

## 2D Correlation of $^1\text{H}$ with $^{13}\text{C}$

- HMBC (Heteronuclear Multiple Bond Correlation) is Used to Solve the Puzzle of the Carbon Skeleton
  - C-H J-Coupling Relationships
  - 2-3 Bond (Remote  $^{13}\text{C}$ -C-C-H,  $^{13}\text{C}$ -C-H,  $^{13}\text{C}$ -O-C-H,  $^{13}\text{C}$ -N-C-H)
  - These 2-3 Bond Couplings Are Small (0-8 Hz)
  - $^1\text{H}$  Shift on Horizontal Axis ( $F_2$ )
  - $^{13}\text{C}$  Shift on Vertical Axis ( $F_1$ )
  - Moderate Sensitivity ( $^1\text{H}$  Detected)
  - High Resolution in  $^1\text{H}$  (Horizontal) Dimension
  - $^{13}\text{C}$ -H (One-Bond) Proton Signal Must Be Suppressed: There Will Be Artifacts
  - No  $^{13}\text{C}$  Decoupling: One-Bond Artifacts Will Appear As Wide (~150 Hz) Doublets
  - Inverse Probe ( $^1\text{H}$  Coil on Inside,  $^{13}\text{C}$  Coil on Outside) Required