Exercise: Assign all of the protons in the NMR spectrum below.

C_{17}H_{20}O_{4}
300 MHz $^1$H NMR spectrum in CDCl3
Source: Greg Hanson thesis (Burke)

O
\begin{align*}
\text{H} & \quad \text{MeO} \\
\text{H} & \quad \text{O} \\
\text{MeO} & \\
\text{Q} & \\
\end{align*}

\text{O}

\begin{align*}
\text{j} & \quad \text{H} & \quad \text{k} \\
\text{i} & \quad \text{h} & \quad \text{c} \\
\text{d} & \quad \text{b} & \quad \text{a} \\
\text{f} & \quad \text{e} & \quad \text{g} \\
\text{n} & \quad \text{o} & \quad \text{p} \\
\text{q} & \\
\end{align*}
Exercise: Assign all of the protons in the NMR spectrum below.

C_{17}H_{20}O_4  
300 MHz $^1$H NMR spectrum in CDCl₃  
Source: Greg Hanson thesis (Burke)

**Exercise:** Assign all of the protons in the NMR spectrum below.

**CDCl₃**

- **f** will be upfield of **g**, from the effect of the two cis-substituents on the 5-ring. This effect is large enough to assign stereochemistry.

- **g** will show significant coupling only to **e**, **f** and **h** (so, a td) - hence this assignment. **d** and **h** have small allylic couplings also.

**Note:**
- **h** will be most upfield of all. This is due to the two cis-substituents on the 5-ring.
- **f** and **g** are close to each other because of the two cis-substituents.

**Conclusion:**
- The assignment of protons is crucial in understanding the structure and stereochemistry of the molecule.

**Source:** Greg Hanson thesis (Burke)
Exercise: Assign the carbons in the $^{13}$C NMR spectrum of fringenal.

C$_{17}$H$_{20}$O$_4$

73.4 MHz $^{13}$C NMR spectrum in CDCl$_3$

Source: Greg Hanson thesis (Burke)
Exercise: Assign the carbons in the $^{13}$C NMR spectrum of fringenal.

There are only 14 carbons (15 expected). The missing peak is probably the Ar-CH$_2$-O (carbon l) under the CDCl$_3$ (middle peak is larger).