Fluorophenylglycine
A Marker for 19F-NMR of Membrane-Associated Polypeptides
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19F - SOLID STATE NMR
Advantages of the 19F label are high sensitivity and absence of natural background. Measurement time can be reduced by several orders of magnitude compared with 1H or 13C labels. The effect of 19F labelling on structural and functional properties is small. Solubility, secondary structure (as revealed from CD), and fluorogenic activity (monitored with fluorescence spectroscopy) of 4-fluorophenylglycine (FPhg) analogs of B18 are very similar to those of the wild type peptide (see poster Afonin et al).

LABELING STRATEGIES
rigid connection to peptide backbone
bioisotopic labeling
The fluorine label can be introduced into proteins and peptides by various techniques and serves as a probe for conformation and/or dynamics of the molecule.

19F-1H RELAXATION
19F T1 relaxation times of FPhg in membrane-associated peptides are in the order of 1 second. The exact value depends on temperature and orientation.

LIPID PHASE STATE
Differences in the spectra are observed between gel and liquid crystalline phase states of the lipids.

LIPOPHILIC OHGANIZATION

19F-NMR EXPERIMENTS
SENSITIVITY
 Oriented samples with a typical linewidth of 1.2 kHz containing 50 nmol FPhg label show a reliable signal after less than one hour of measurement time.

TEMPERATURE DEPENDENCE
With increasing temperature the 19F chemical shifts of an oriented sample narrow toward the isotropic position. This can reflect both rotation of the sidechain and overall mobility of the peptide.

CONCLUSIONS

• 4-Fluorophenylglycine (FPhg) is a very sensitive NMR marker to study membrane-associated peptides.

REFERENCES
[Provide references]

REFERENCES
In order to determine the involvement of the FPhg marker in solid-state NMR, further systematic experiments are needed. These include the use of FPhg analogs and derivatives with different chemical properties and the comparison of NMR spectra from model membranes and natural membranes. Future work will focus on the development of new fluorophores with improved spectroscopic properties and the application of these probes in a variety of biological systems.