

Unit 10 - Advanced topics (Solvent suppression, Drug Discovery, DOSY)

Course outline

How does an NPTEL online course work?

Week 0 Assignment

Introduction to NMR spectroscopy

Chemical shifts and J-coupling

One-dimensional proton NMR

One dimensional NMR of X-nuclei (13C, 15N, 31P and 19F)

Homonuclear 2D NMR

Heteronuclear 2D NMR

Structure determination of molecules

Advanced topics (Solvent suppression, Drug Discovery, DOSY)

● Advance topics Chemical exchange I

○ Hydrogen or deuterium exchange

● Diffusion ordered spectroscopy DOSY I

● DOSY II

○ STD NMR for drug target interactions

○ Quiz : Week 8 Assignment

Text Transcripts

Weekly Feedback forms

Video download

Week 8 Assignment

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-25, 23:59 IST.

1) Two protons in a molecule undergo chemical exchange at the rate of 60 s^{-1} . For the exchange process to be **1 point** considered slow on the chemical shift time scale on a 900 MHz NMR spectrometer, what would be the smallest difference between the two chemical shifts possible?

- 0.05 ppm
- 0.1 ppm
- 0.2 ppm
- 0.3 ppm

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.1 ppm

2) Which of the following 2D NMR experiments gives information on the chemical exchange between two protons **1 point**

- 2D TOCSY
- 2D ROESY
- 2D HSQC
- 2D HMQC

No, the answer is incorrect.
Score: 0

Accepted Answers:
2D ROESY

3) Two protons in a molecule have a proton chemical shift difference of 0.05 ppm. For the exchange process to be **1 point** considered Fast on the chemical shift time scale on a 400 MHz NMR spectrometer, what would be an appropriate rate of exchange?

- 5 s^{-1}
- 10 s^{-1}
- 20 s^{-1}
- 50 s^{-1}

No, the answer is incorrect.
Score: 0

Accepted Answers:
 50 s^{-1}

4) In a DOSY NMR experiment, the intensity of the signal is measured by varying which of the following parameters to fit **1 point** to the Tjeskal-Tanner equation?

- Pulse width
- Gradient duration
- Gradient strength
- Diffusion delay period

No, the answer is incorrect.
Score: 0

Accepted Answers:
Gradient strength

5) Which of the following methods are used in NMR for characterizing ligand-protein interactions **1 point**

- 2D TOCSY
- STD-NMR
- Chemical shifts of ligand
- J-coupling between ligand and protein

No, the answer is incorrect.
Score: 0

Accepted Answers:
STD-NMR

6) The Hydrogen/deuterium exchange experiment gives information about which of the following: **1 point**

- The secondary structure of the peptide
- The hydrogen bond pattern in the peptide
- The tertiary structure of the peptide
- The composition of the peptide.

No, the answer is incorrect.
Score: 0

Accepted Answers:
The hydrogen bond pattern in the peptide

7) The translational diffusion coefficient is inversely proportional to which of the following parameters? **1 point**

- Molecular weight
- Viscosity
- Temperature
- Molecular size

No, the answer is incorrect.
Score: 0

Accepted Answers:
Viscosity

8) In the hydrogen/deuterium exchange experiment, which of the following protons will undergo faster exchange with **1 point** the solvent?

- Strongly hydrogen bonded protons
- Weakly hydrogen bonded protons
- Protons buried inside the molecule
- Aliphatic protons

No, the answer is incorrect.
Score: 0

Accepted Answers:
Weakly hydrogen bonded protons

9) Which is an important requirement in STD NMR experiment to work: **1 point**

- Strong interaction between ligand and protein
- High concentration of the Protein
- Medium to weak interaction between ligand and protein
- Ligand and protein should have different molecular weights

No, the answer is incorrect.
Score: 0

Accepted Answers:
Medium to weak interaction between ligand and protein

10) Which of the following parameters cannot be used to characterize ligand binding to protein? **1 point**

- Exchange rate between free and bound ligand
- Diffusion coefficient between free and bound ligand
- The relative size of the ligand and protein
- NOE transfer between free and bound ligand

No, the answer is incorrect.
Score: 0

Accepted Answers:
The relative size of the ligand and protein