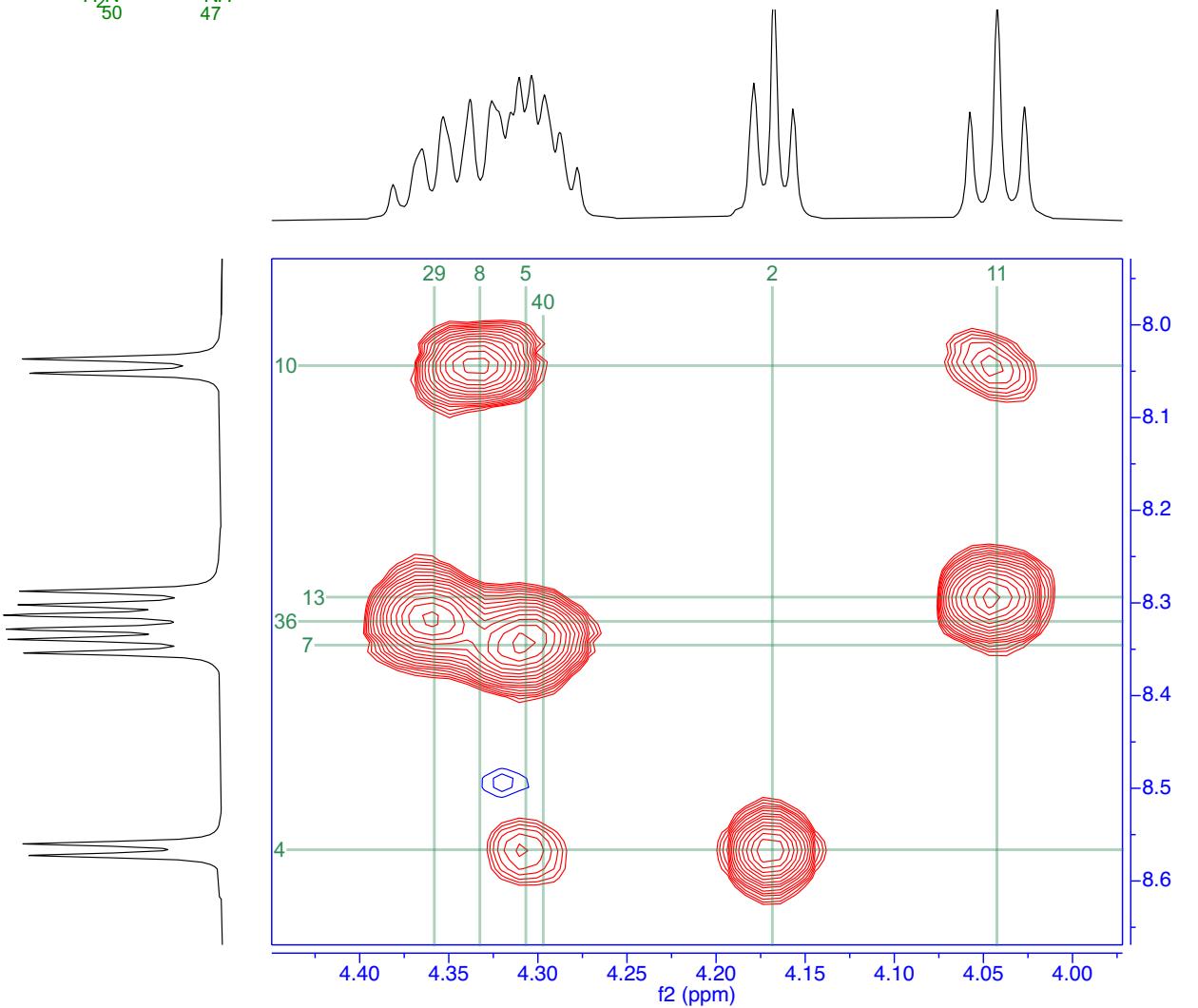
ToCSy

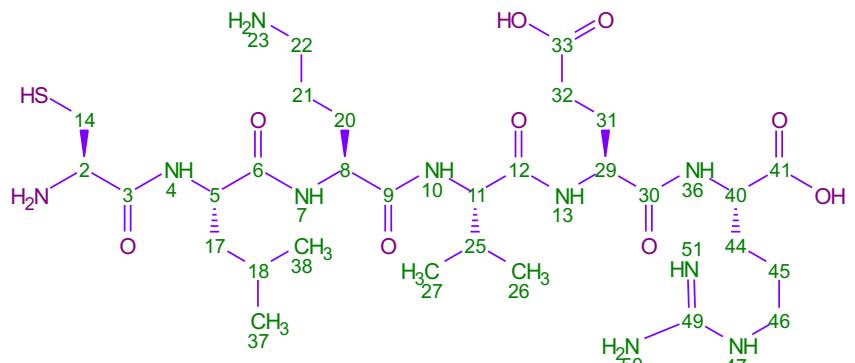




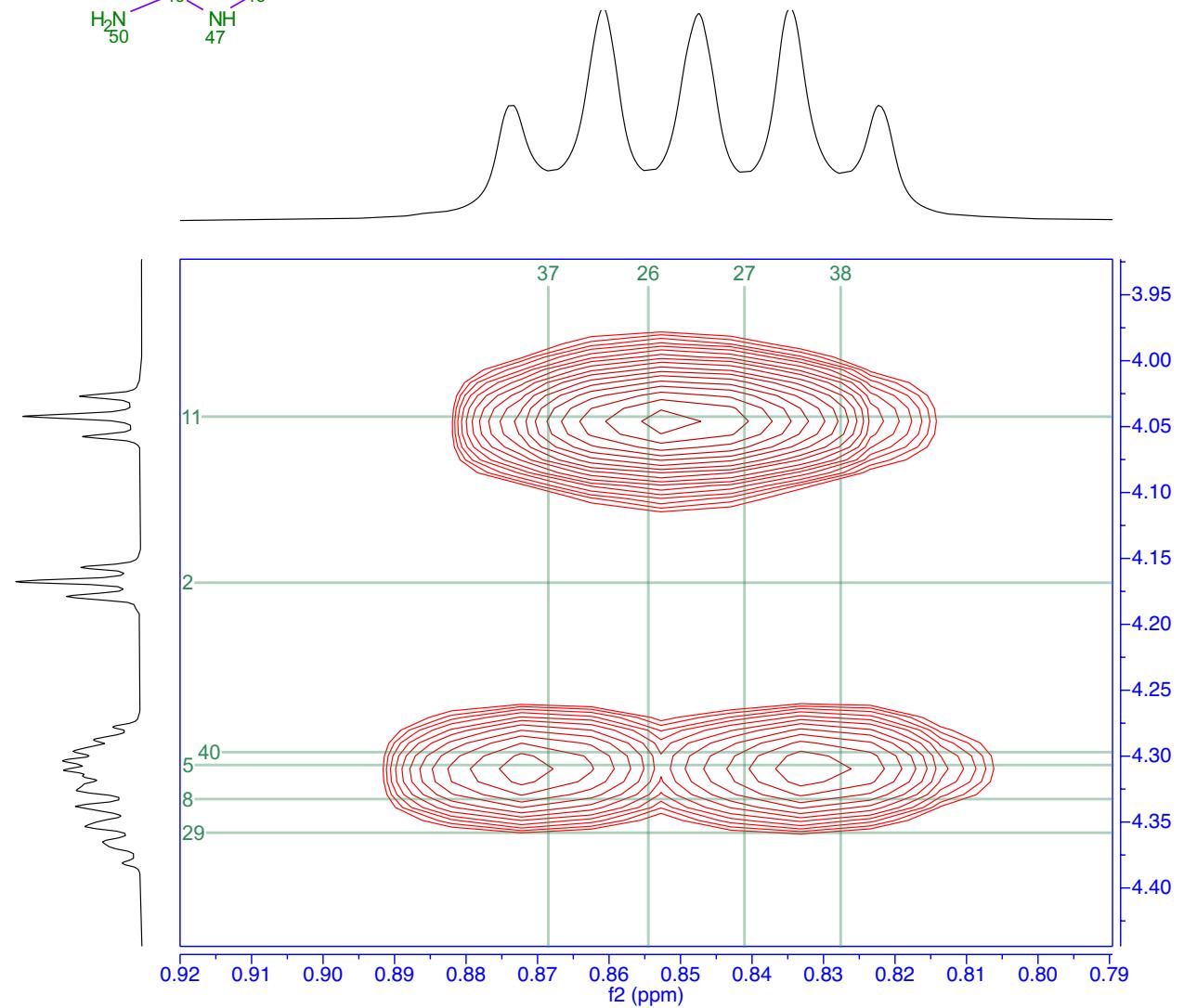
Roesy

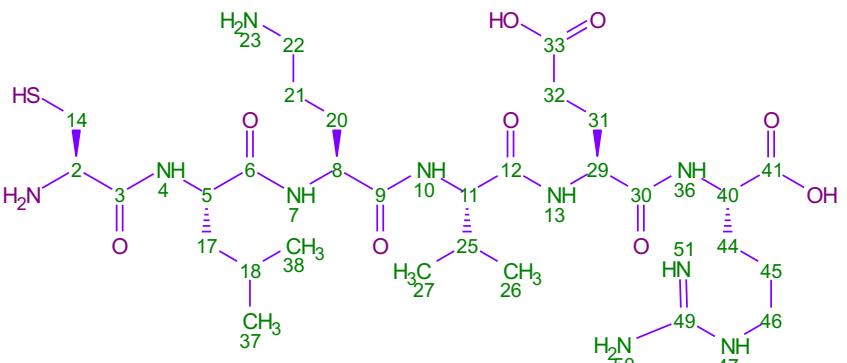
I know that the signal 10 can see 8 & 11 but not 2. I also know that the signal 4 can see 2 & 5 but not 11.



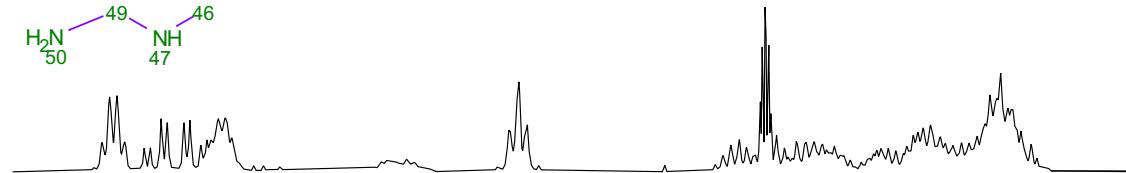


ToCSy



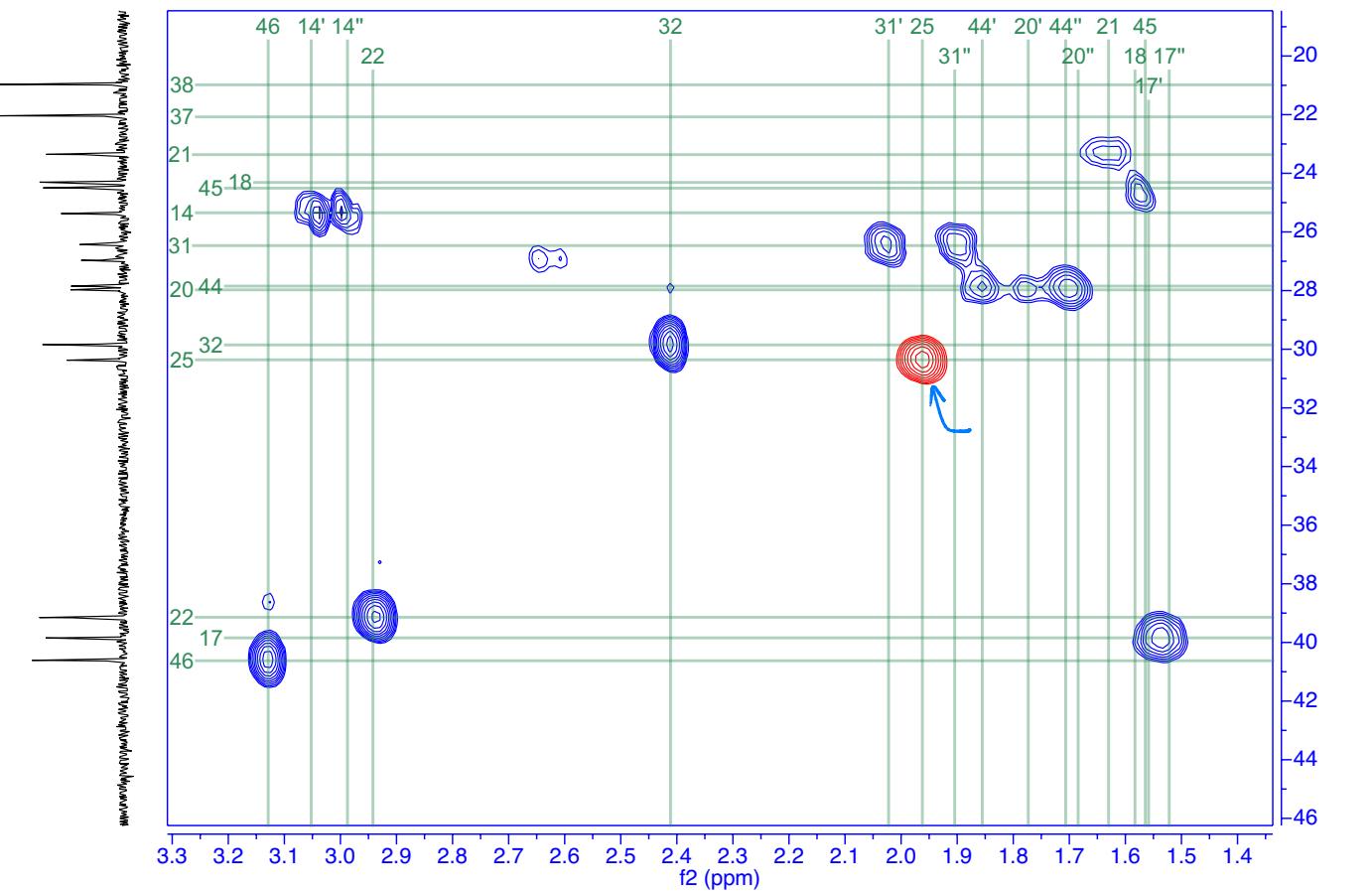
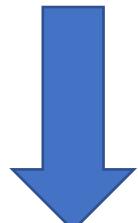


HSQC

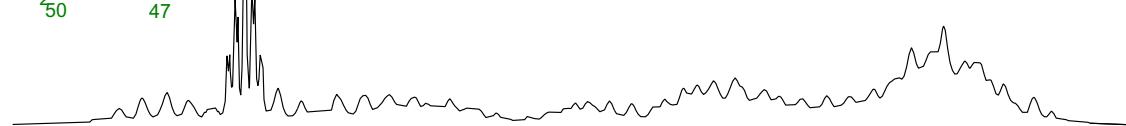
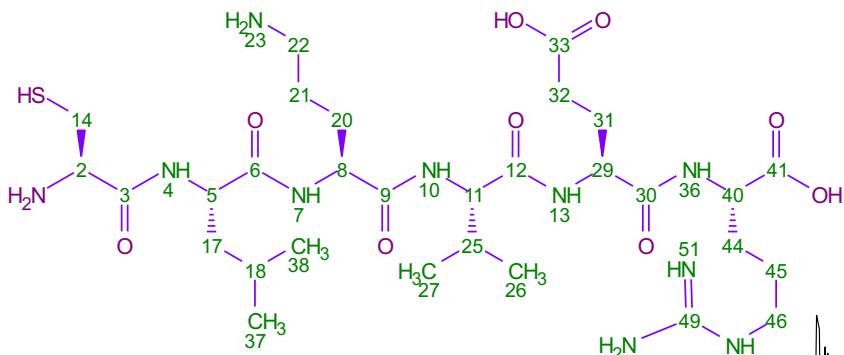


I should see two red signals
in this region representing
the two isopropyl's?

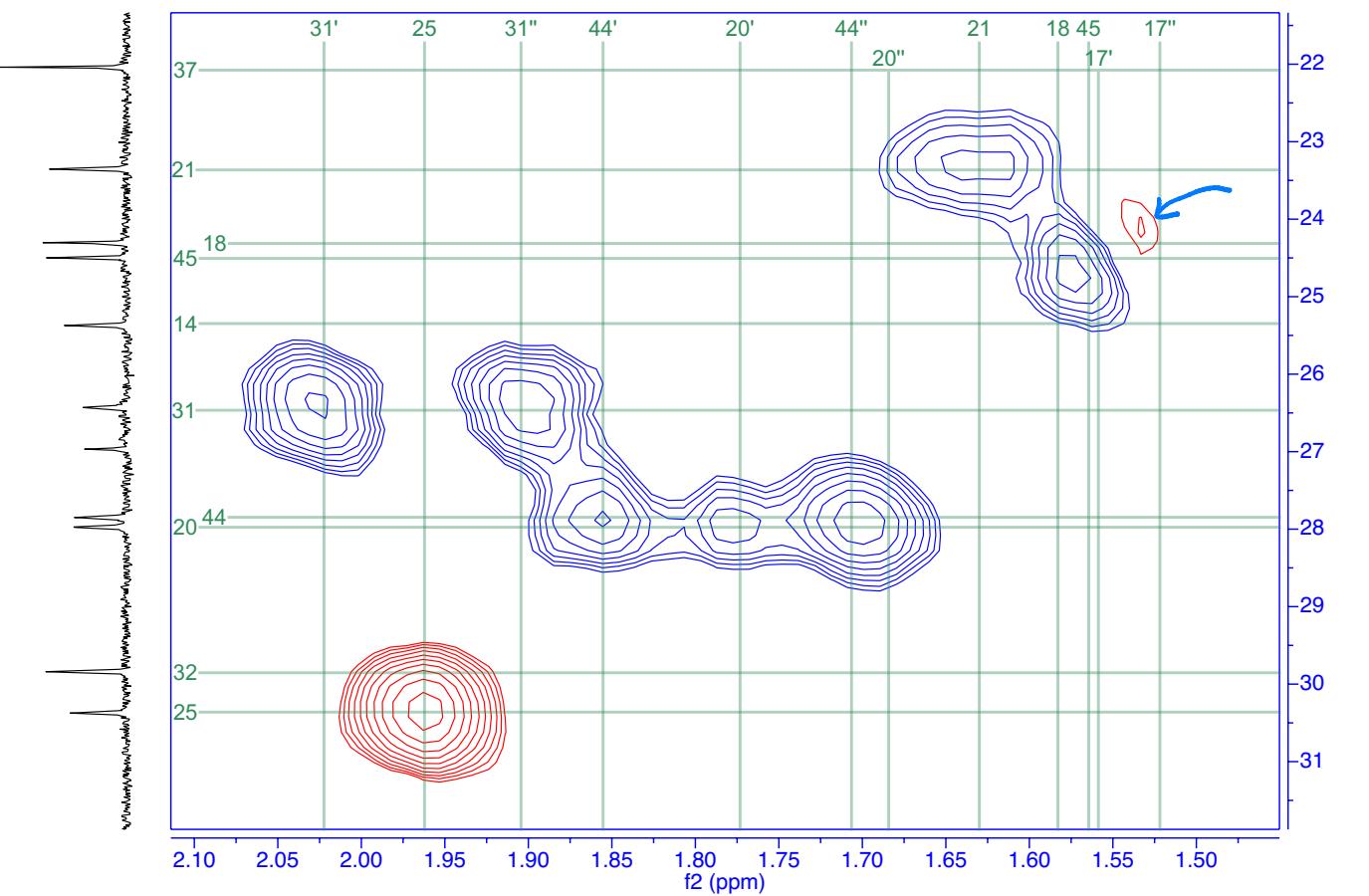
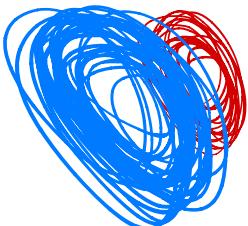
Zoomed in

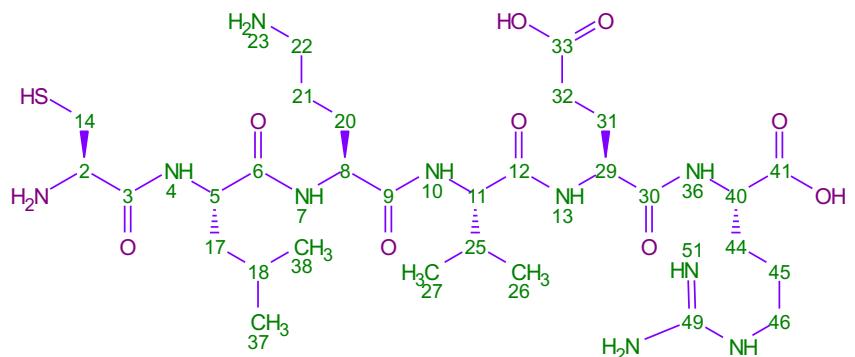


HSQC

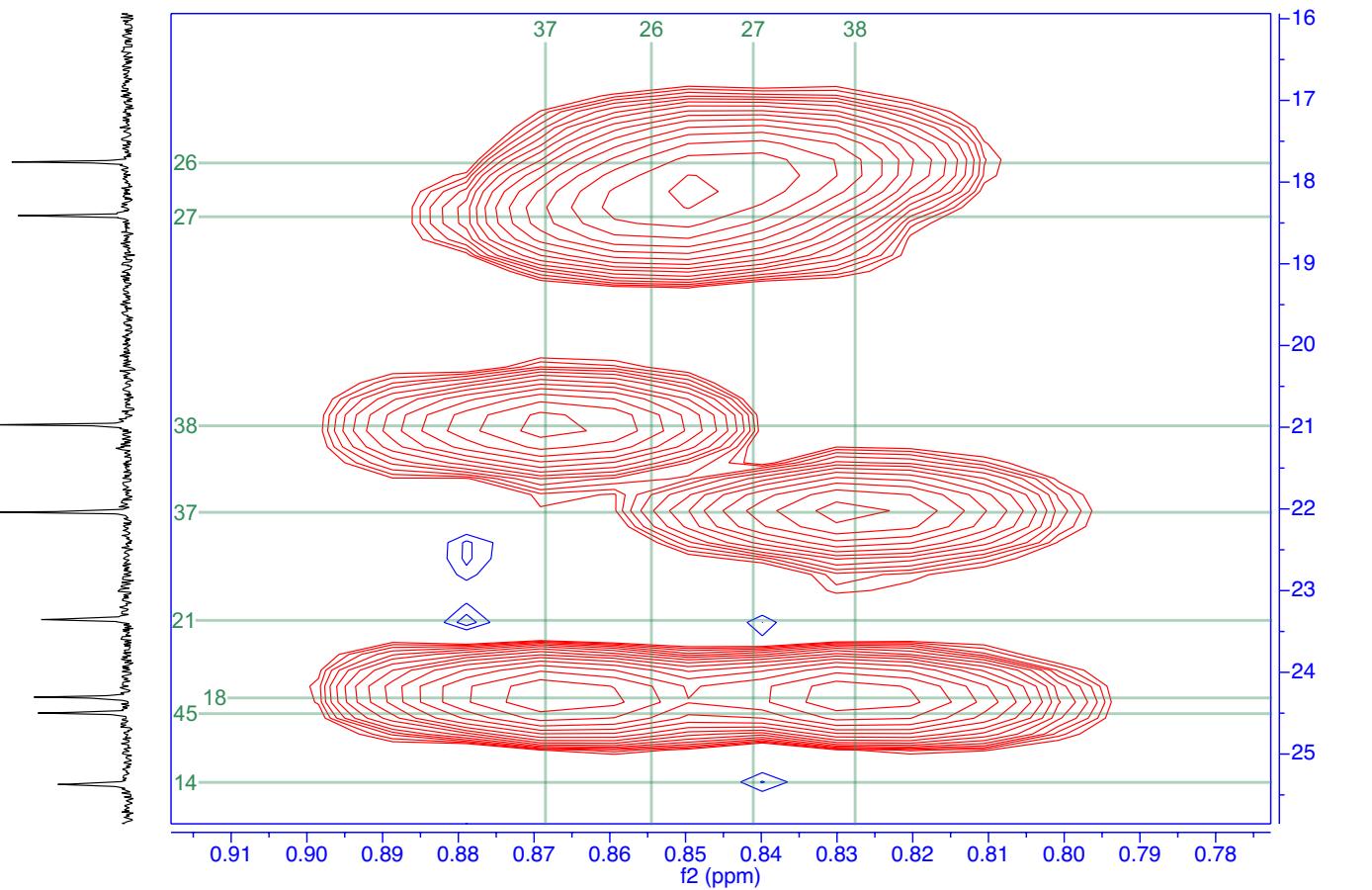


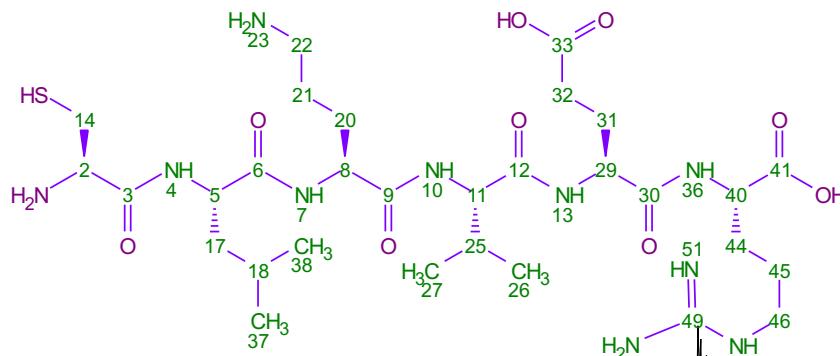
THERE HE IS!
Sneaky.



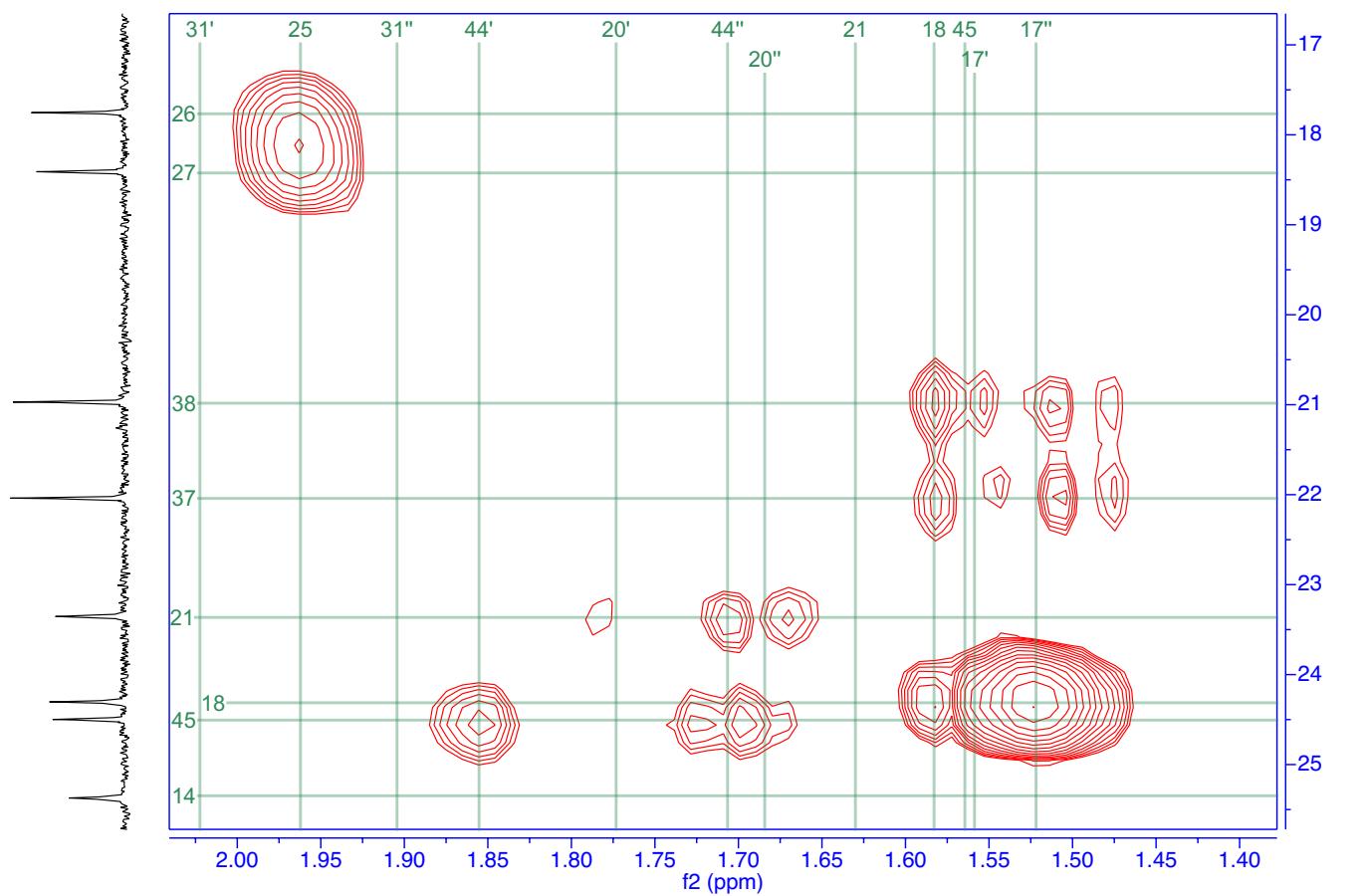


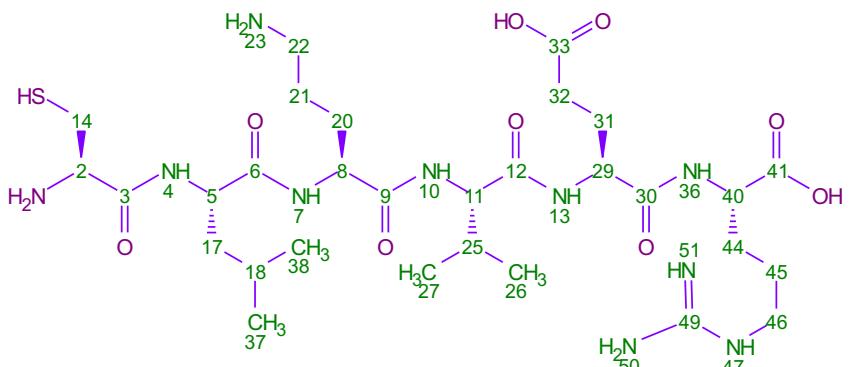
HMBC





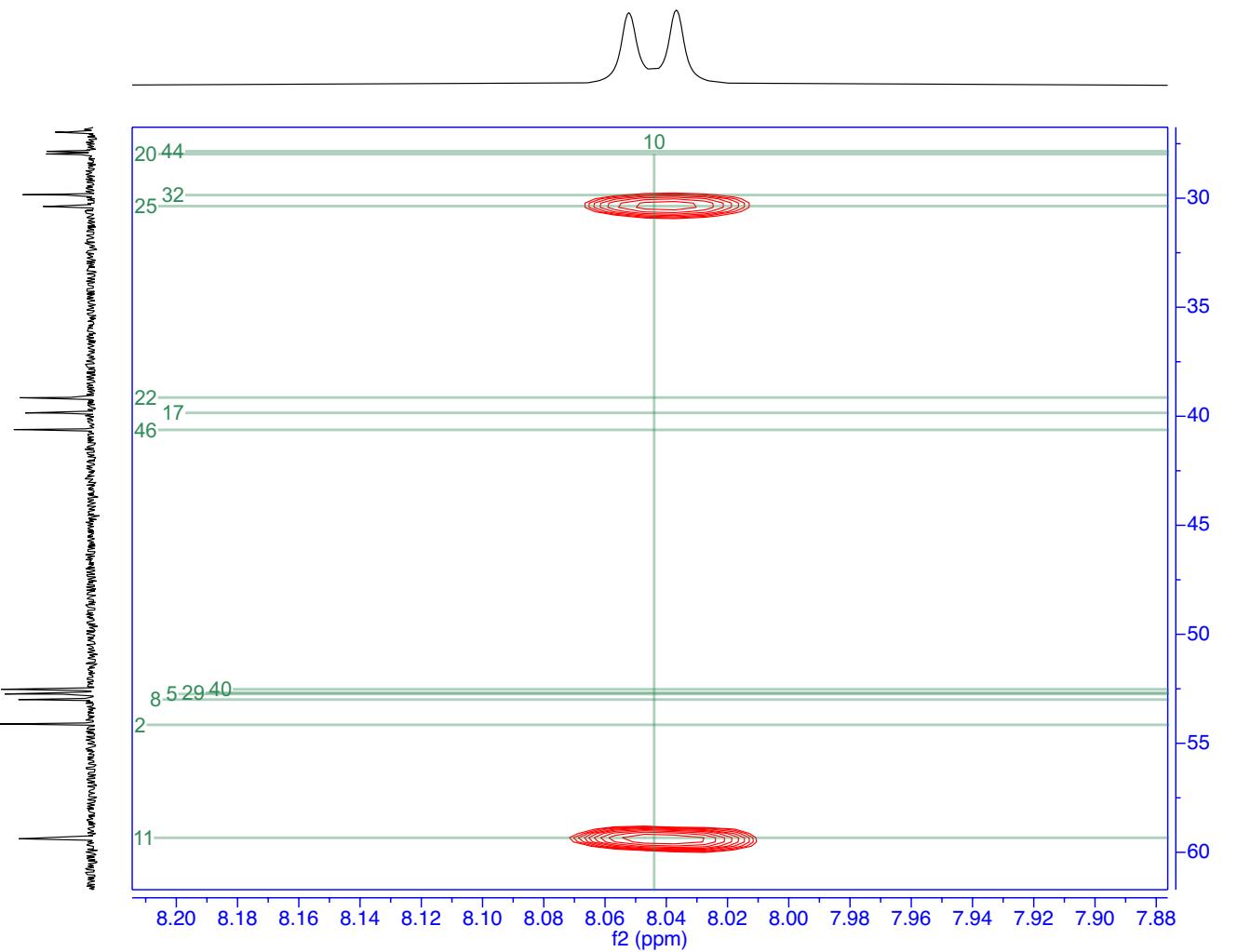
HMBC



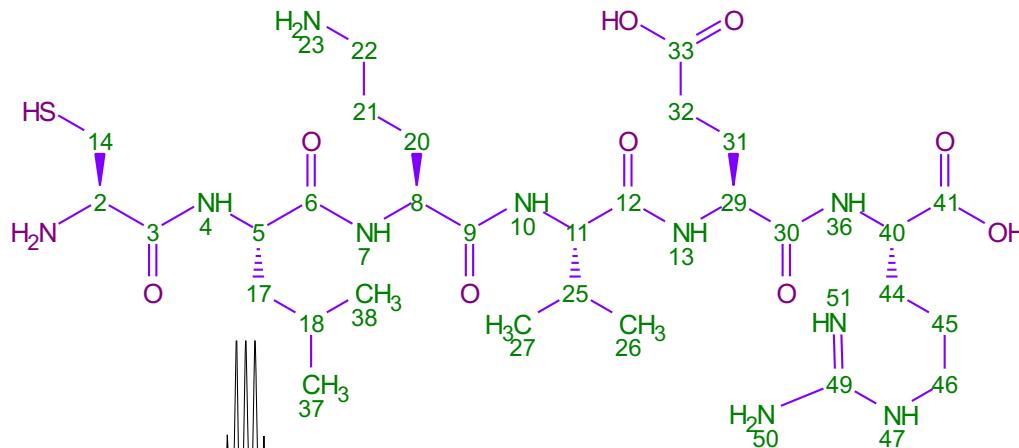


HMBC

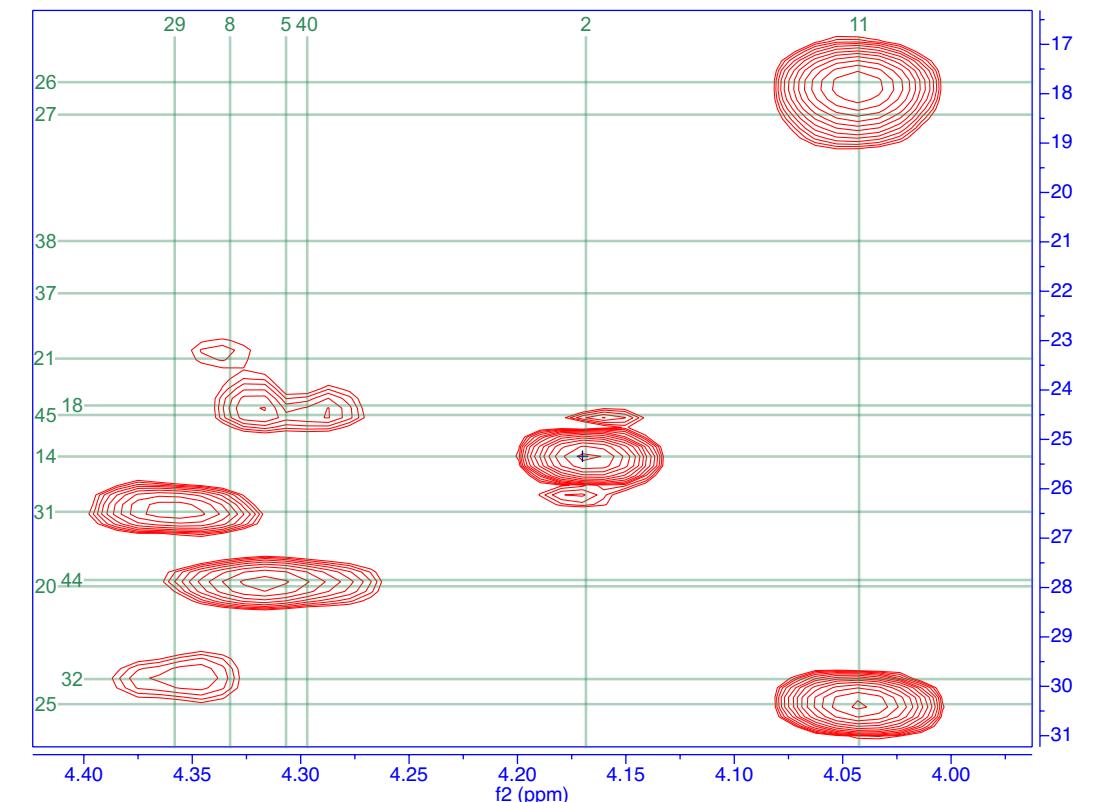
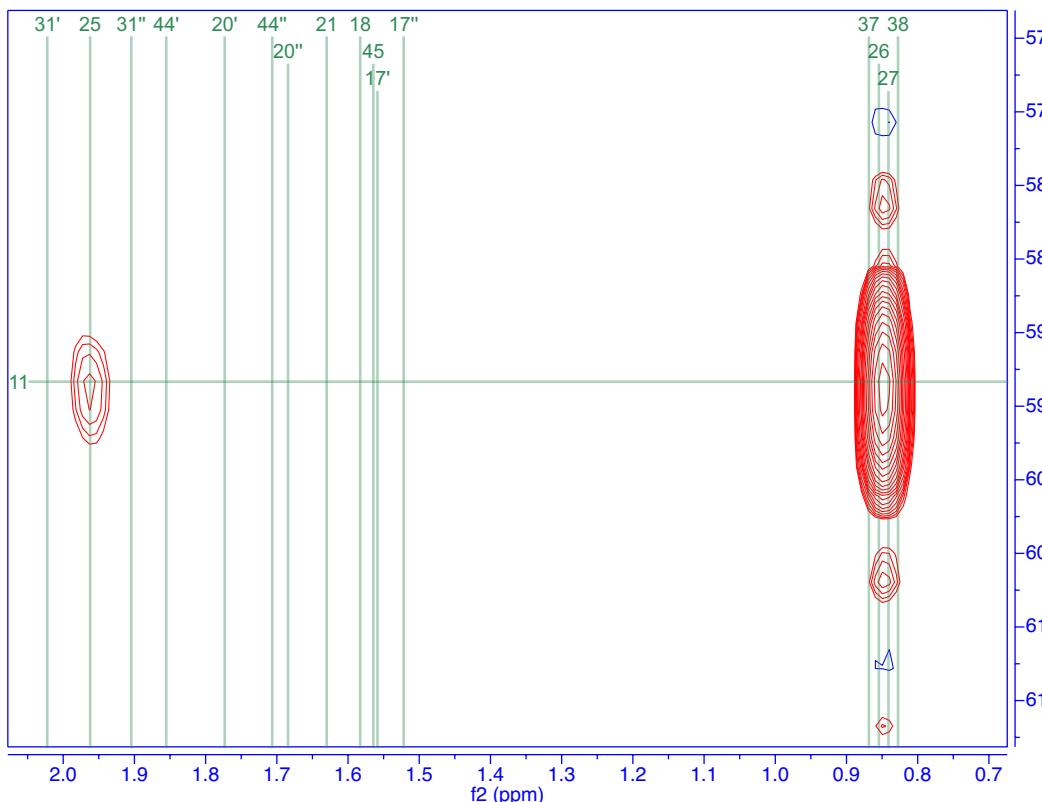
Amide region



HMBC

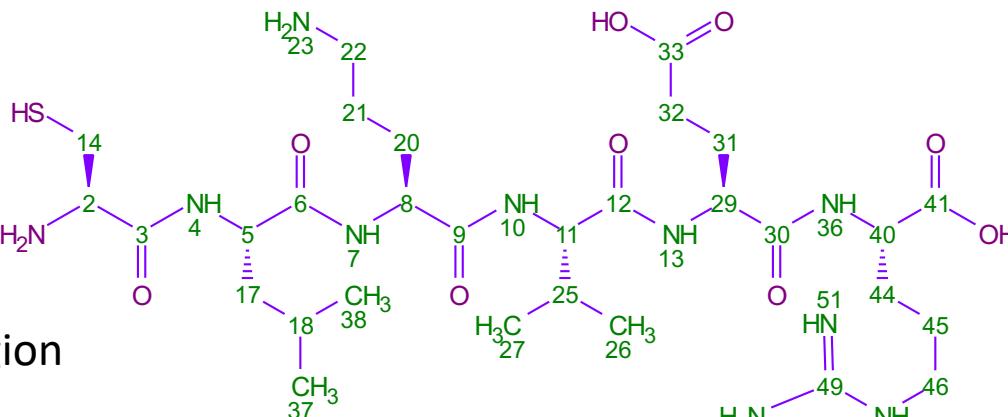


HMBC

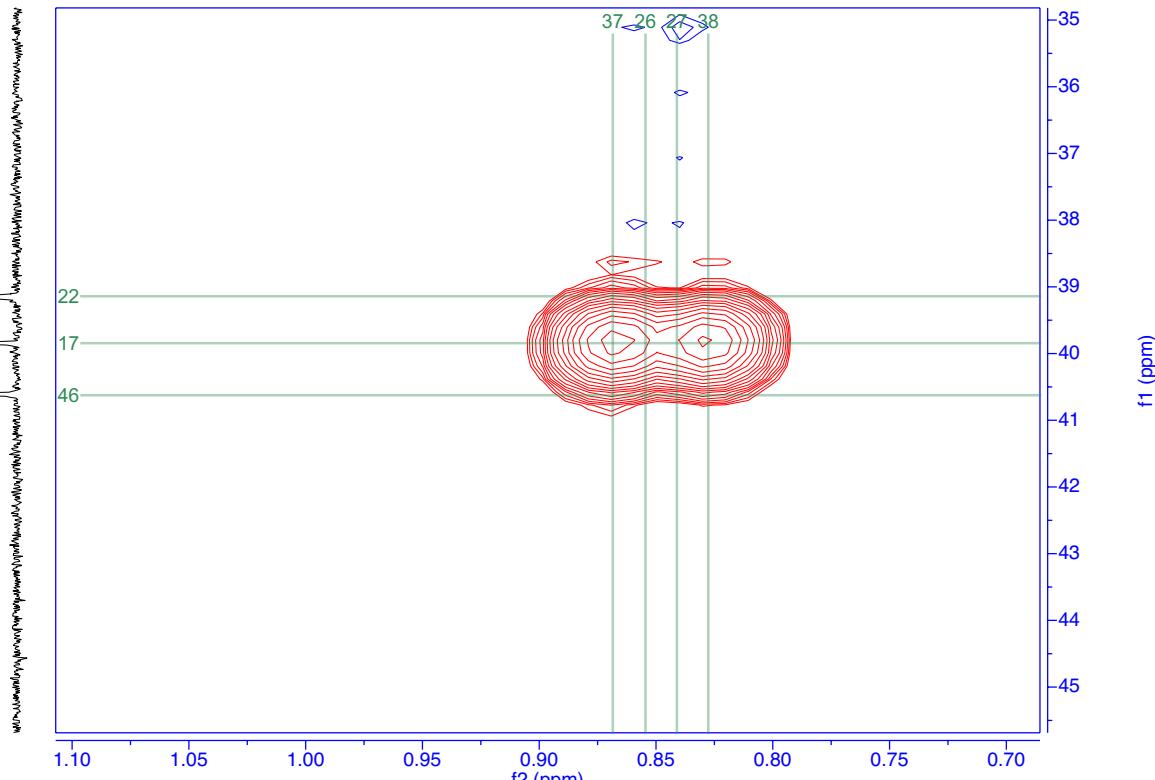
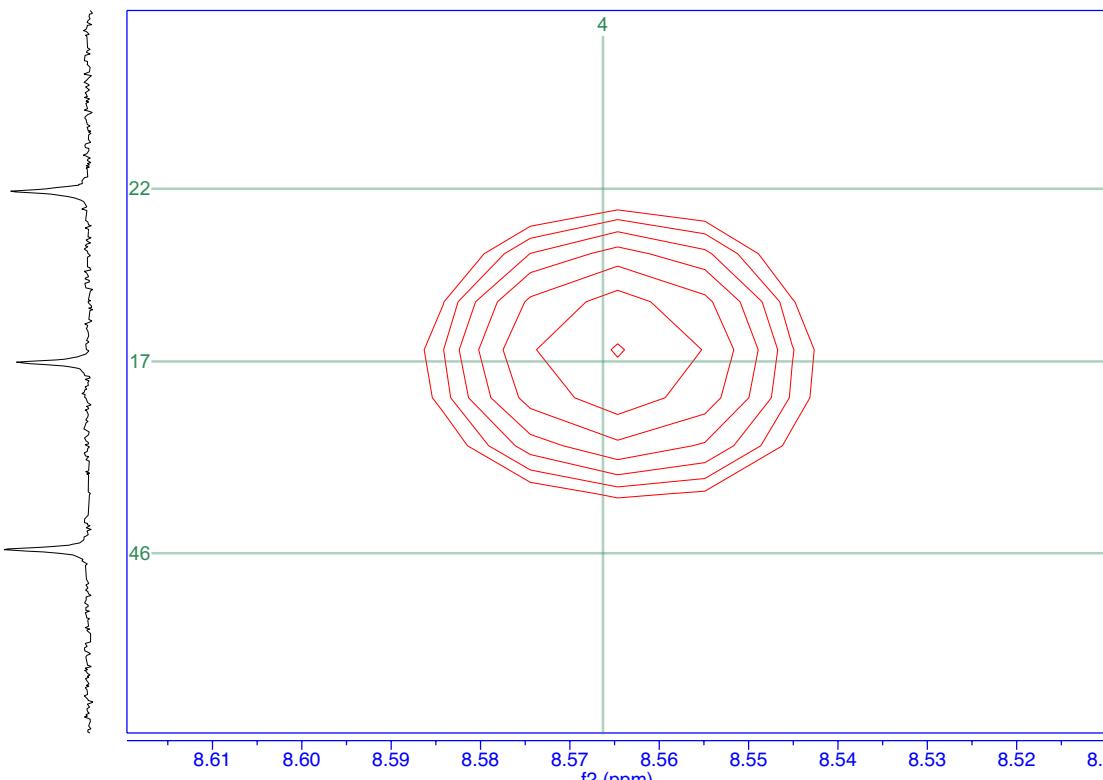
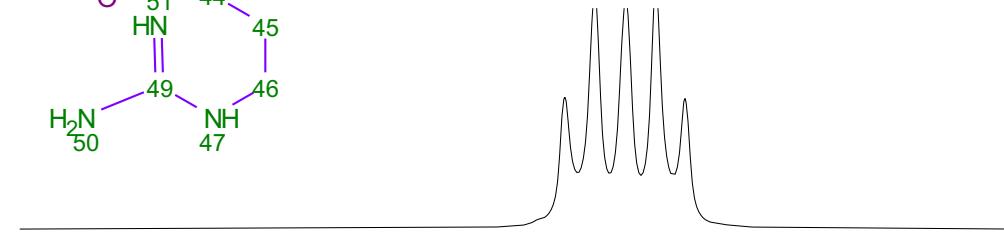
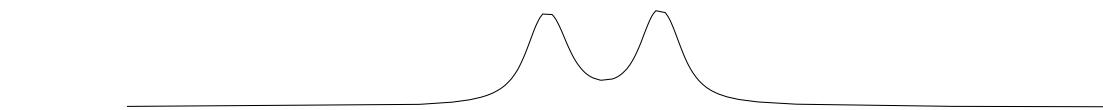


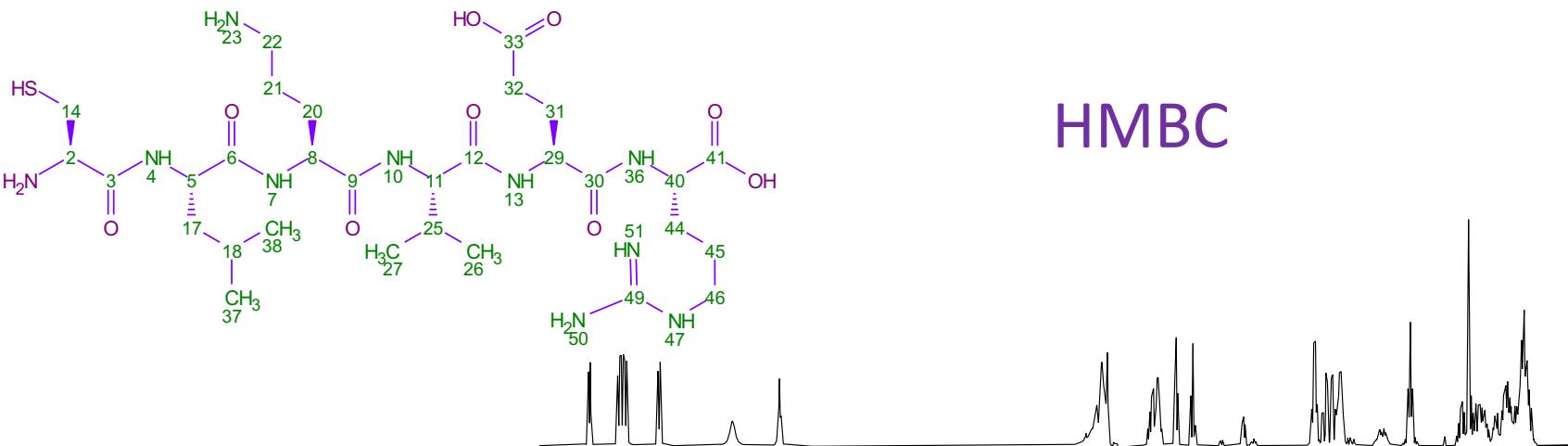
HMBC

Amide region



HMBC



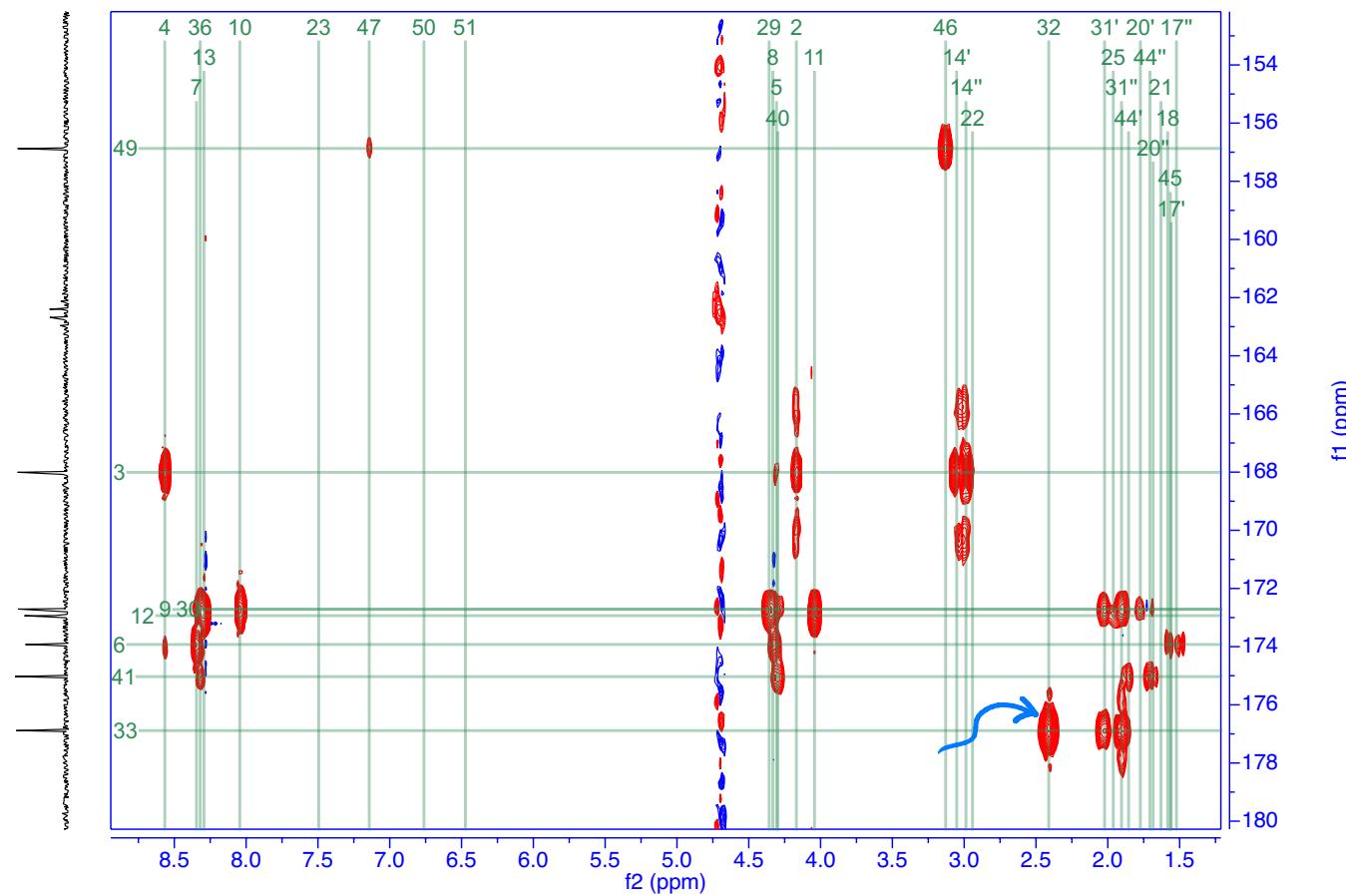


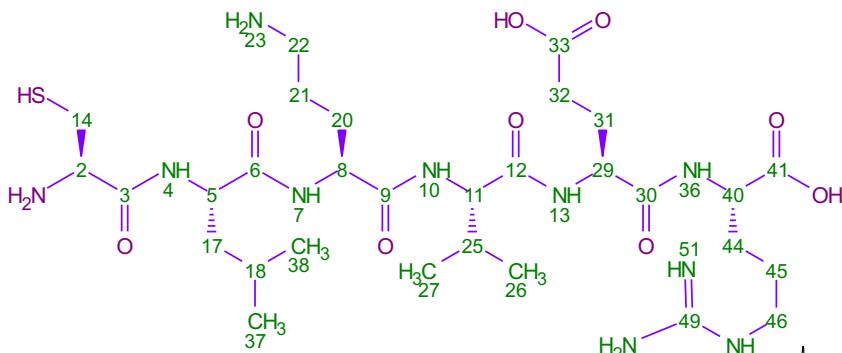
HMBC

Now that that's over...
Time to find Glutamic Acid (Glu) or E

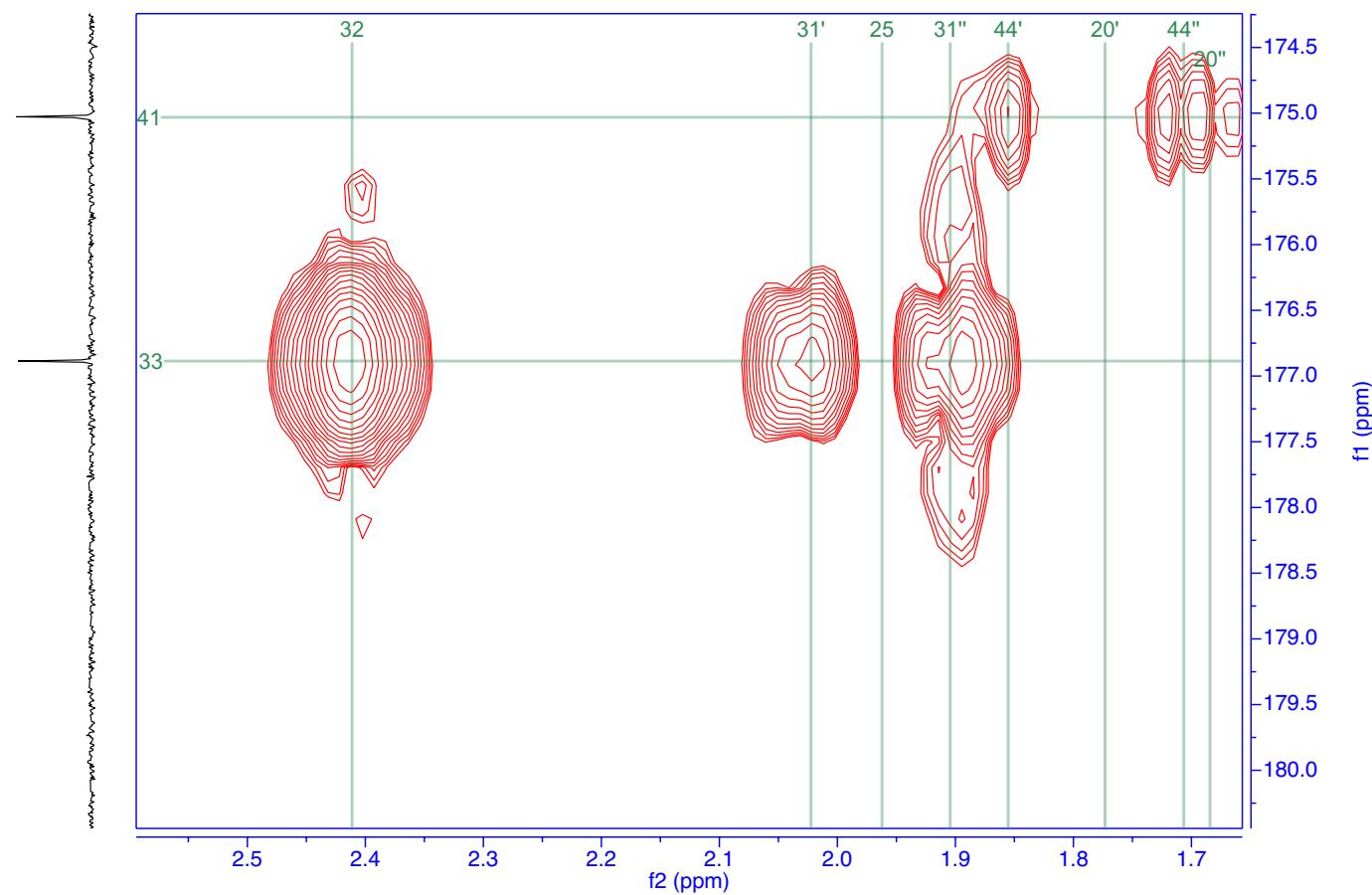
All of my carbonyl's
correspond to a nitrogen
except one?

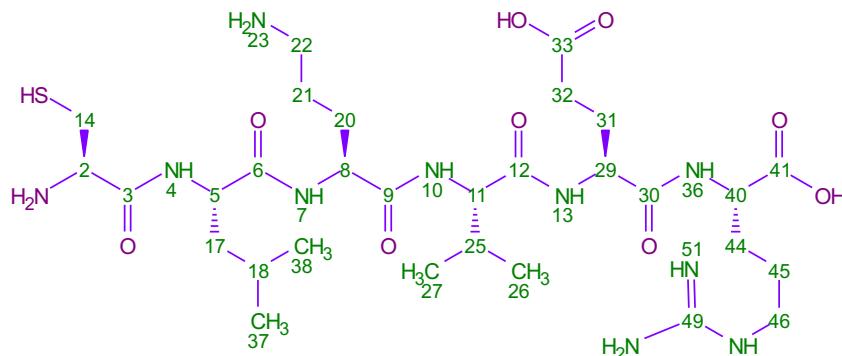
Zooming in on next slide.



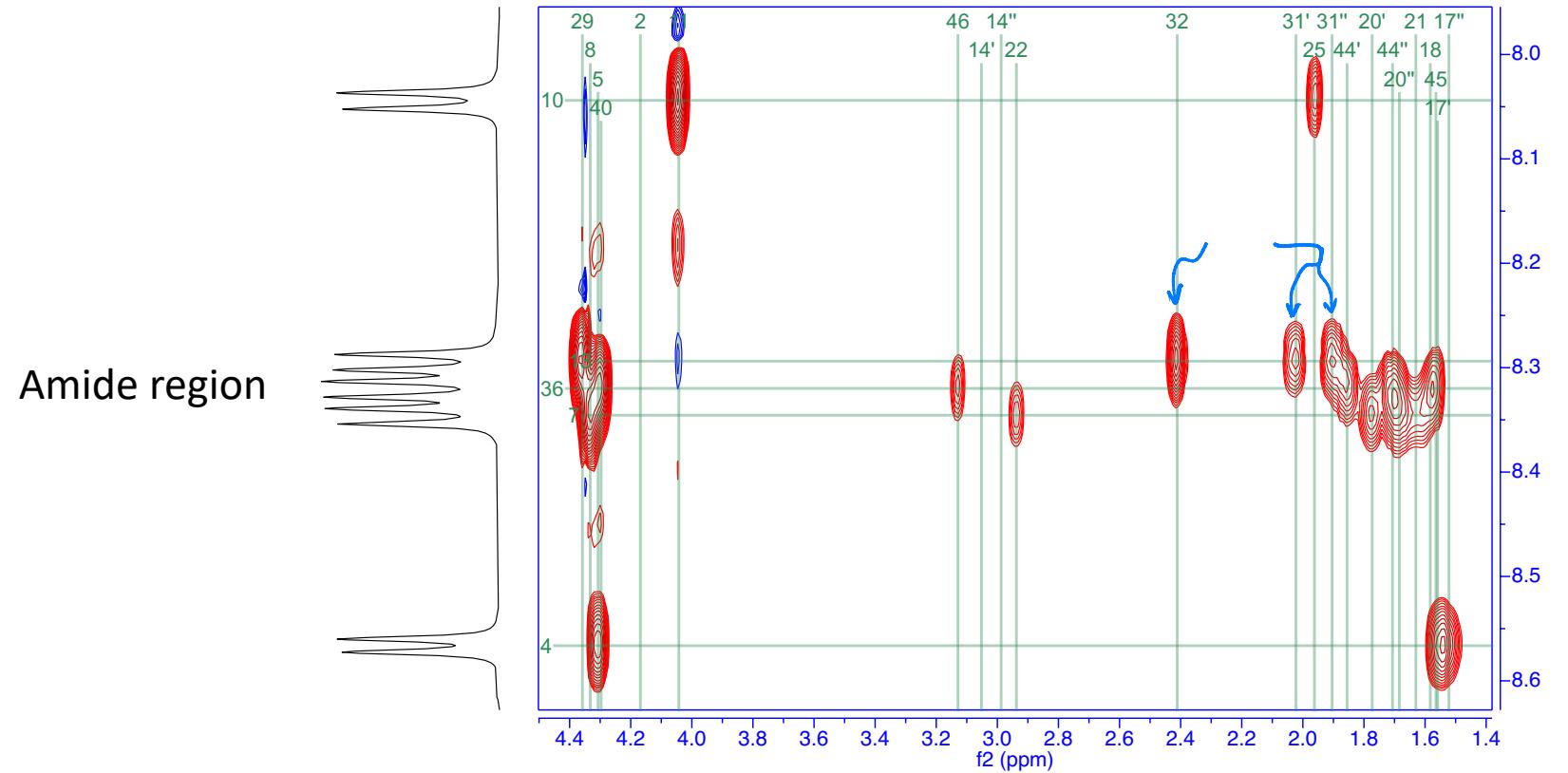
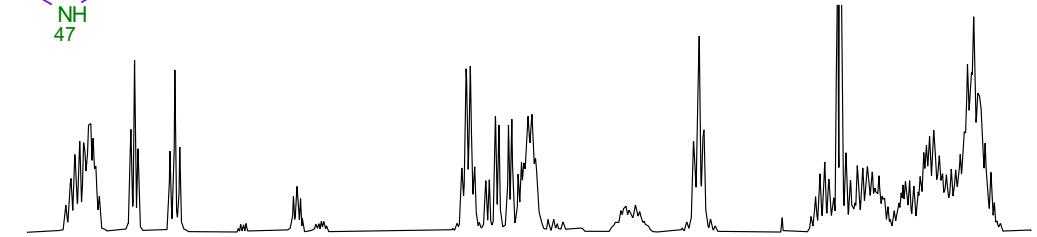


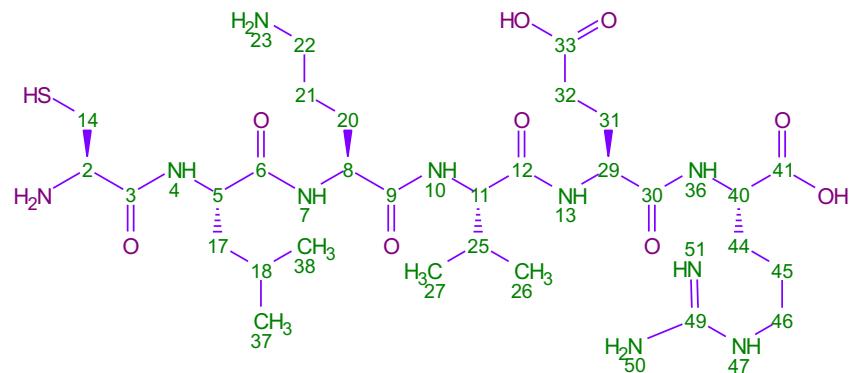
HMBC





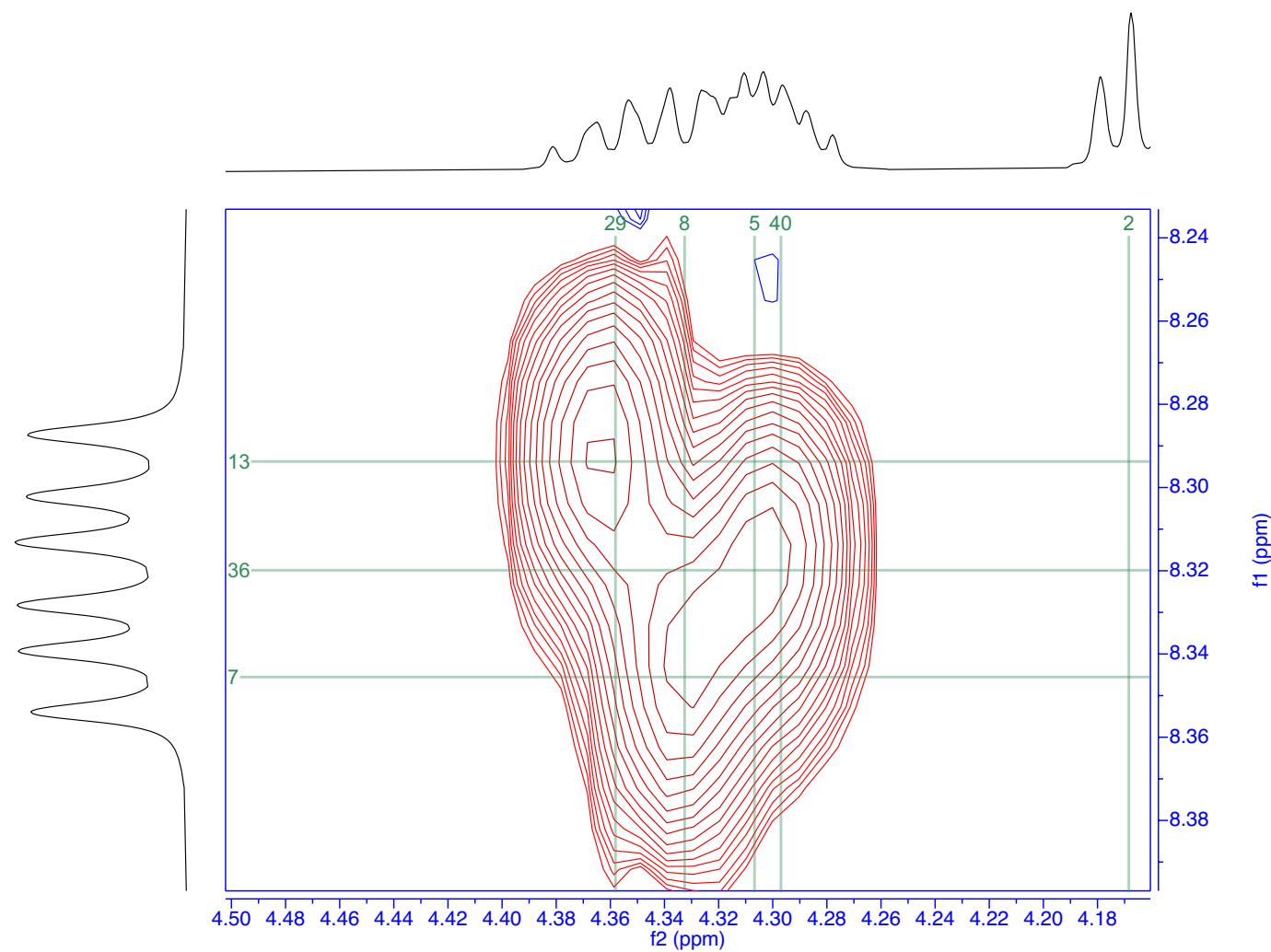
ToCSY



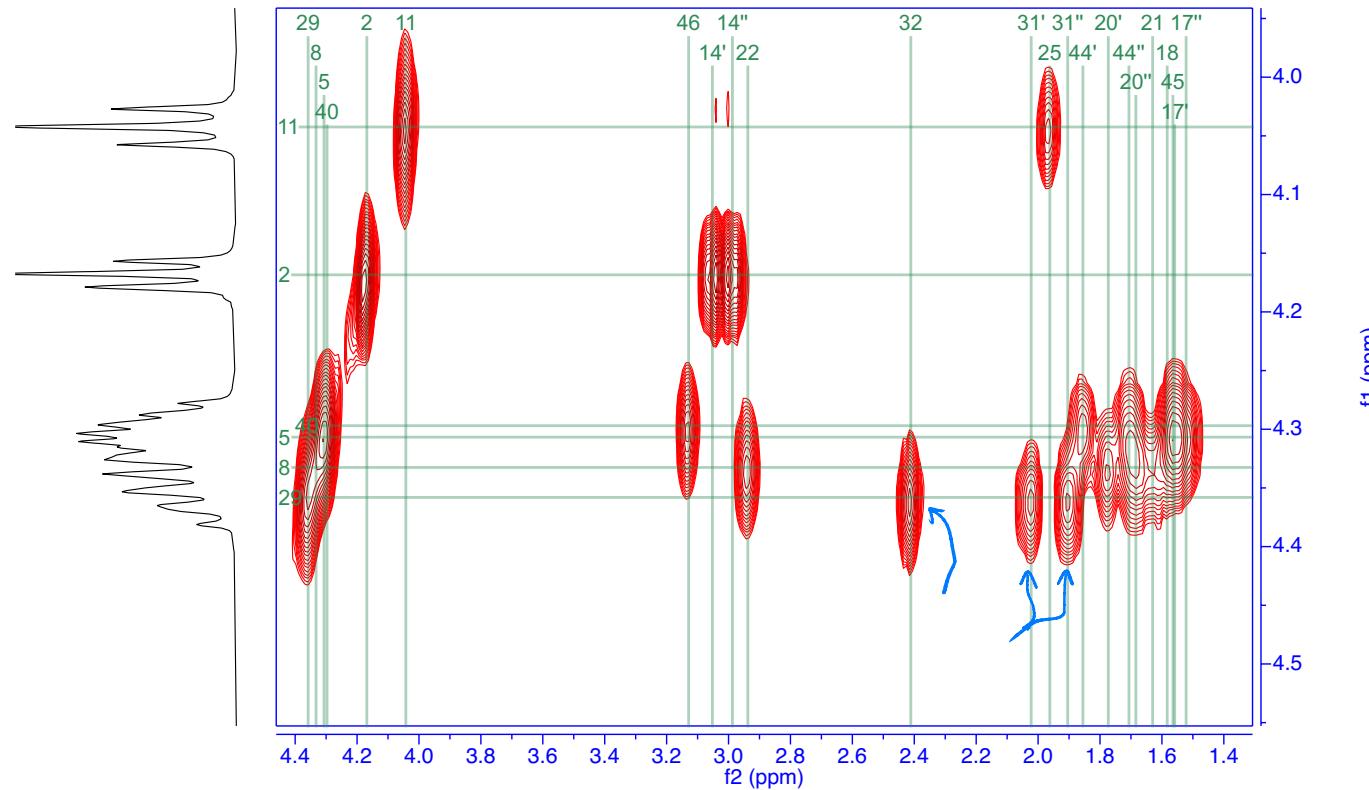
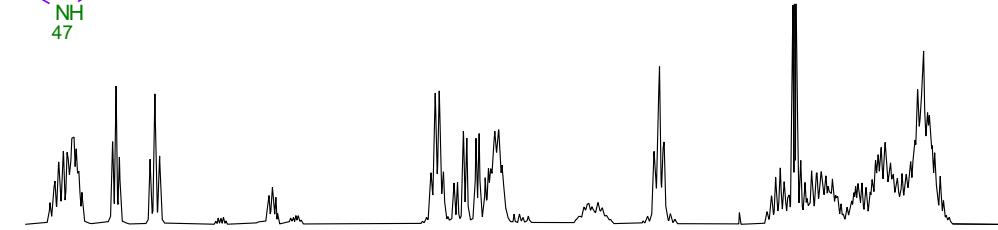
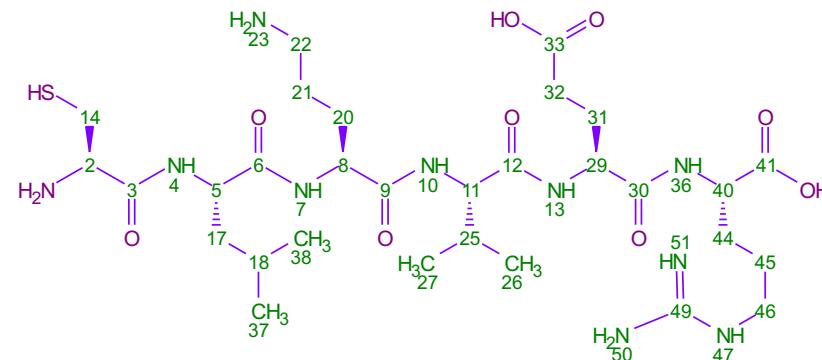


ToCSy

Amide region

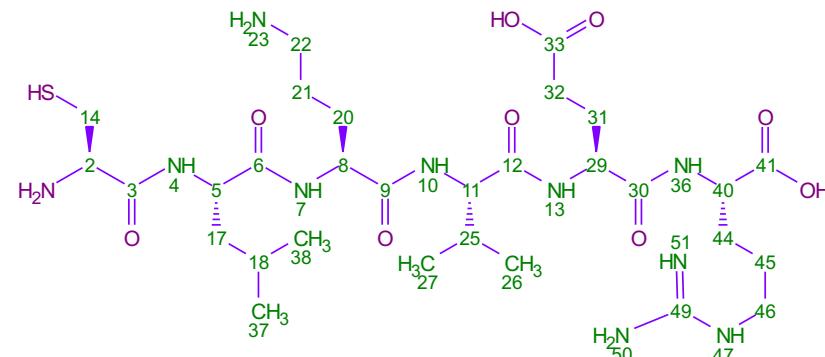


ToCSy

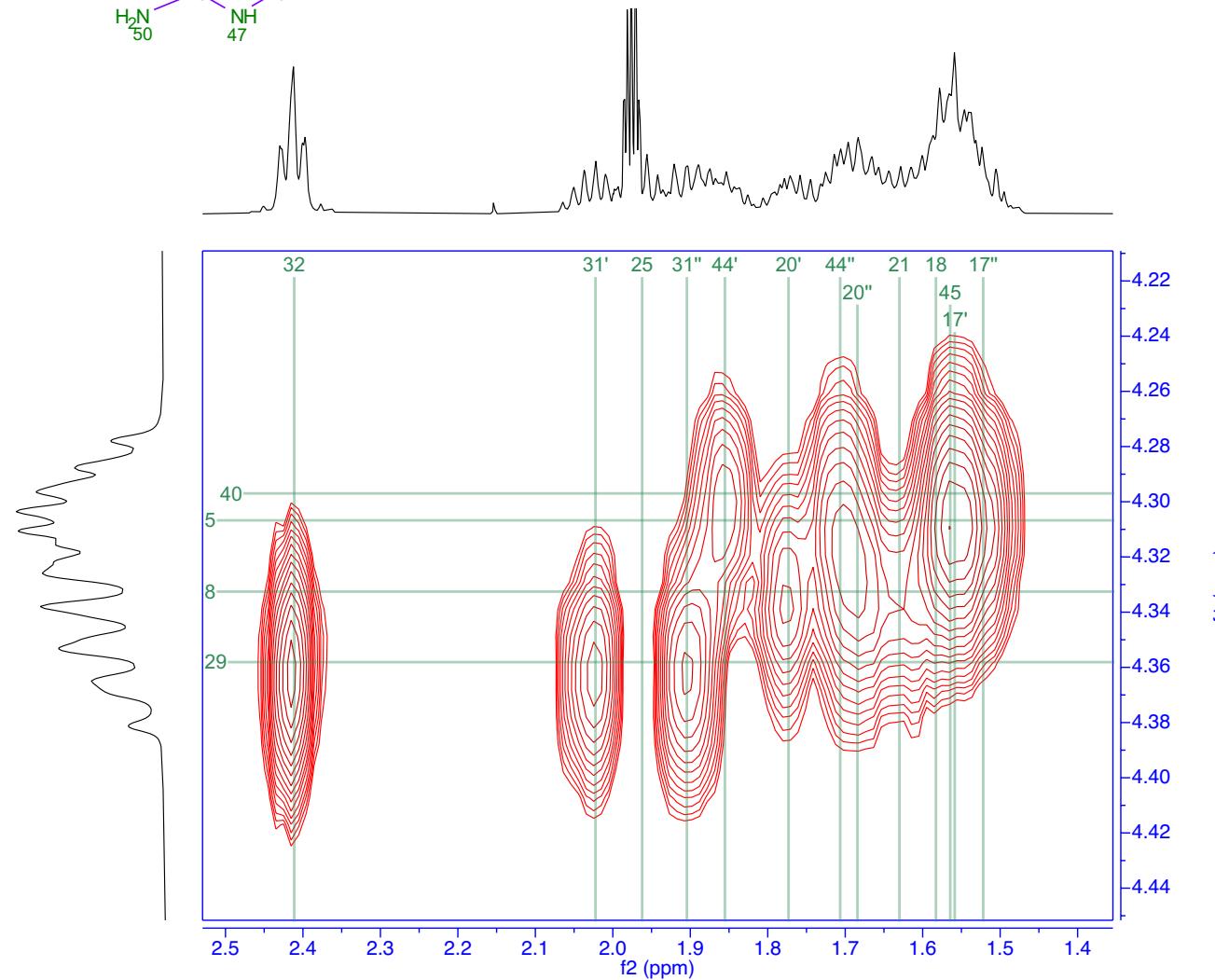


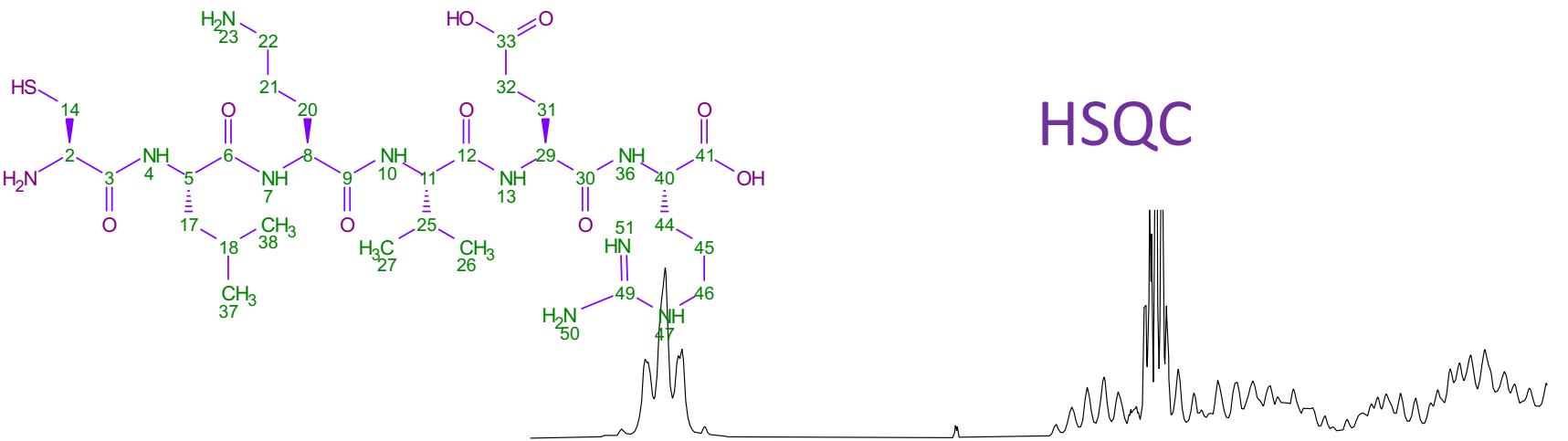
Zooming in





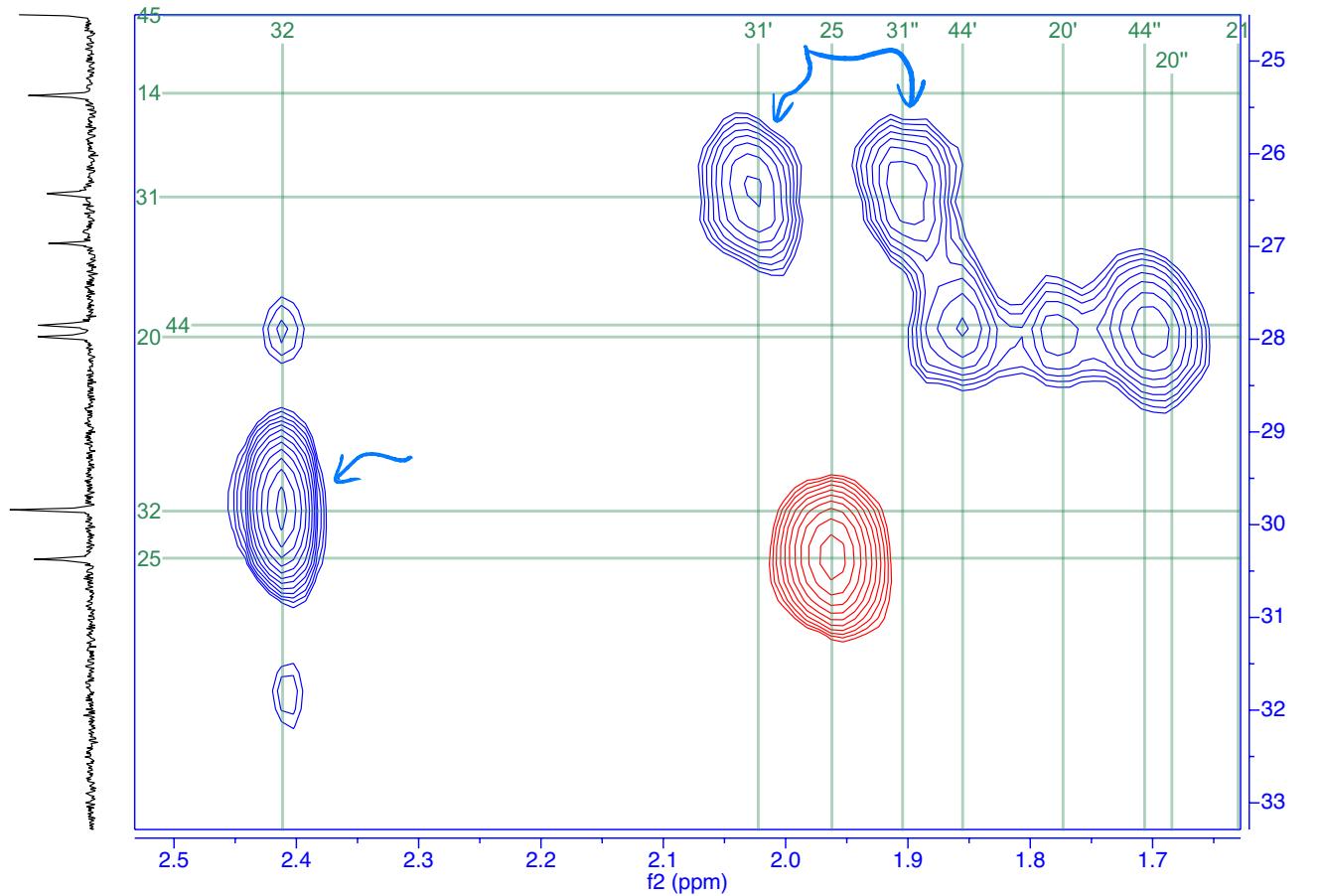
ToCSY



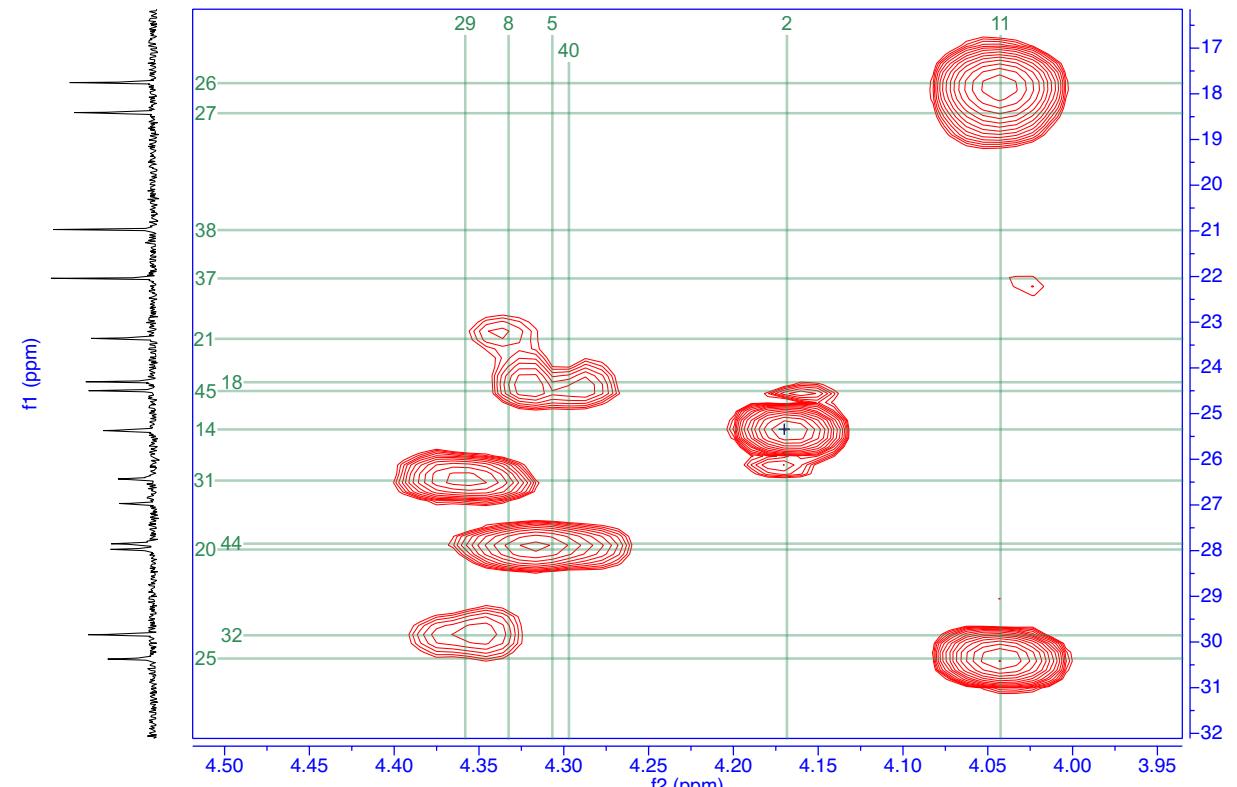
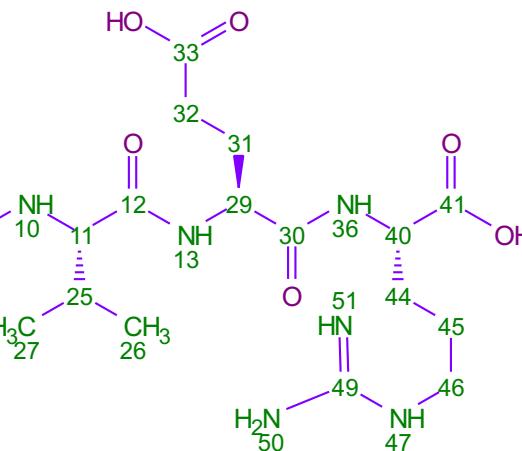
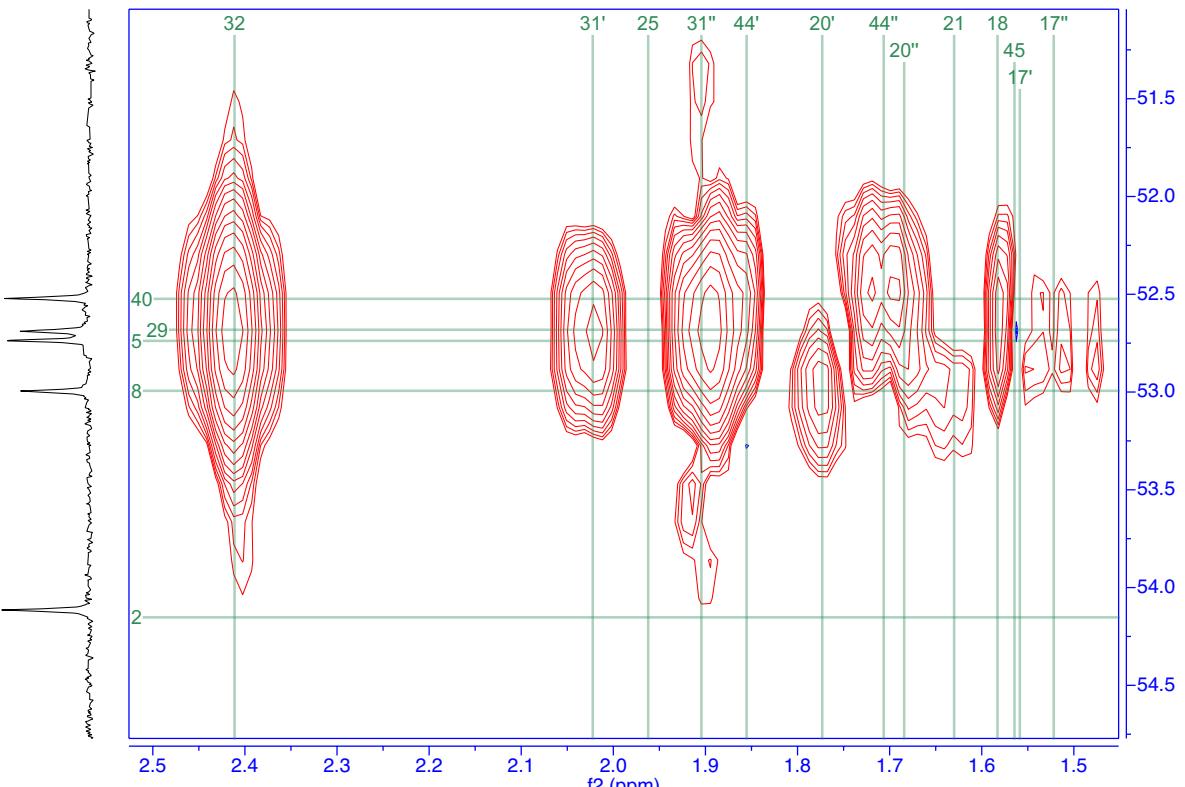
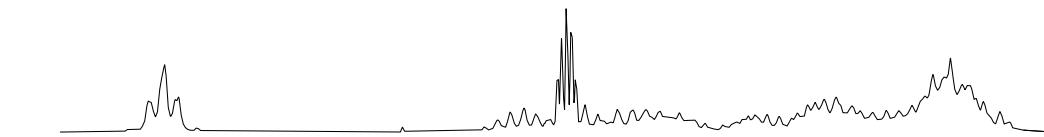
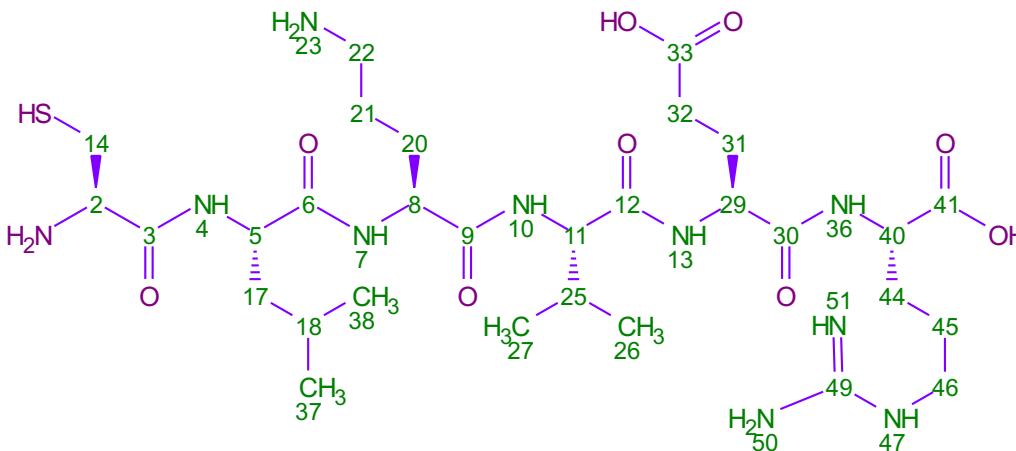


32-32

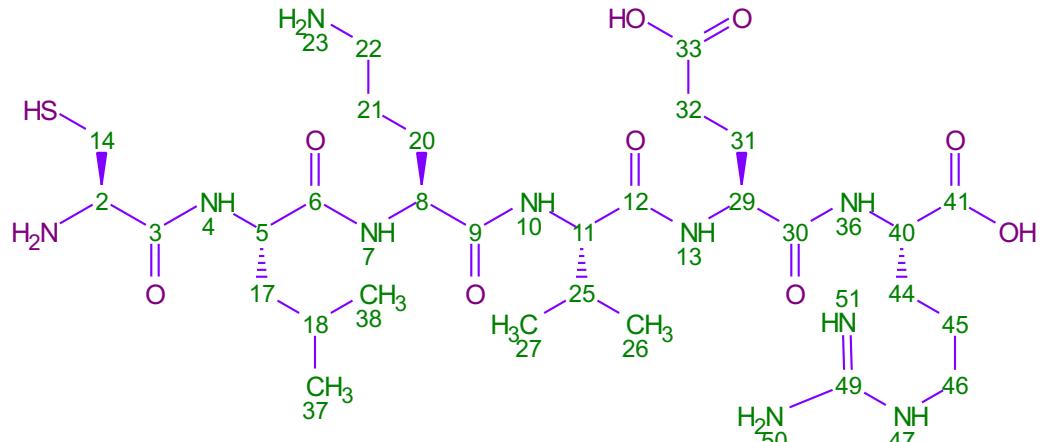
31-31



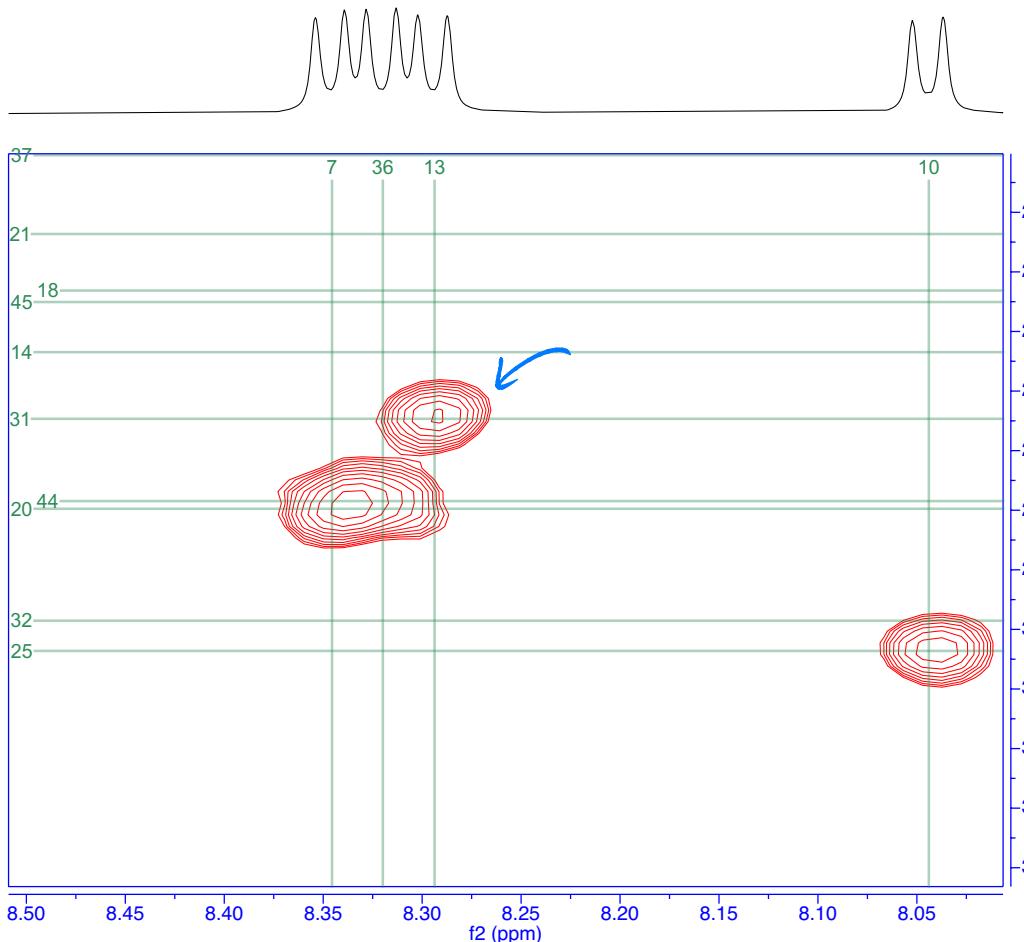
HMBC



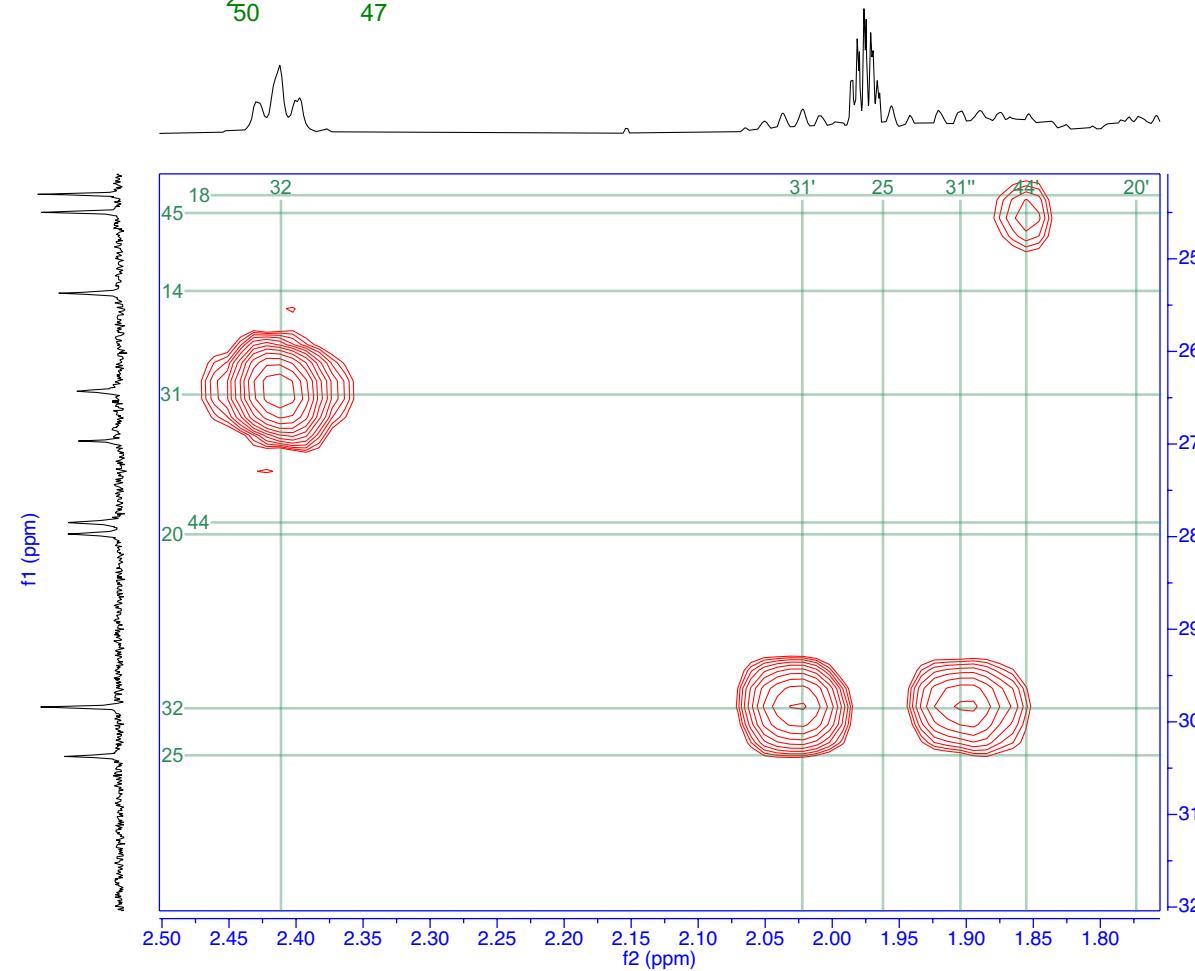
HMBC

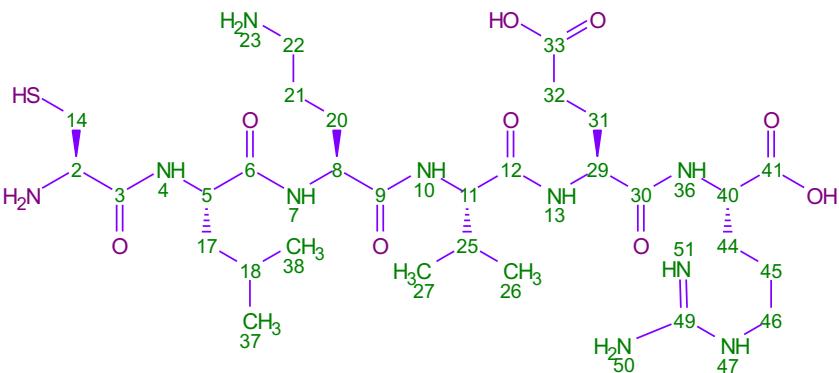


Amide region



HMBC





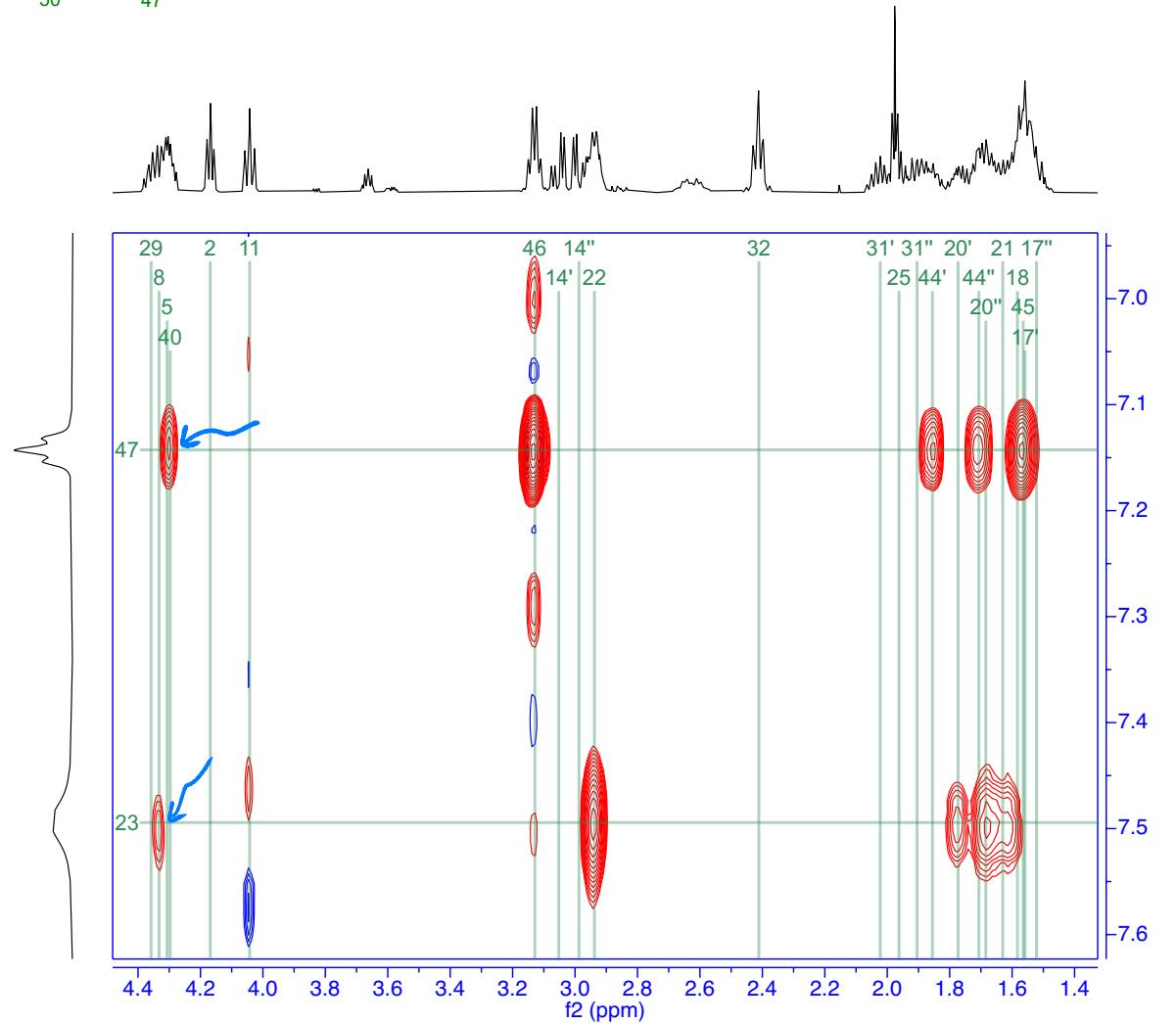
Tocsy

On to the meat and potatoes!
Determining Arginine (Arg) and Ornithine (Orn)

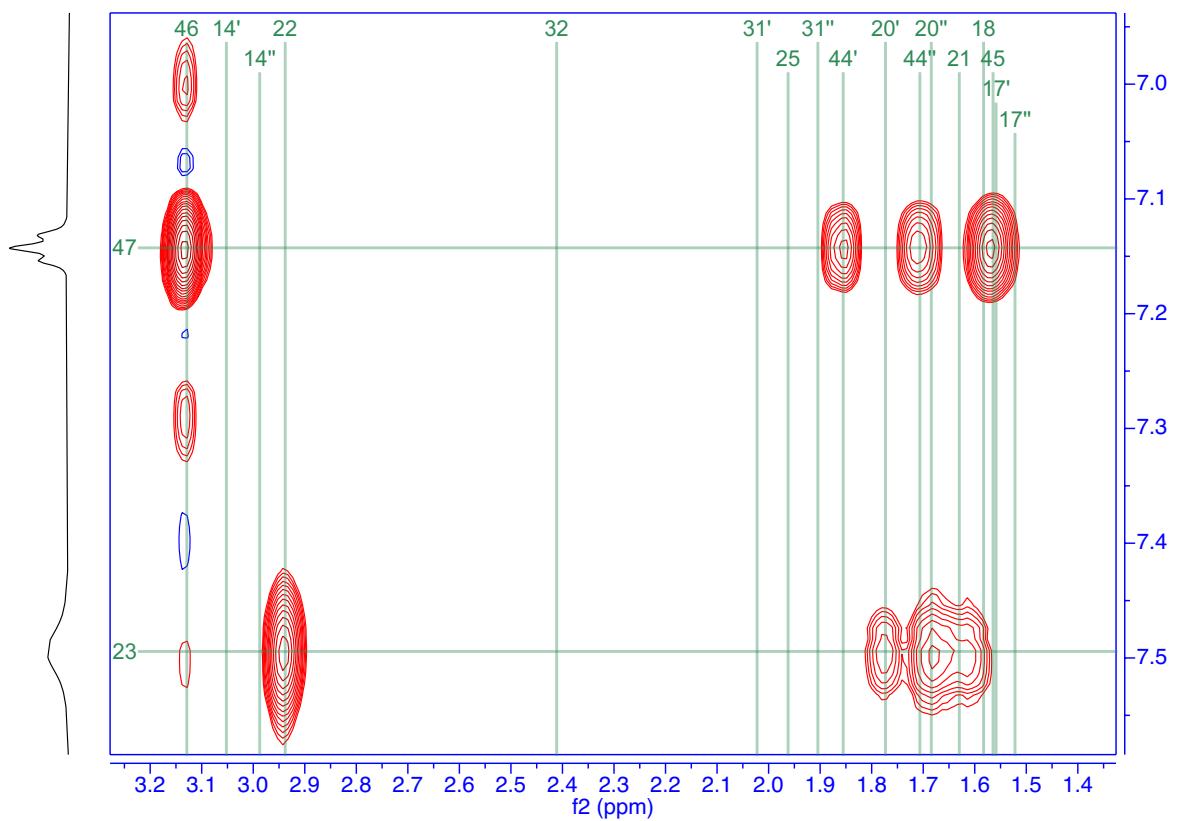
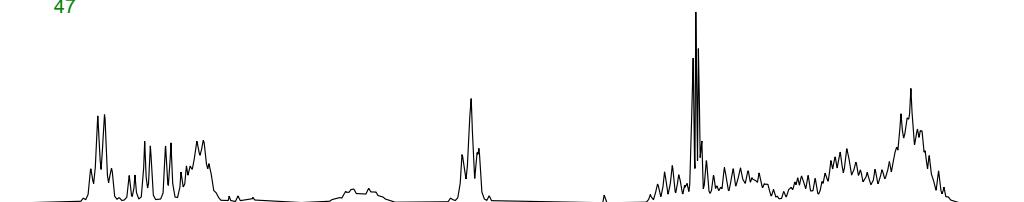
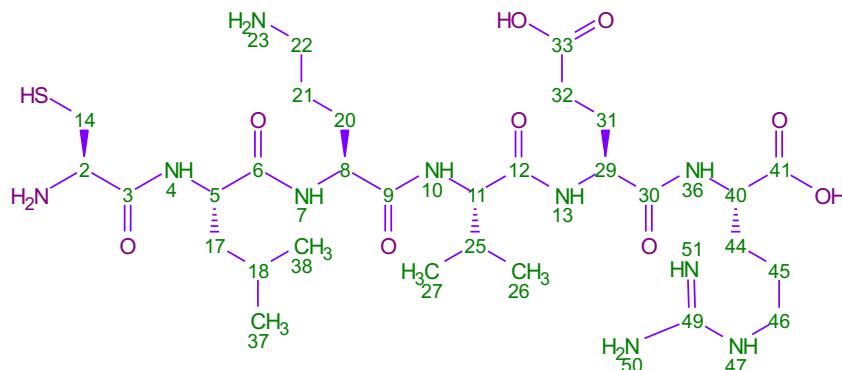
Little recap: What have we done so far?
Cysteine, Leucine, Valine, and Glutamic acid.

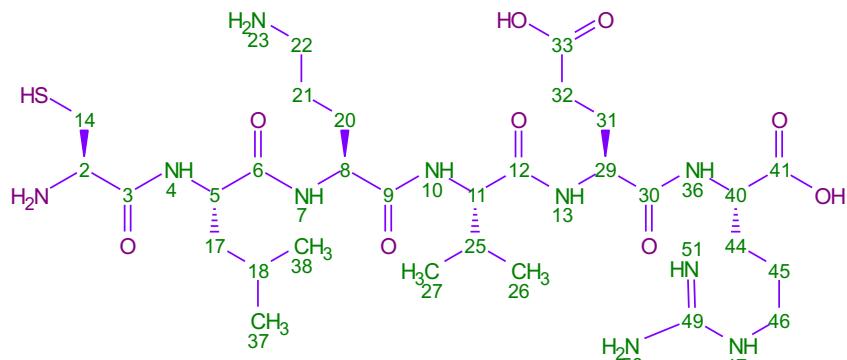
We know that a primary amine on Ornithine will give us a singlet and the amide on Arginine will give us a triplet.

Zooming in on next slide.

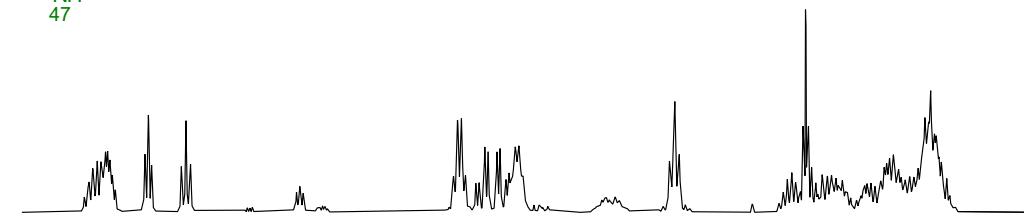


ToCSy





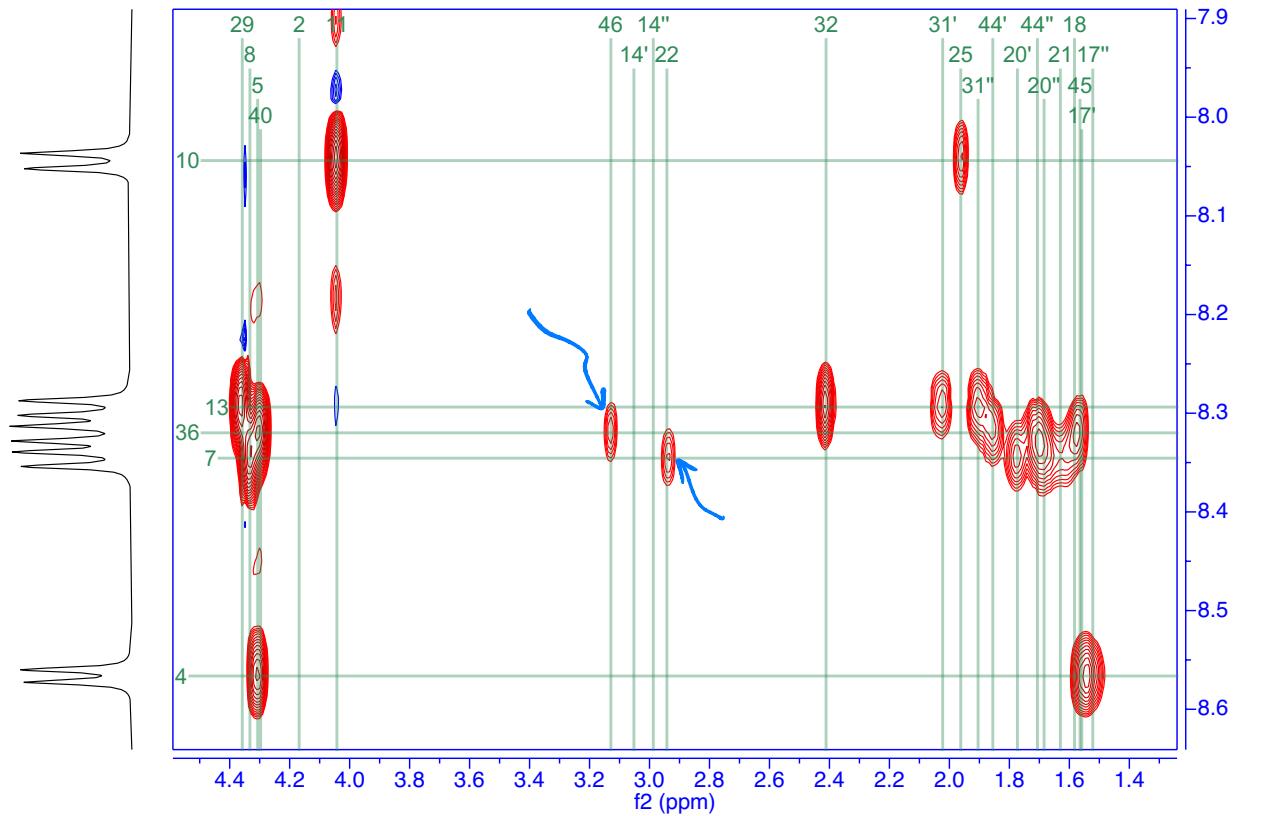
Tocsy



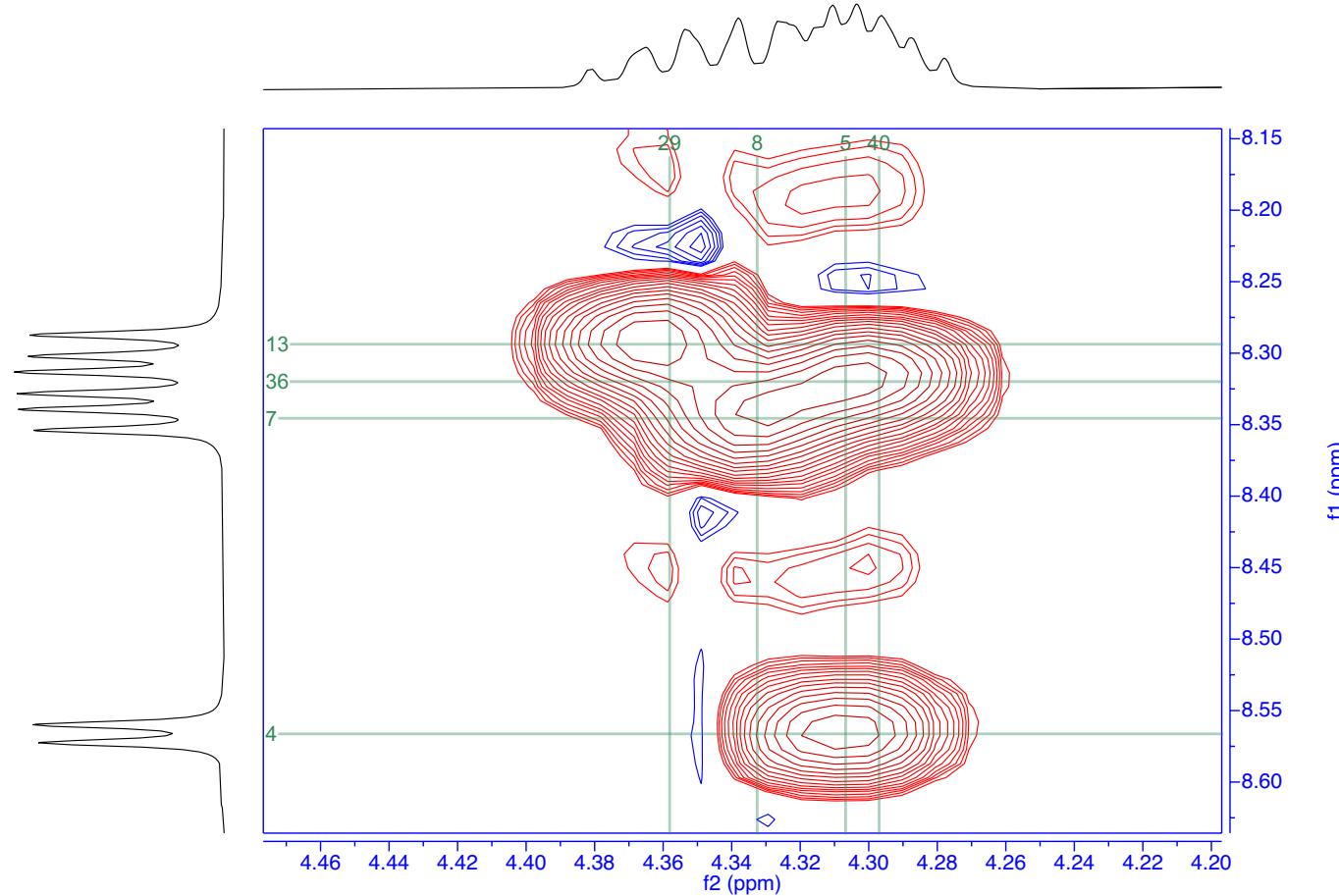
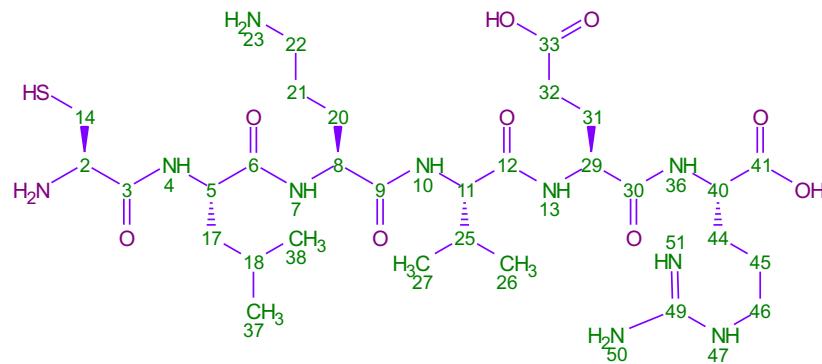
I know that 36 can see 46.

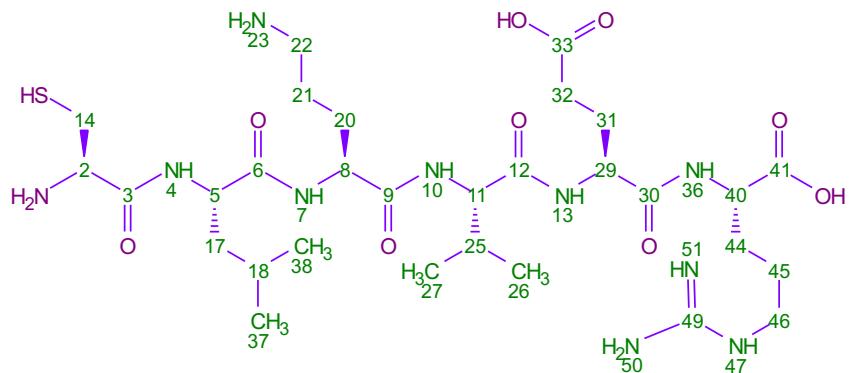
I know that 7 can see 22.

Zooming in

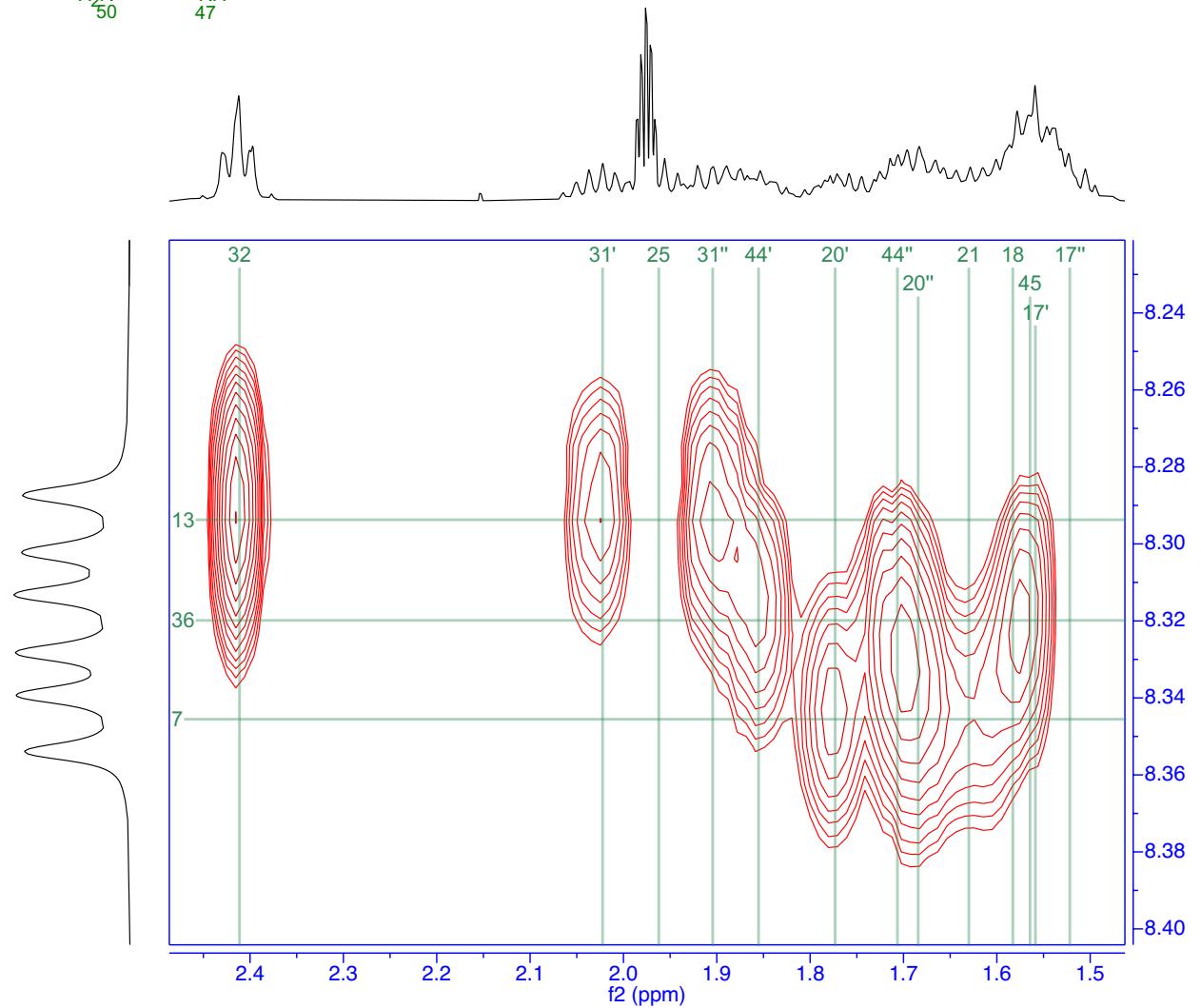


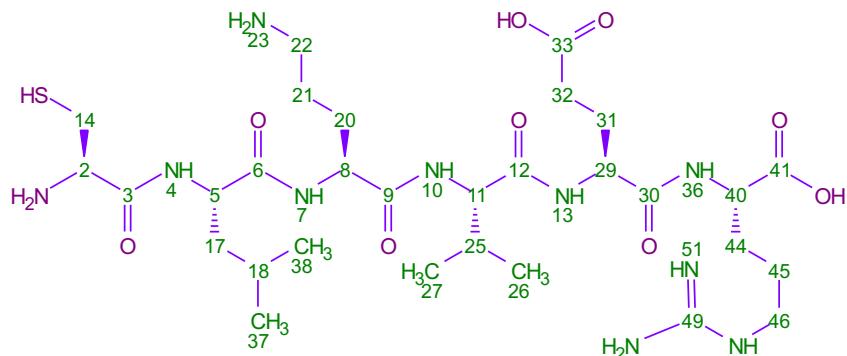
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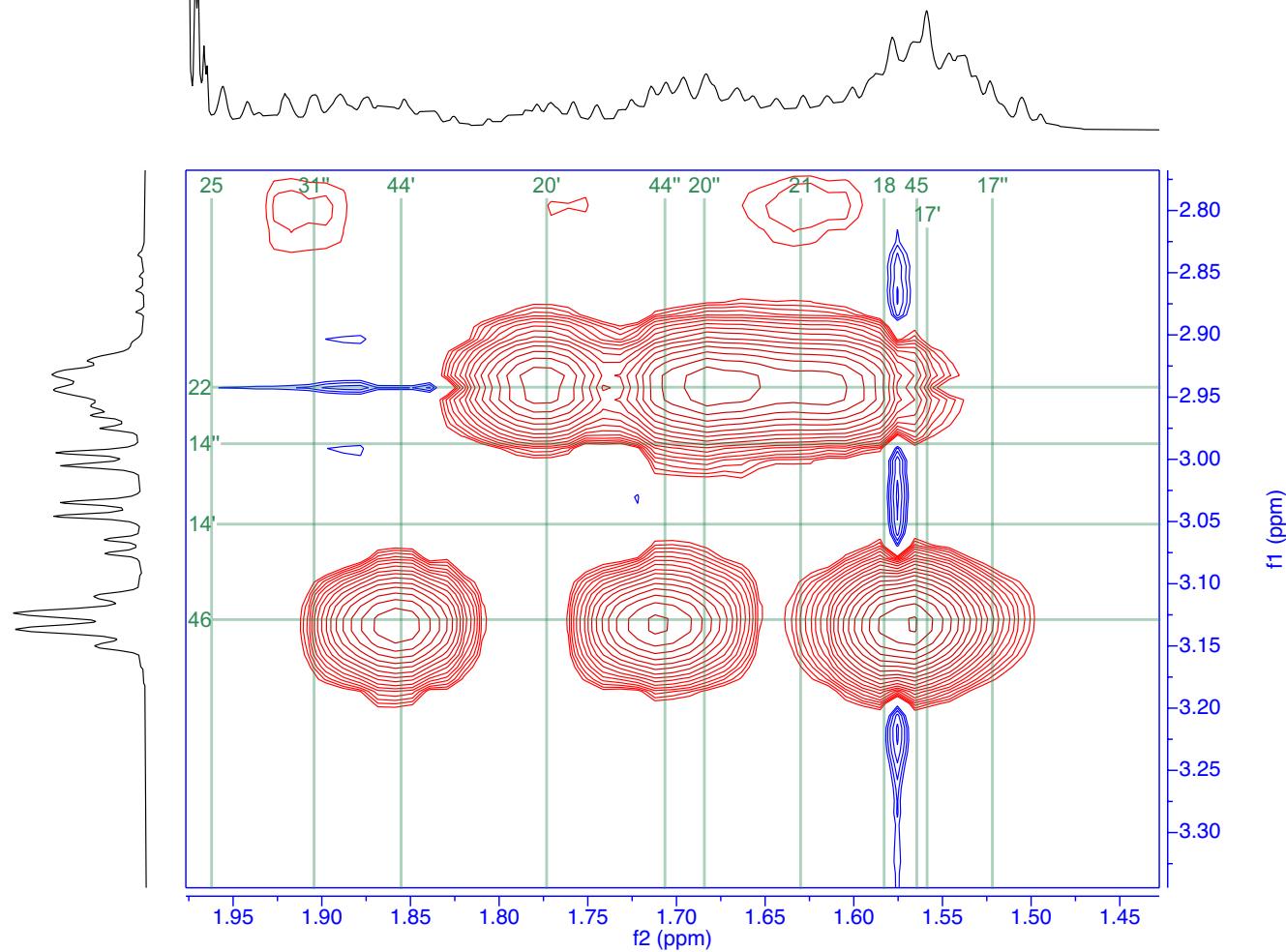
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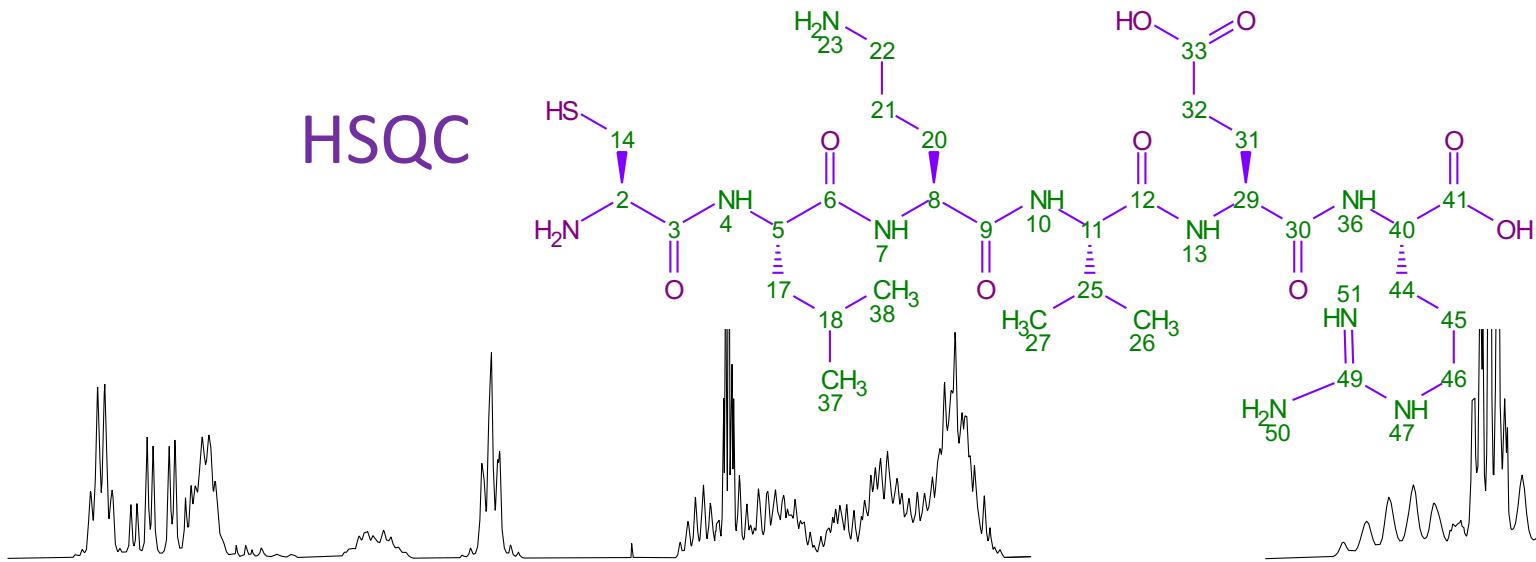


ToCSy

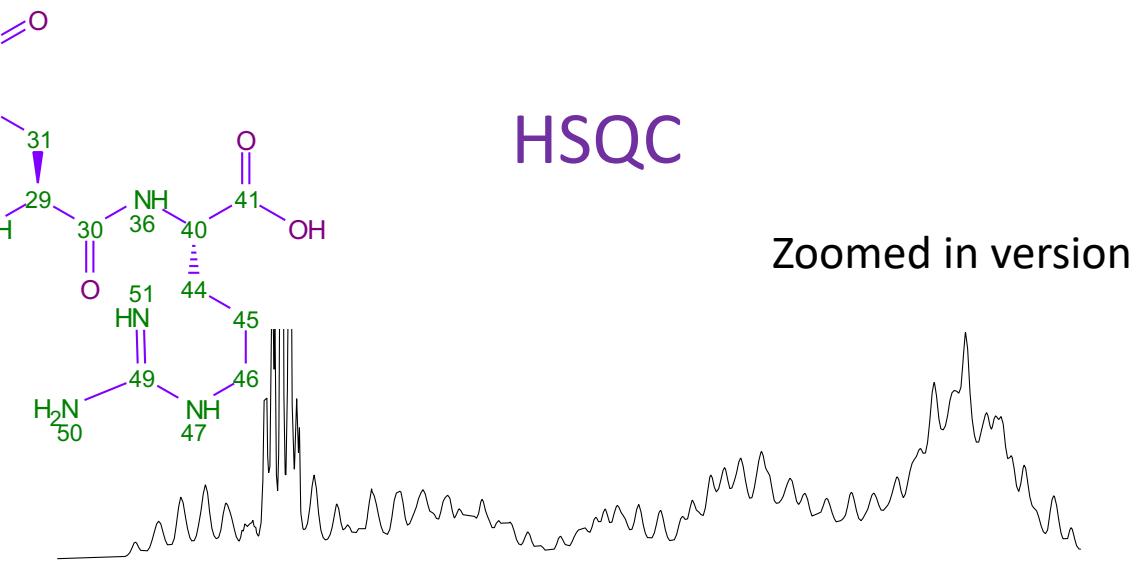
This is the good stuff!



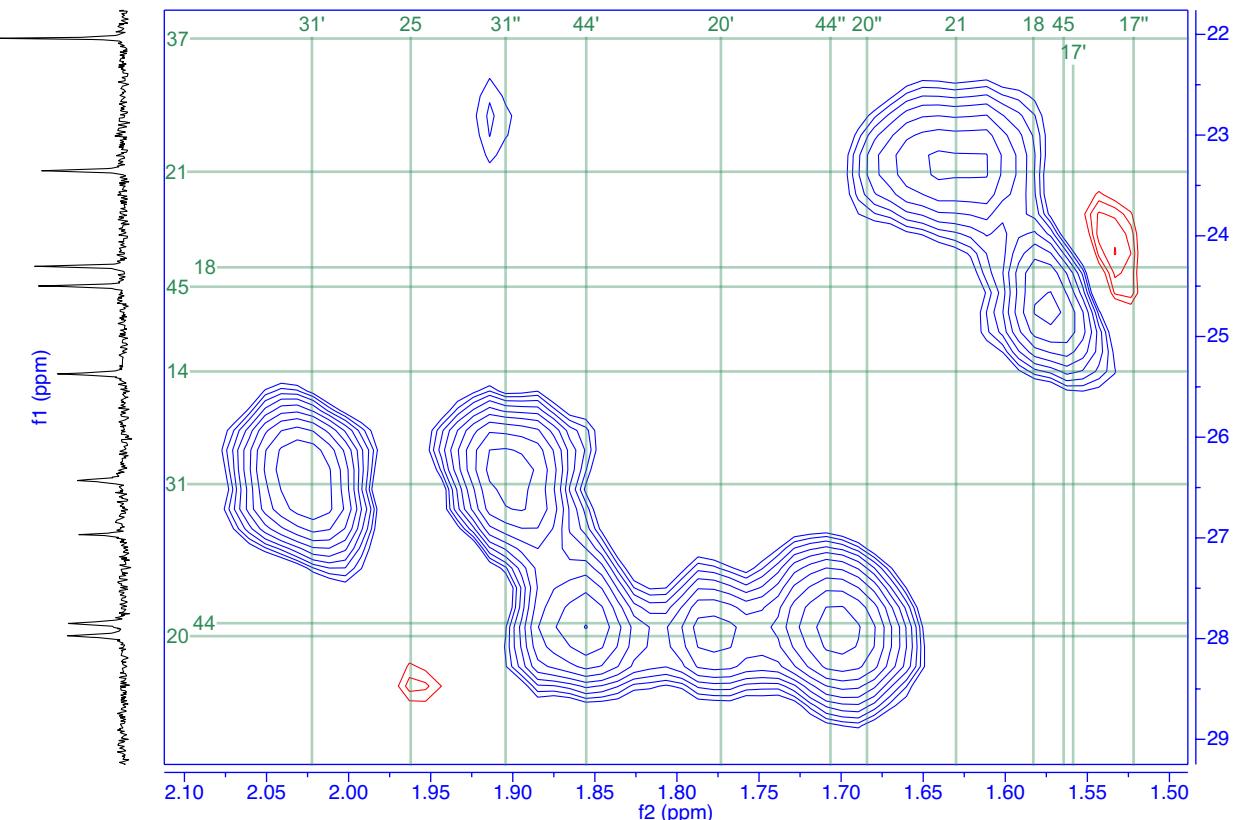
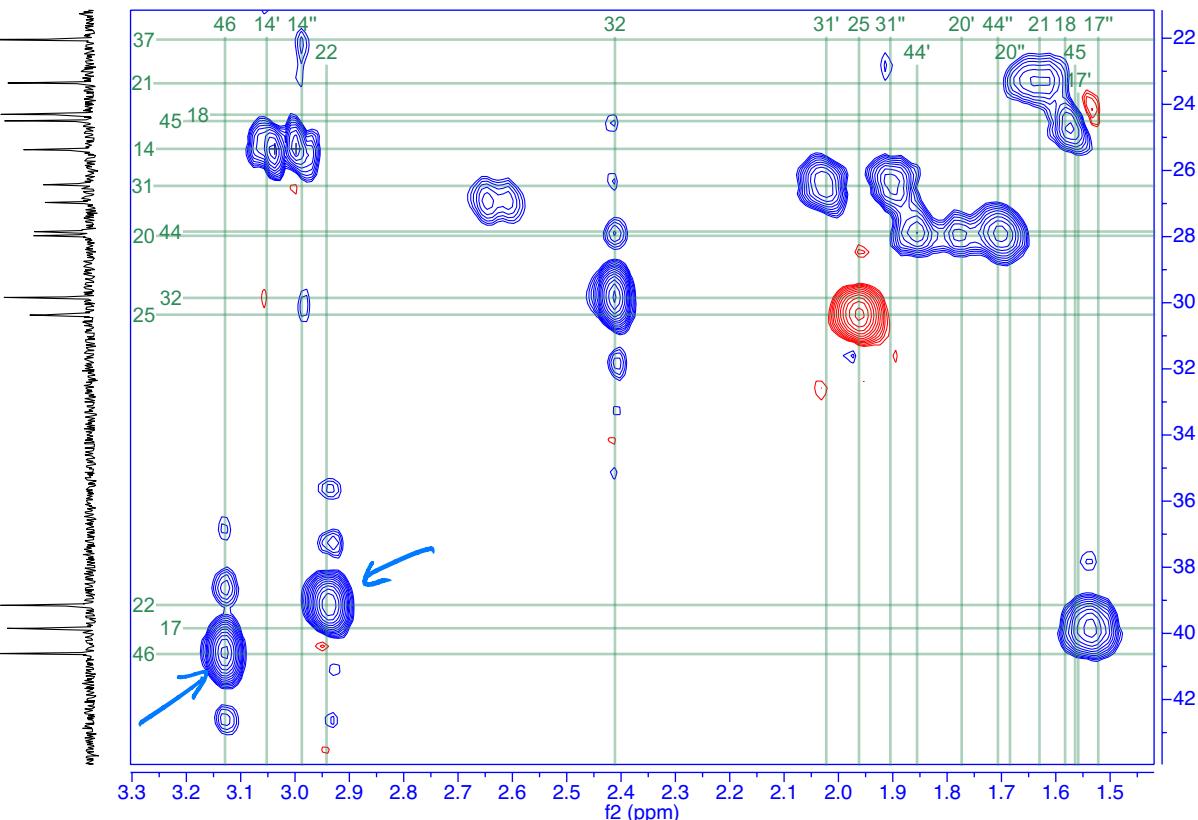
HSQC



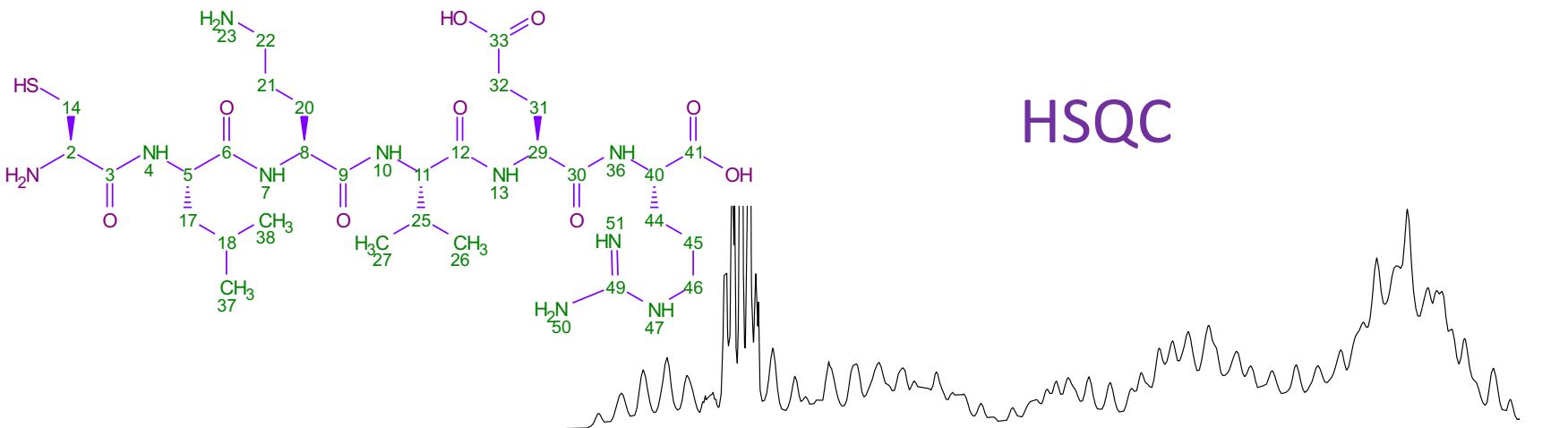
HSQC



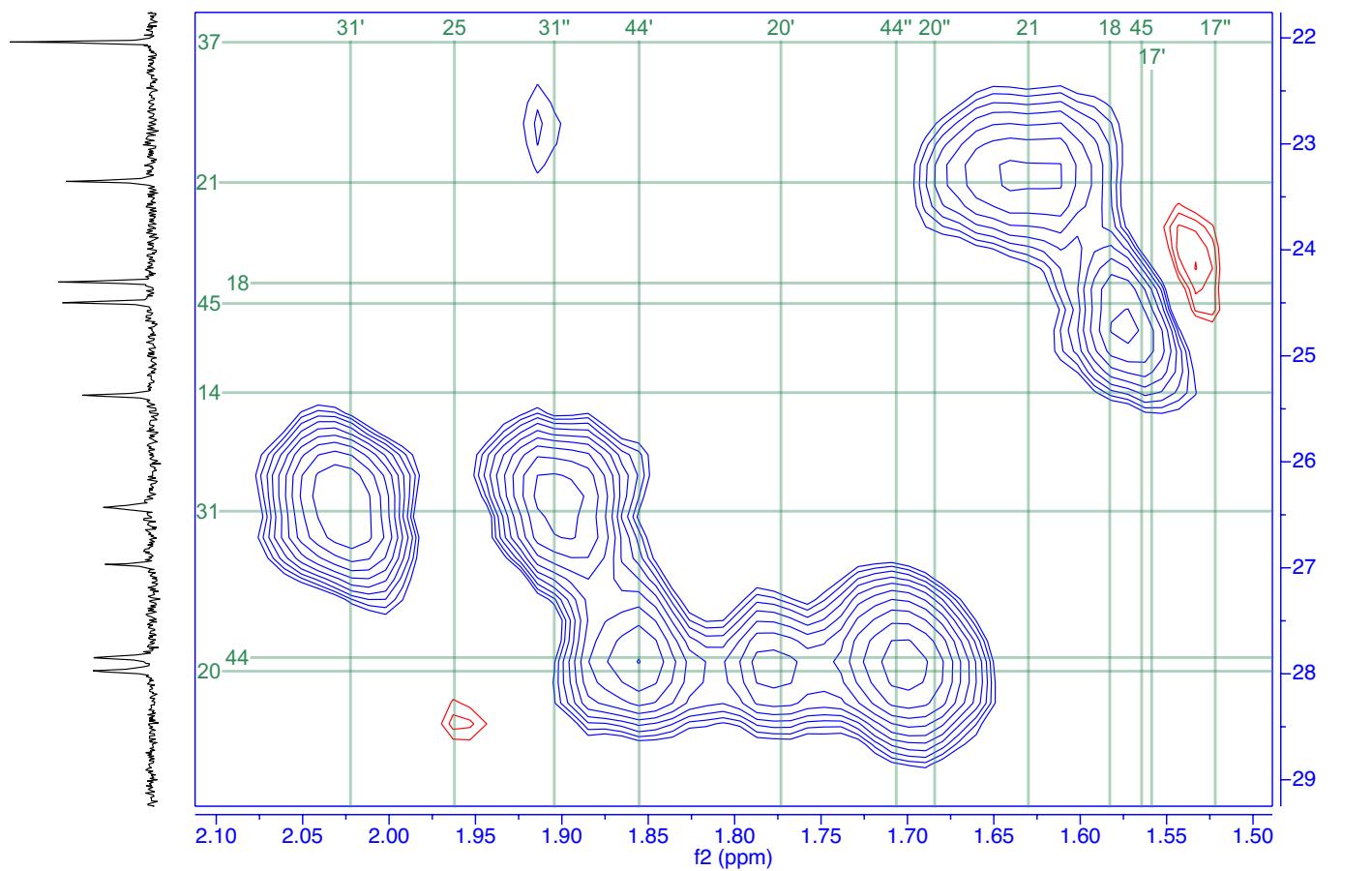
Zoomed in version

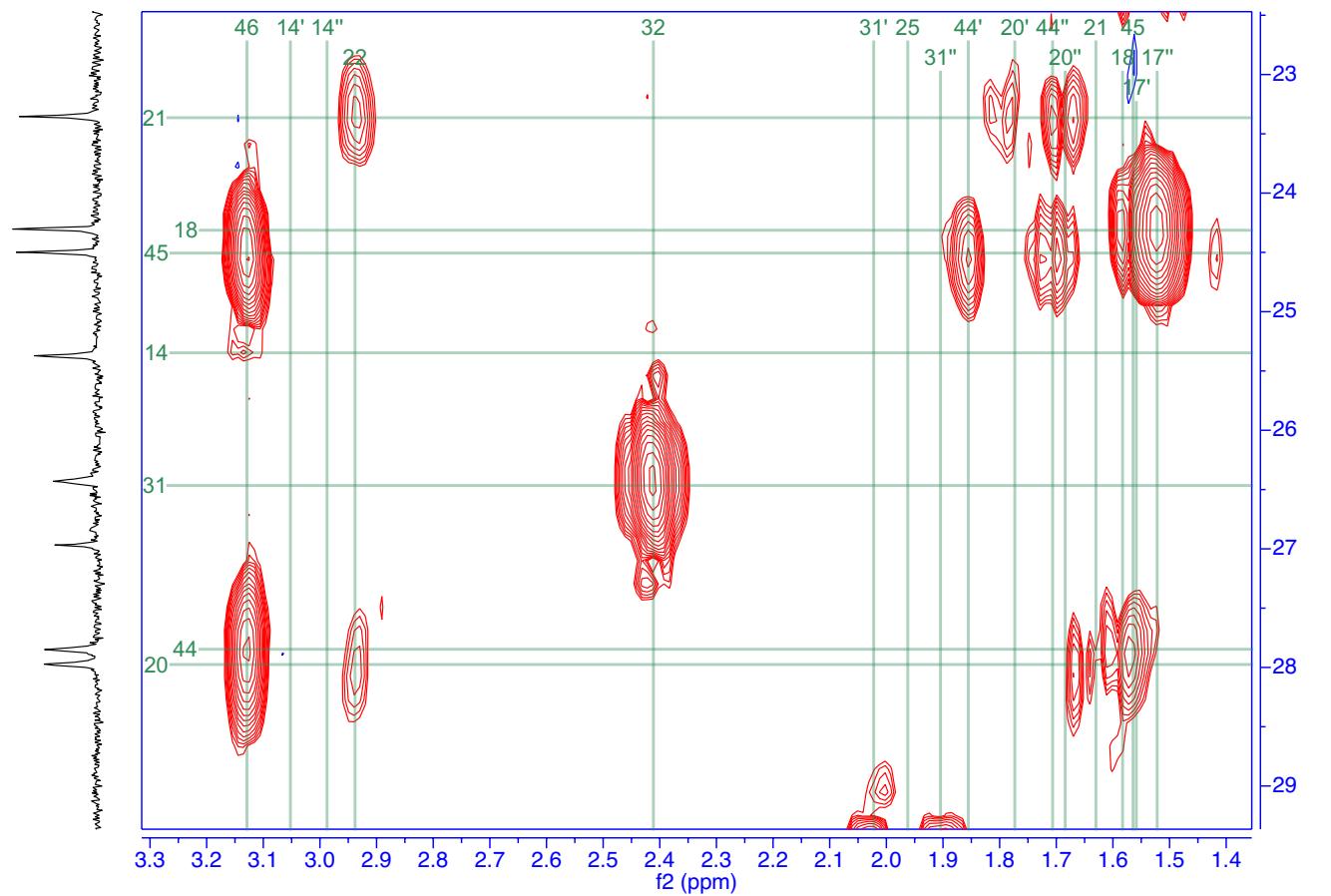
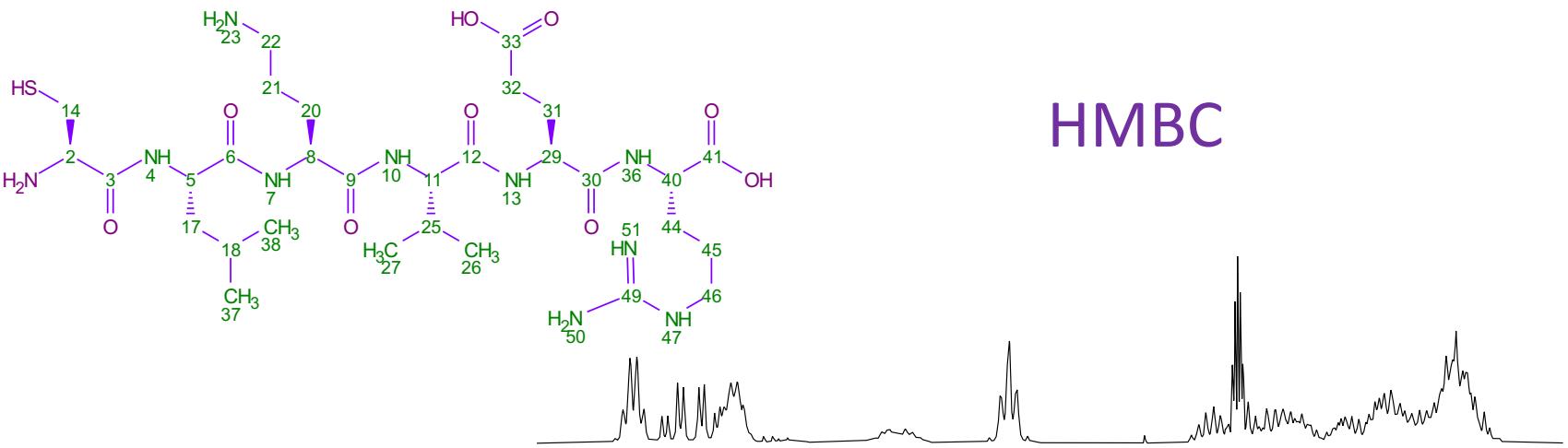


Same picture as top
right on prior slide.

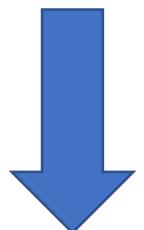


HSQC

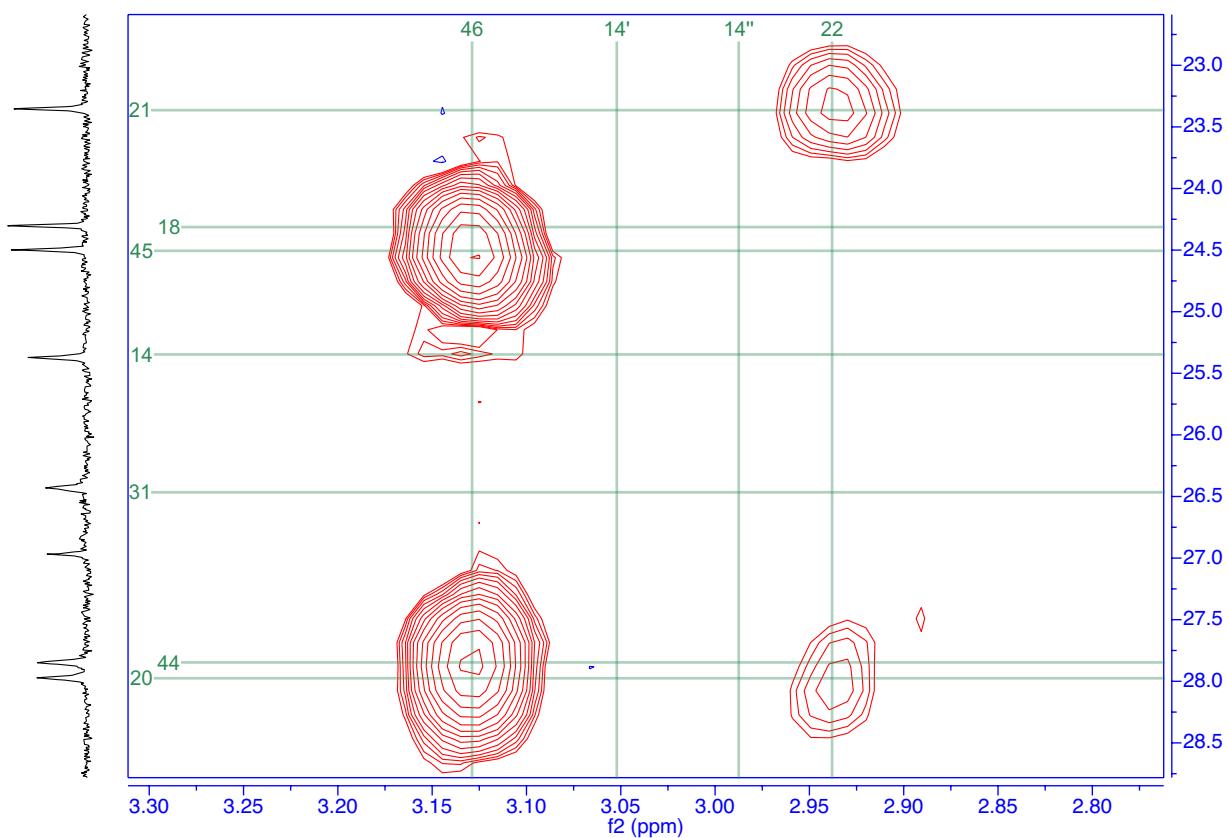
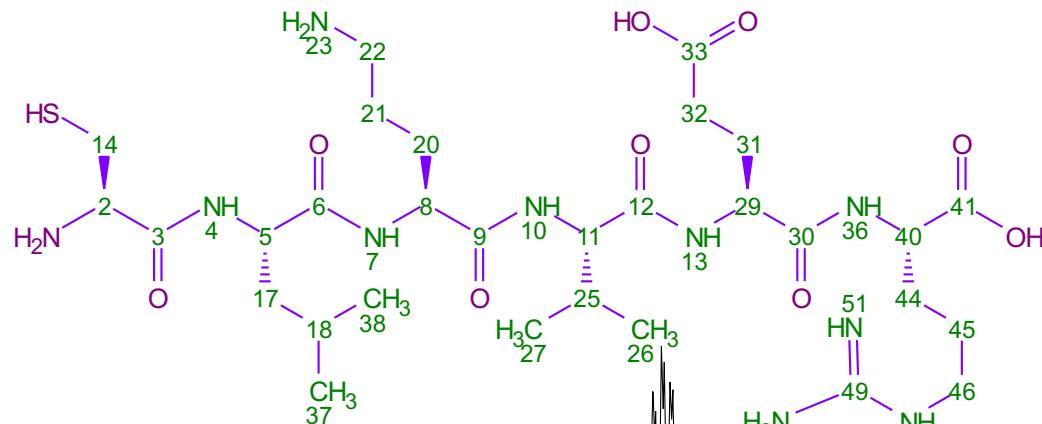




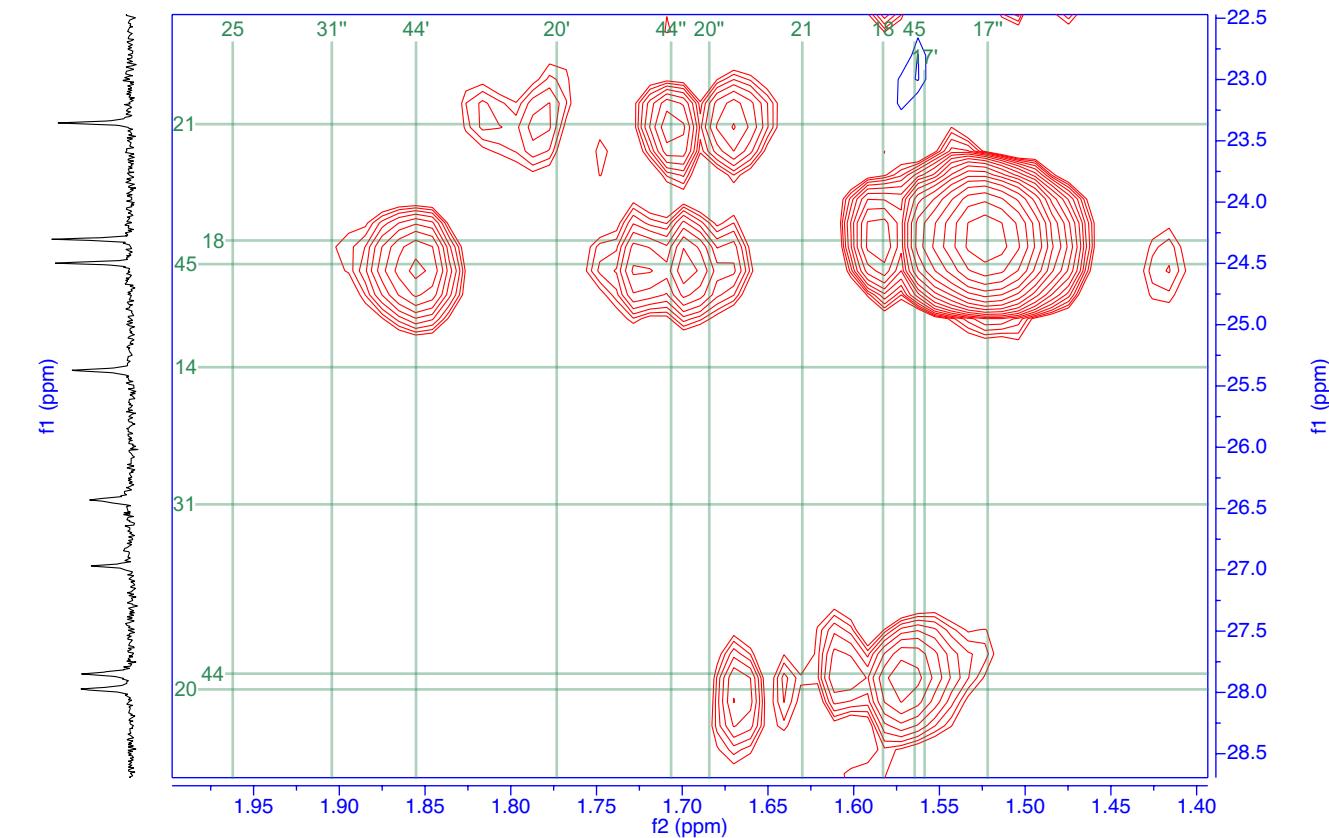
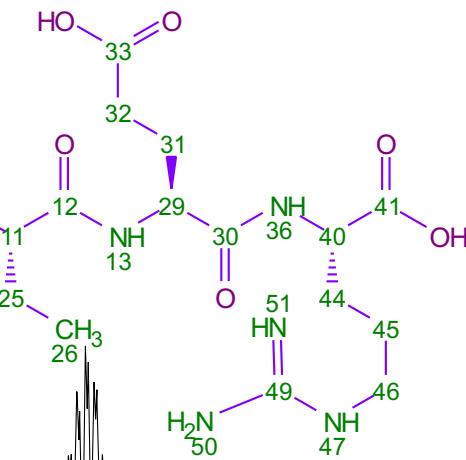
Zoomed in version of
left and right signals

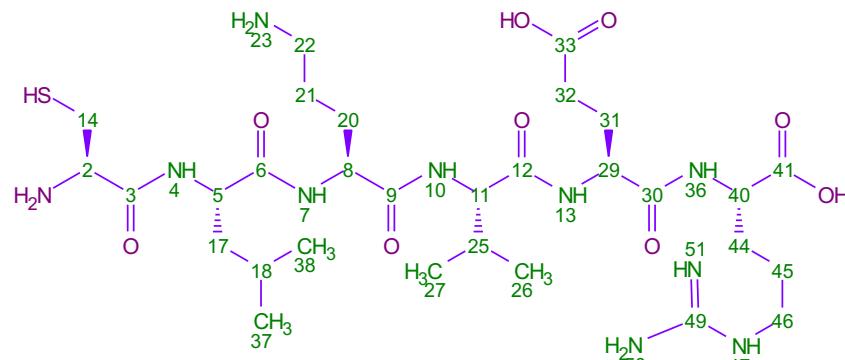


HMBC

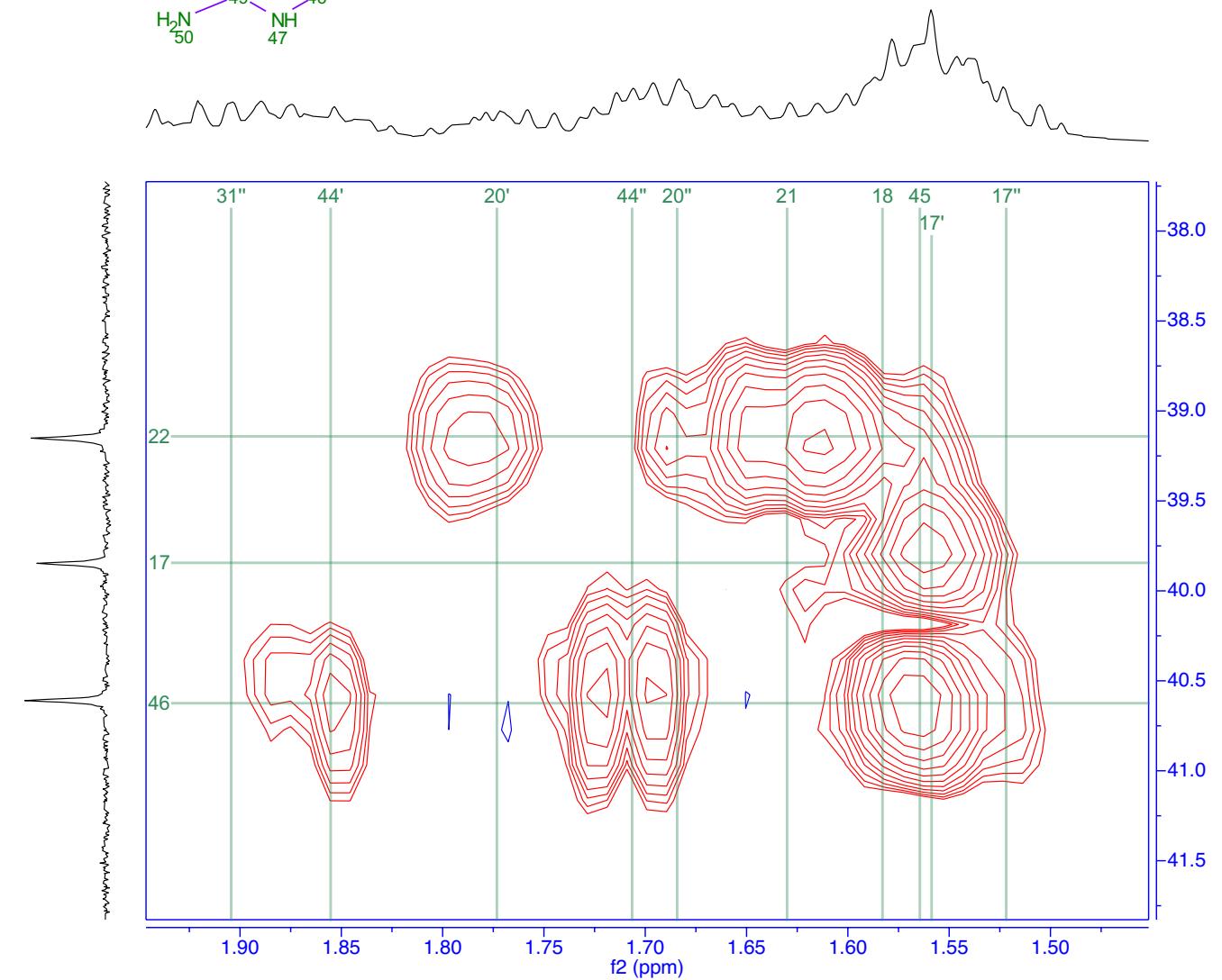


HMBC

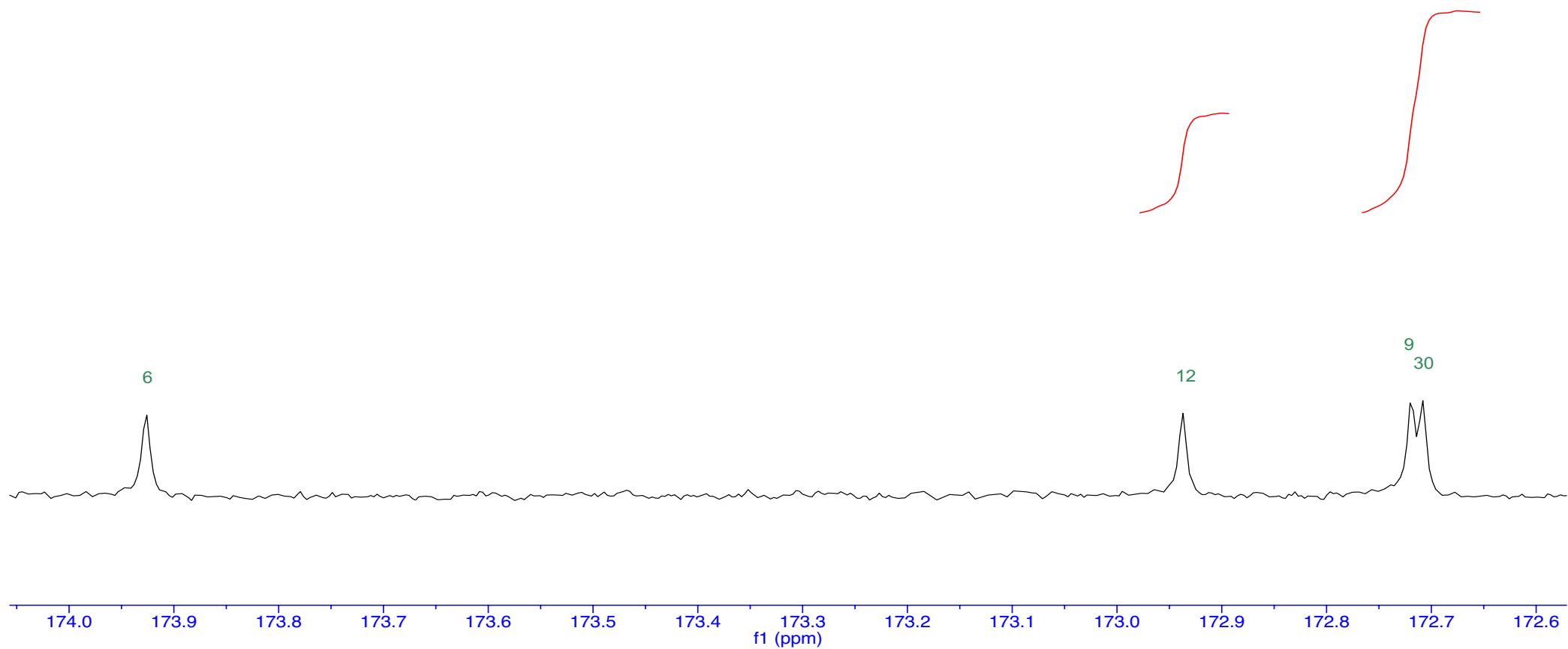
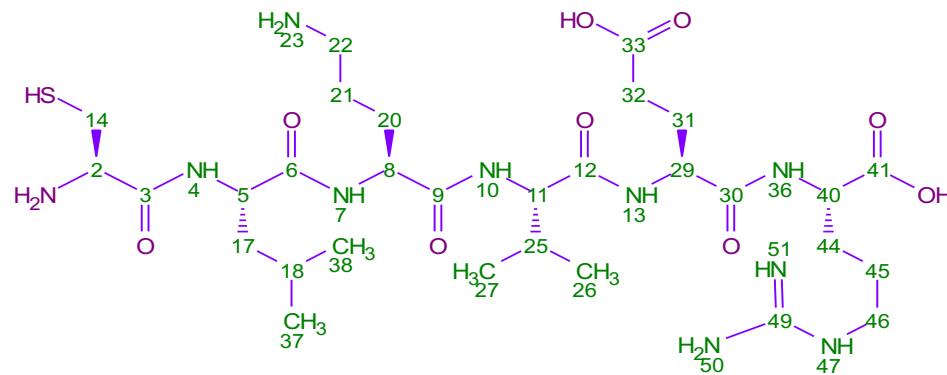




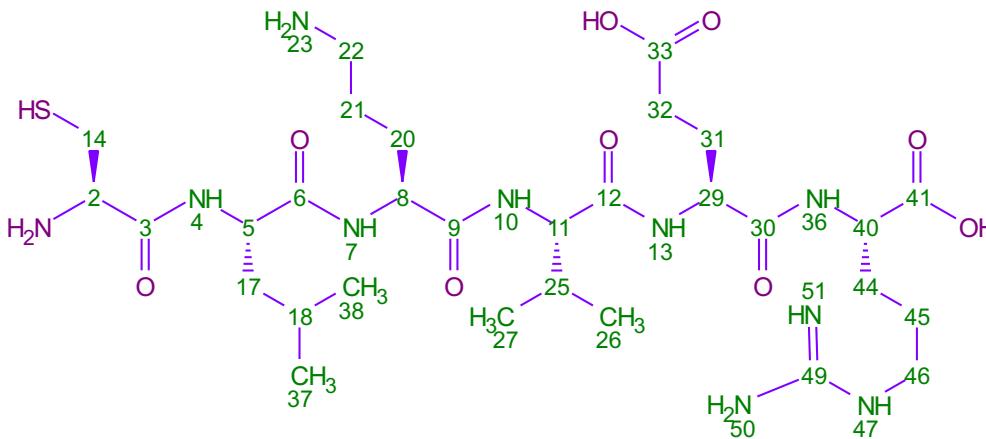
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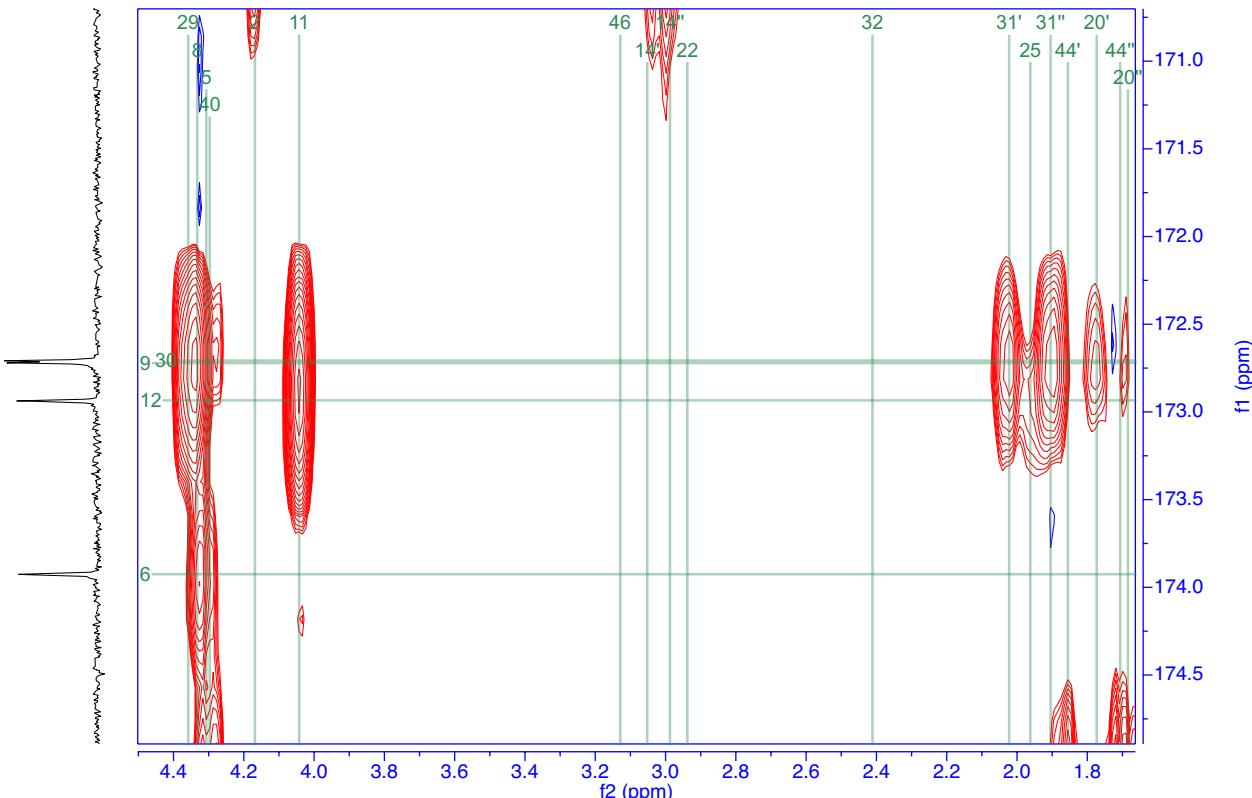
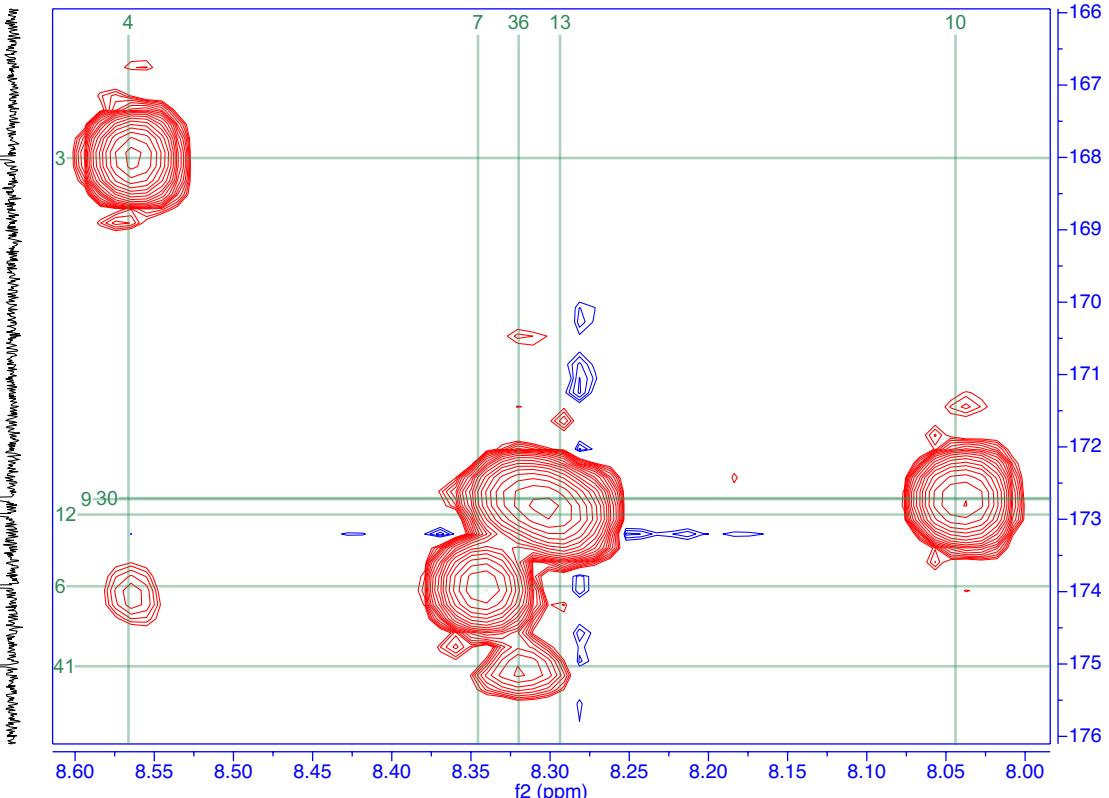
Carbon



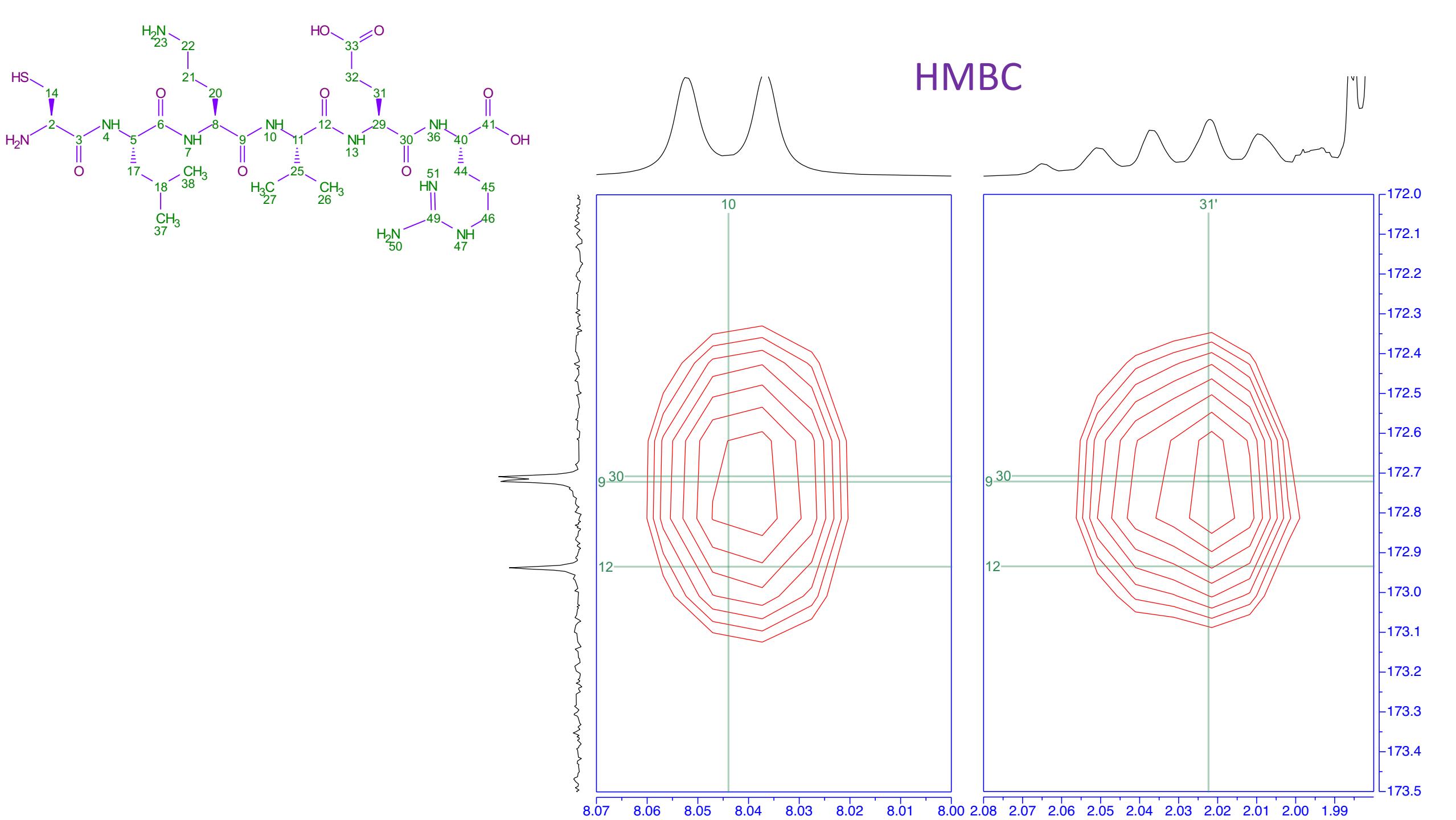
HMBC

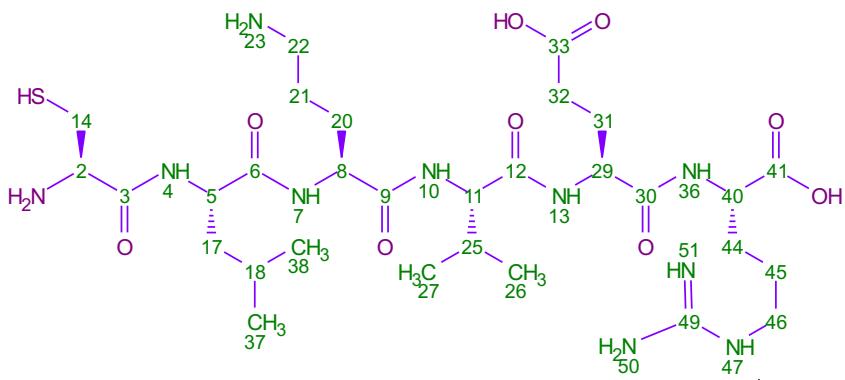


Labeling carbonyl's to amides

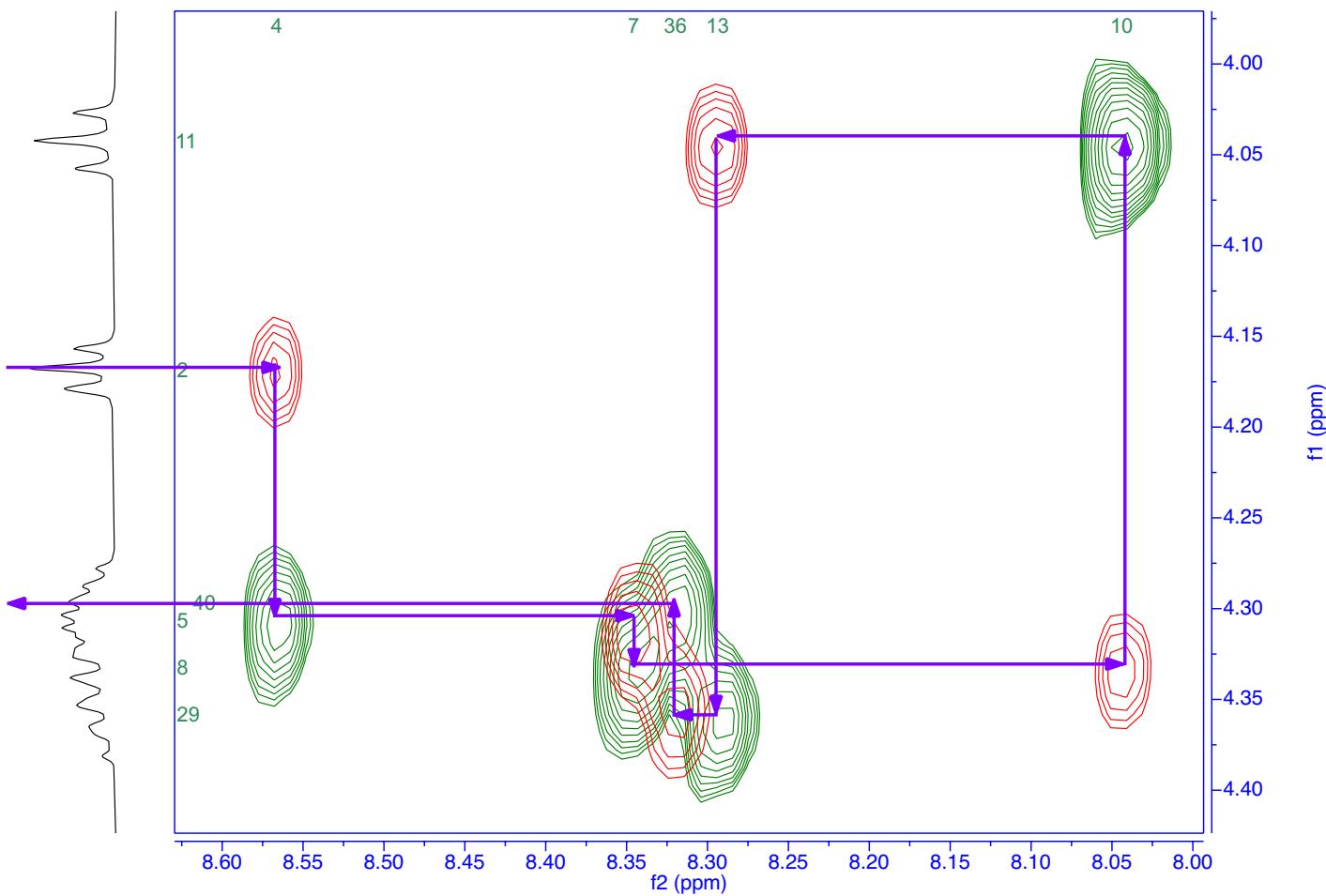


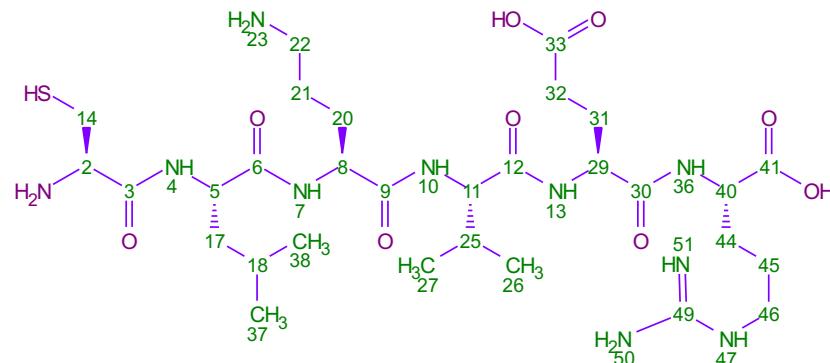
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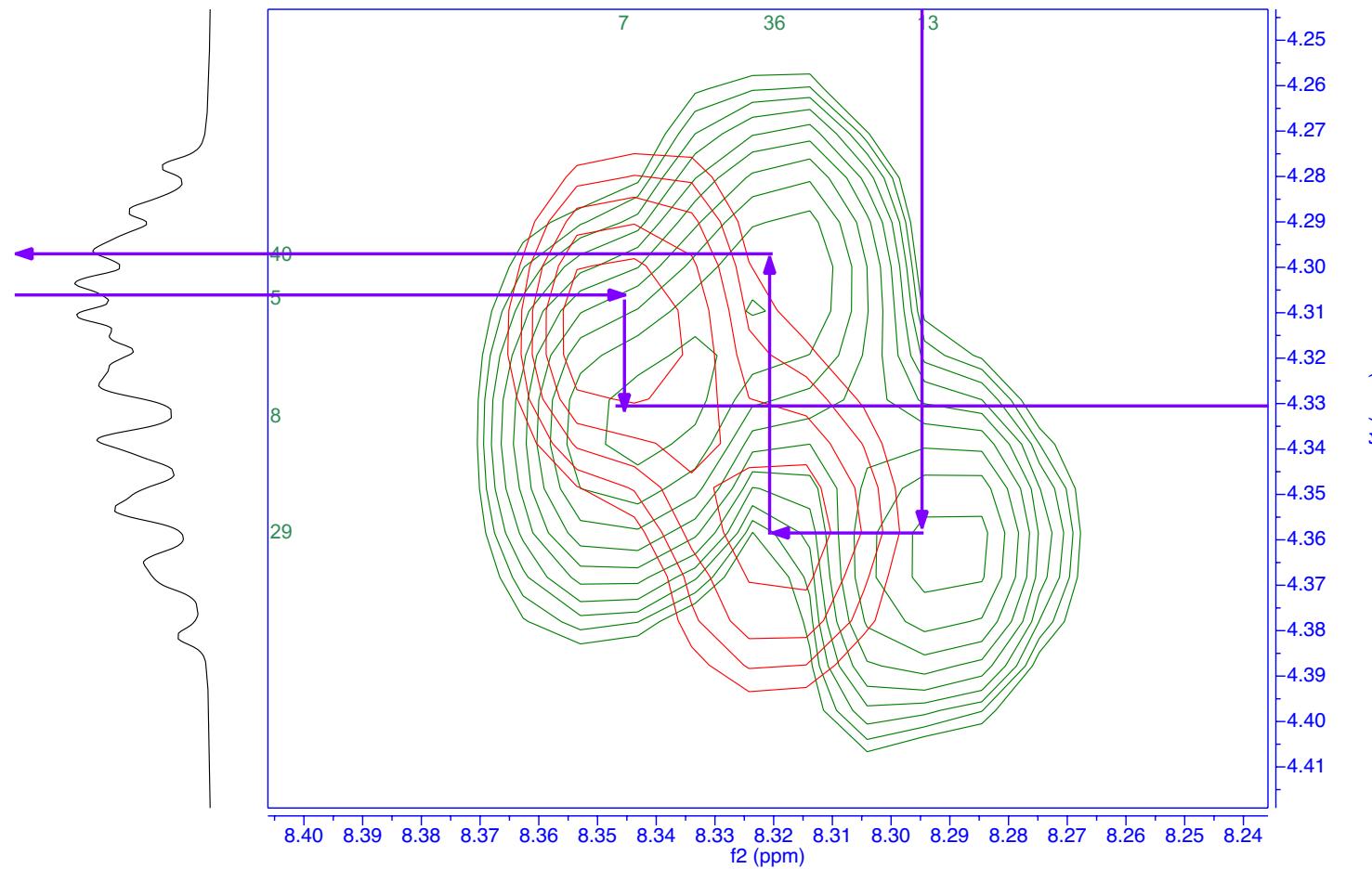


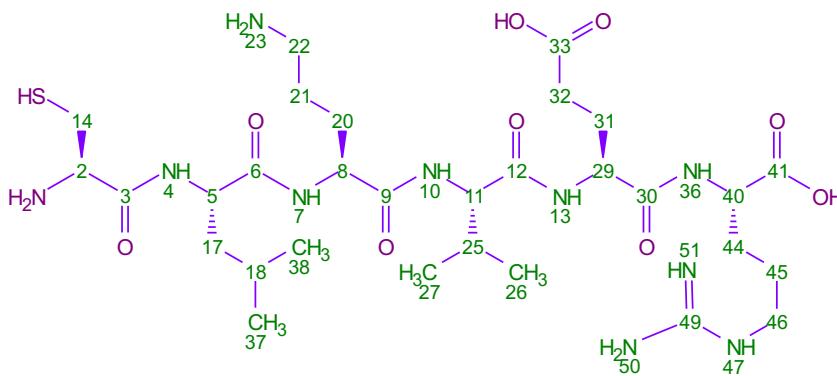
First walk. Tocsy & Roesy



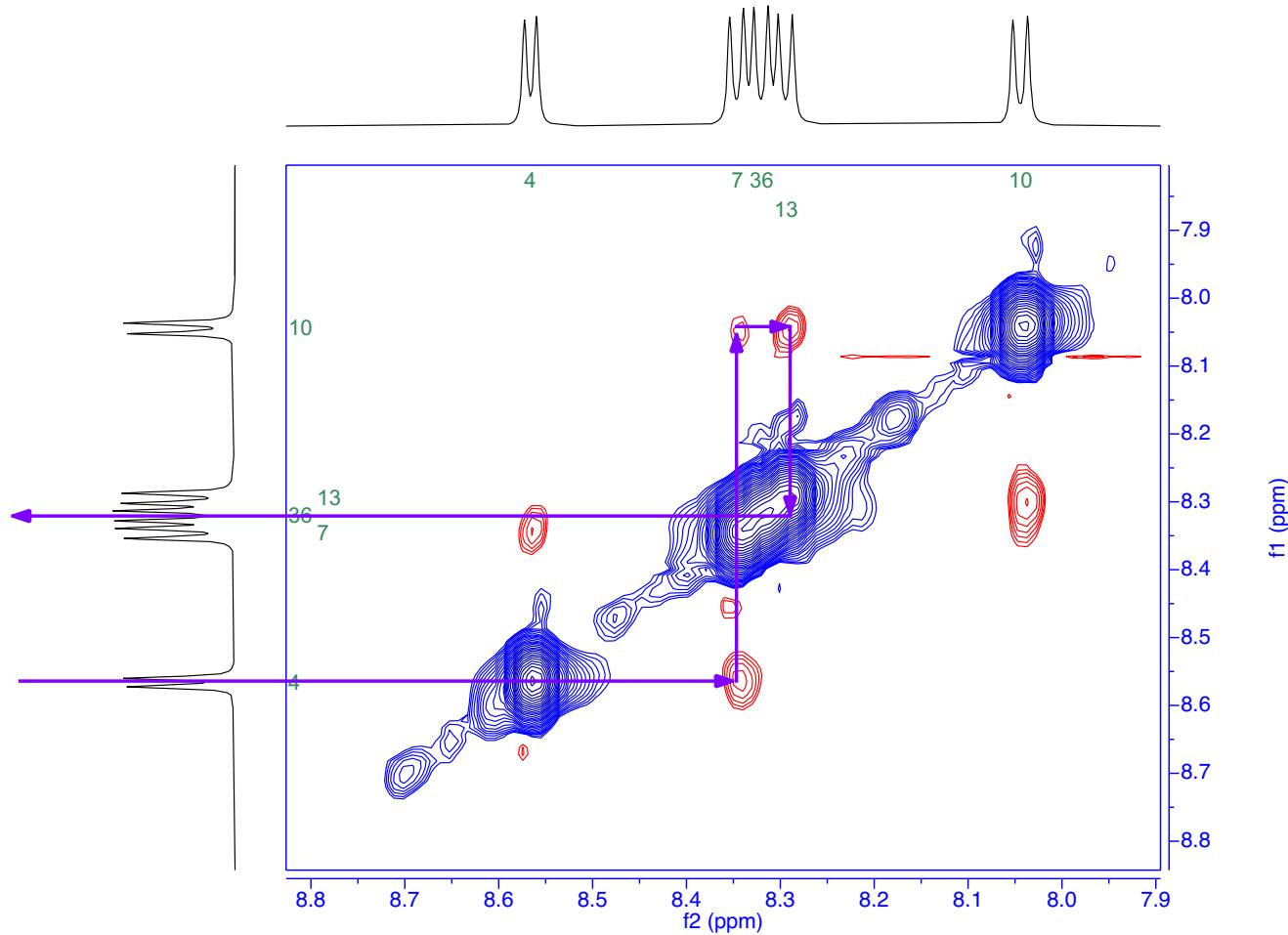


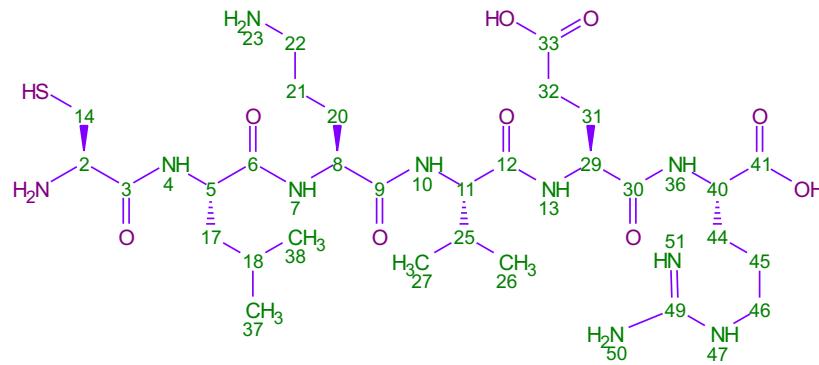
Zoomed in version
on walk one.





Walk of the Roesy





Walk of both spectra due to the center peak of 13-36.

