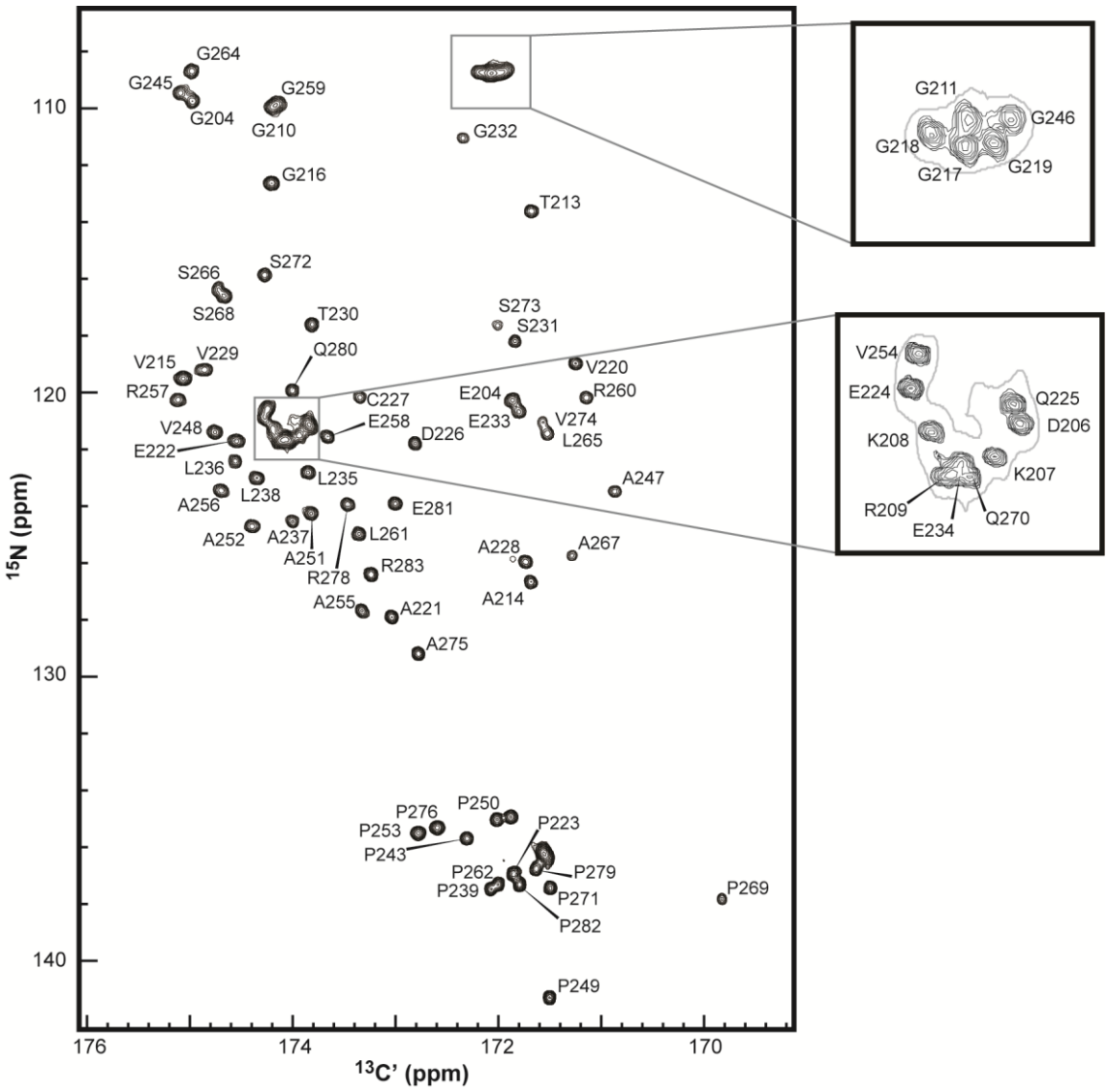

Figure S1. Chemical shift assignments of Pdx1 c-terminus IDP annotated on a 2D-heteronuclear correlation spectra using the newer H_{α}- start ^{13}C-detected CON as described in Figure 2B. The zoom of the region with the high concentrations of NMR peaks are shown on the right with high resolution H_N- start ^{13}C-detected CON as described in Figure 2A.

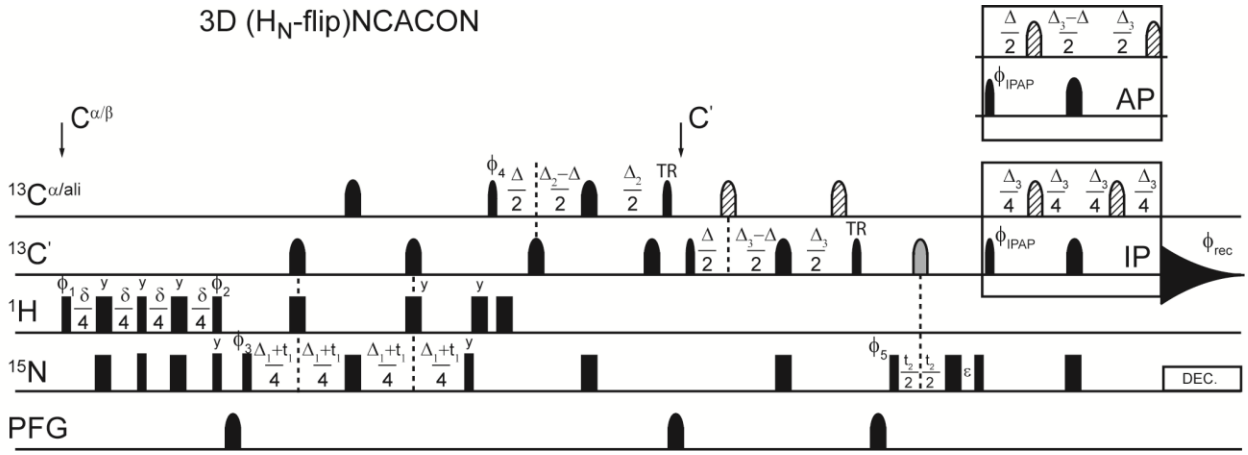

Figure S2. Pulse sequence for the (H_N-flip)NCACON-IPAP experiment. The delays are δ = 10.8 ms, Δ = 9.0 ms, Δ_1 = 24.8 ms, Δ_2 = 28.0 ms, Δ_3 = 32.0 ms, and ε = $t_2(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C´ and ^{13}C$^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{15}N was achieved by the use of 1.25 kHz garp- sequences. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 8(x), 8(-x); φ_2 = 8(-x), 8(x); φ_3 = x, -x; φ_4 = 2(x), 2(-x); φ_5 = 4(x), 4(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = x, 2(-x), x, -x, 2(x), -x, -x, 2(x), -x, x, 2(-x), x. Quadrature detection in the t_1 and t_2 dimension is obtained by States-TPPI incrementation of φ_3 and φ_5 respectively.

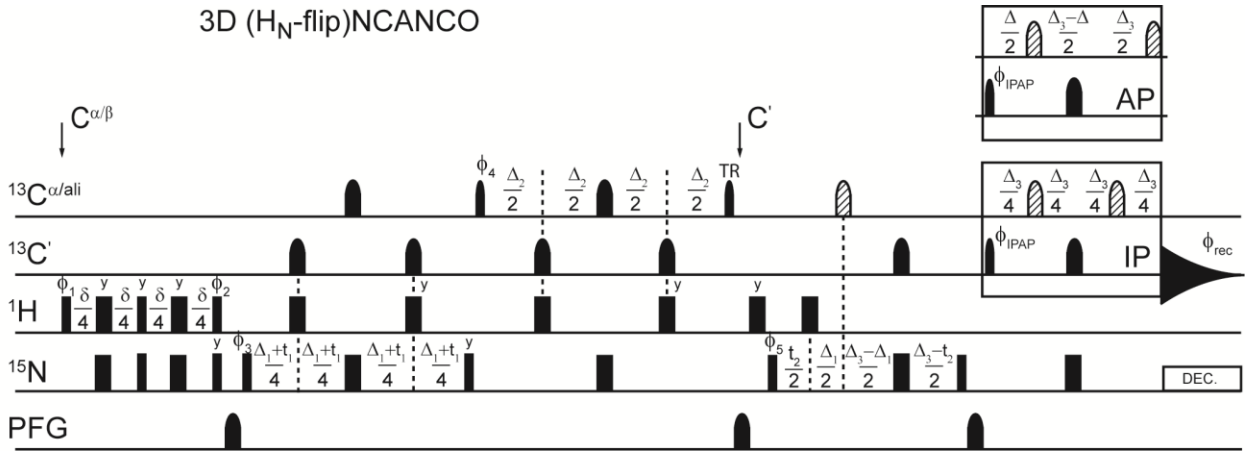

Figure S3. Pulse sequence for the (H$_N$-flip)NCANCO-IPAP experiment. The delays are δ = 10.8 ms, Δ = 9.0 ms, Δ_1 = 24.8 ms, Δ_2 = 28.0 ms, Δ_3 = 32.0 ms, and ε = $t_2(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C´ and ^{13}C$^{\alpha}$ inversion pulse. Composite pulse decoupling of ^{15}N was achieved by the use of 1.25 kHz garp- sequences. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 8(x), 8(-x); φ_2 = 8(-x), 8(x); φ_3 = x, -x; φ_4 = 2(x), 2(-x); φ_5 = 4(x), 4(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = x, 2(-x), x, -x, 2(x), -x, -x, 2(x), -x, x, 2(-x), x. Quadrature detection in the t_1 and t_2 dimension is obtained by States-TPPI incrementation of φ_3 and φ_5 respectively.

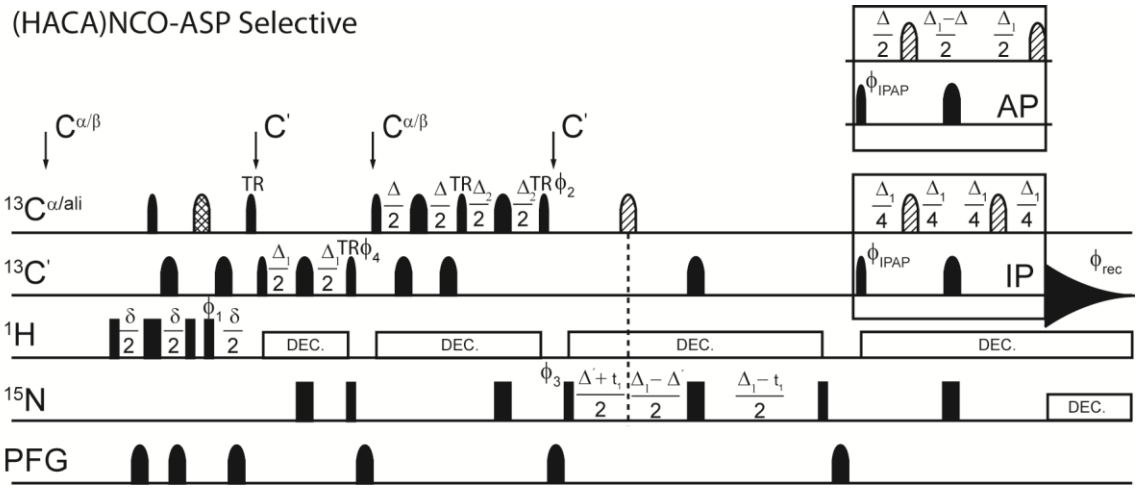

Figure S4. Pulse sequence for the (HACA)NCO-D-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 18 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulse filled with hashed lines achieves selection of aspartic acid and is a 180° Q3 shaped pulse, centered at 42 ppm, and applied with a duration of 1200 μs on a system opperating at 11.7 T static field strength. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x), 8(-x); φ_3 = x, -x; φ_4 = 16(x), 16(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 4(-x, x, x, -x), 2(x, -x, -x, x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

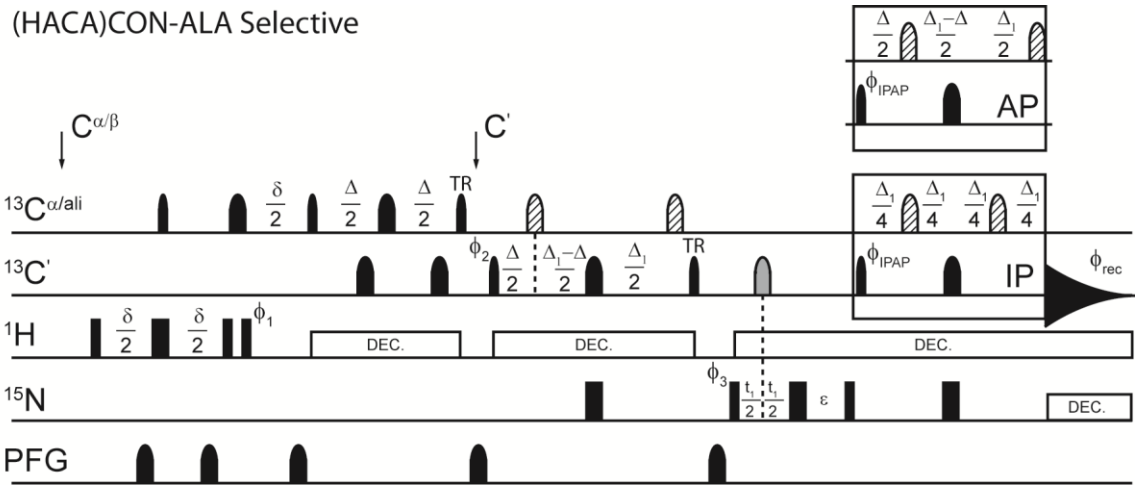

Figure S5. Pulse sequence for the (HACA)CON-A-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C´ and ^{13}C$^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x),12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

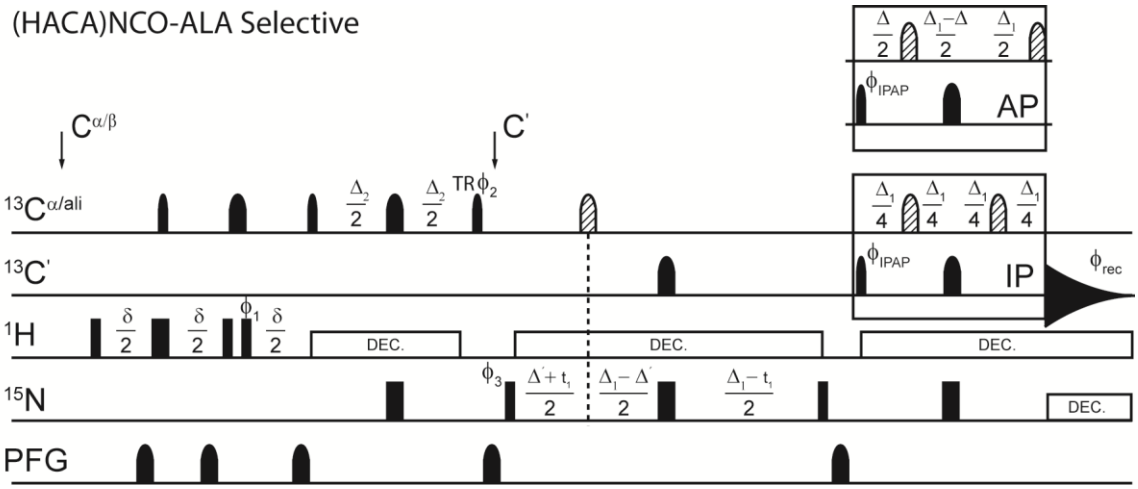

Figure S6. Pulse sequence for the (HACA)NCO-A-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 15 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x), 12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

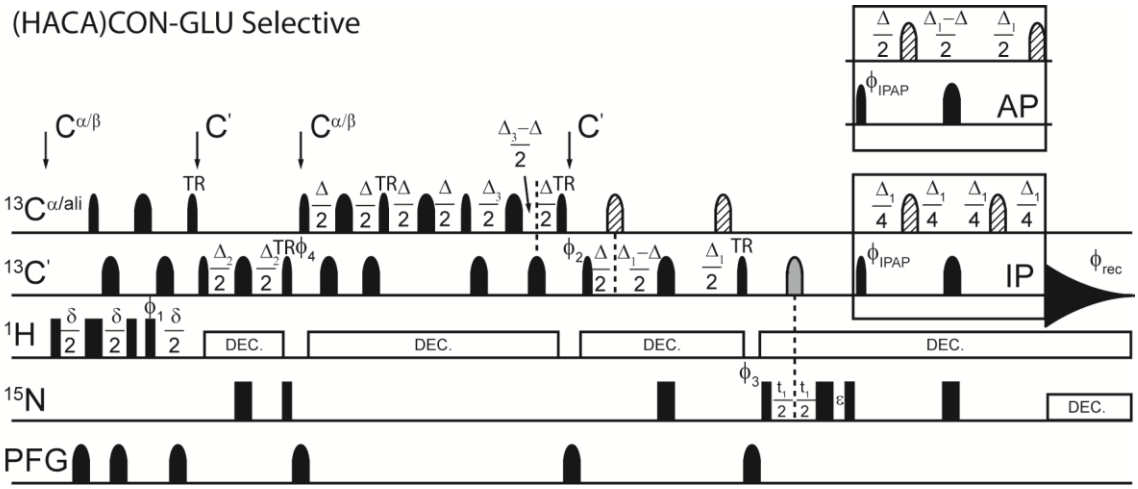

Figure S7. Pulse sequence for the (HACA)CON-E-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, Δ_2 = 32 ms, Δ_3 = 18 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective $^{13}C'$ and $^{13}C^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x),8(-x); φ_3 = x, -x; φ_4 = 16(x), 16(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 4(-x, x, x, -x), 2(x, -x, -x, x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

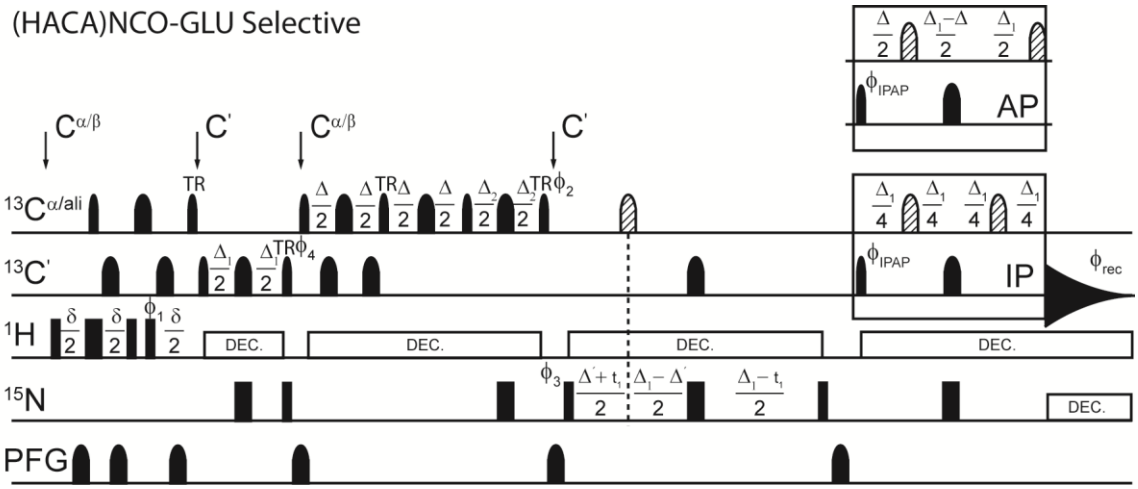

Figure S8. Pulse sequence for the (HACA)NCO-E-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 18 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x), 8(-x); φ_3 = x, -x; φ_4 = 16(x), 16(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 4(-x, x, x, -x), 2(x, -x, -x, x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

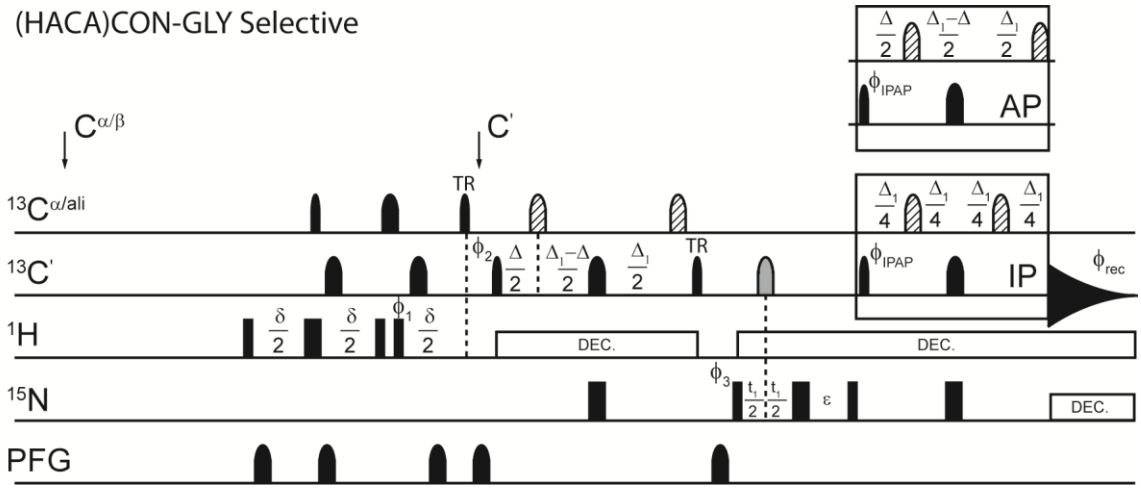

Figure S9. Pulse sequence for the (HACA)CON-G-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C´ and ^{13}C$^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x),8(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 2(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

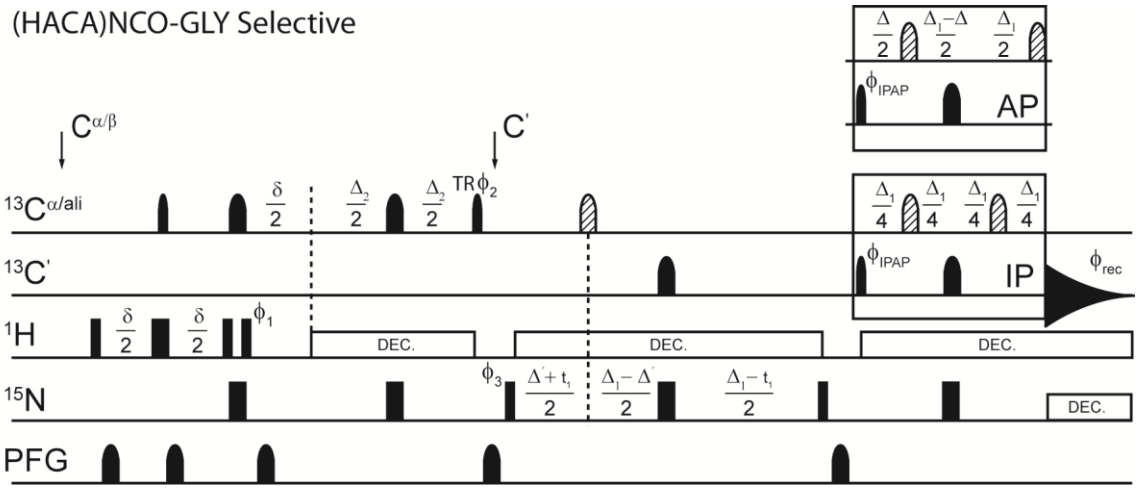

Figure S10. Pulse sequence for the (HACA)NCO-G-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 14 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x), 8(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 2(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

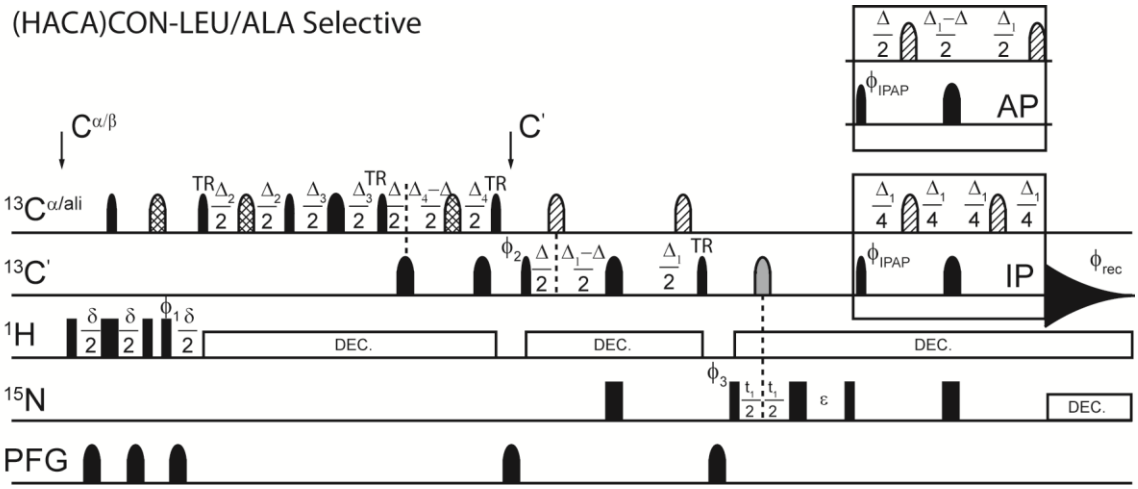

Figure S11. Pulse sequence for the (HACA)CON-LA-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, Δ_2 = 7.2 ms, Δ_3 = 14 ms, Δ_4 = 18 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective $^{13}C'$ and $^{13}C^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulses filled with hashed lines achieve selection of leucine and alanine. These band selective pulses are 180° Q3 shaped pulses with the following properties (times relevant for a system opperating at 11.7 T static field strength): 1st is centered at 19 ppm and applied for 1200 μs; 2nd is centered at 35 ppm and applied for 840 μs; 3rd is centered at 48 ppm and applied for 1200 μs. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x),12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

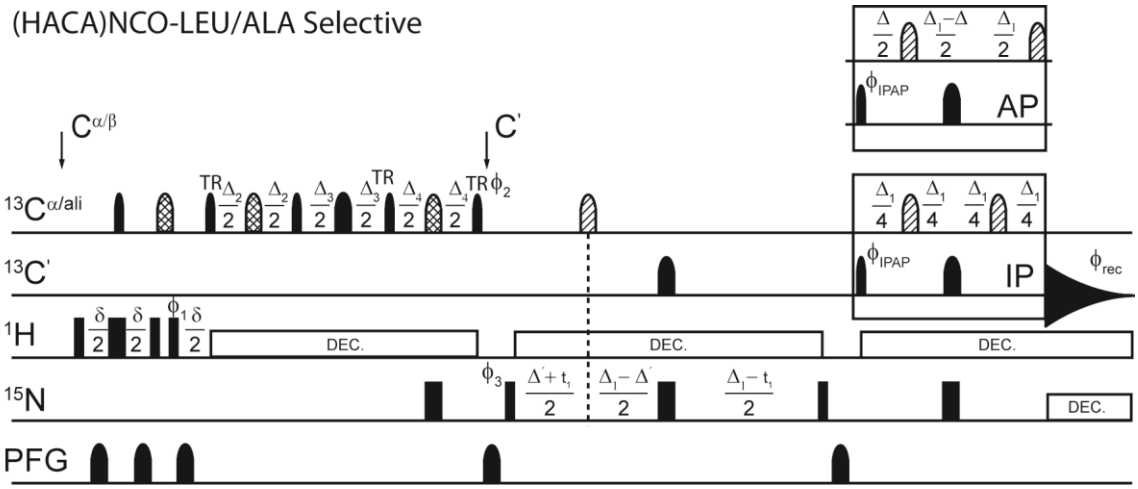

Figure S12. Pulse sequence for the (HACA)NCO-LA-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 7.2 ms, Δ_3 = 14 ms, Δ_4 = 18 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulses filled with hashed lines achieve selection of leucine and alanine. These band selective pulses are 180° Q3 shaped pulses with the following properties (times relevant for a system opperating at 11.7 T static field strength): 1st is centered at 19 ppm and applied for 1200 μs; 2nd is centered at 35 ppm and applied for 840 μs; 3rd is centered at 48 ppm and applied for 1200 μs. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x),12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

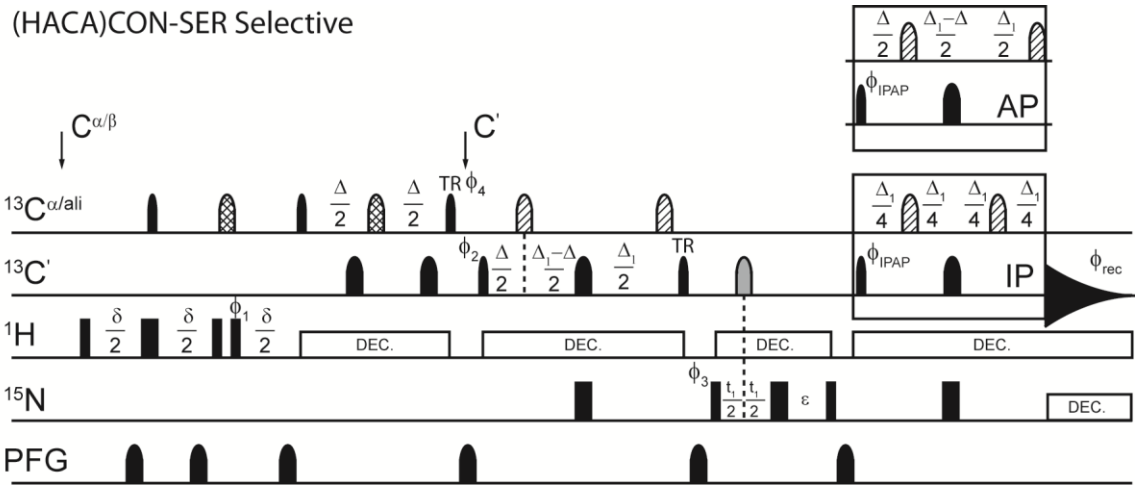

Figure S13. Pulse sequence for the (HACA)CON-S-IPAP experiment. The delays are δ = 7.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective $^{13}C'$ and $^{13}C^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulses filled with hashed lines achieve selection of serine. These band selective pulses are 180° Q3 shaped pulses, centered at 60 ppm and applied for 1200 μs on a system opperating at 11.7 T static field strength. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x),8(-x); φ_3 = x, -x; φ_4 = 16(x), 16(-x); φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 4(-x, x, x, -x), 2(x, -x, -x, x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

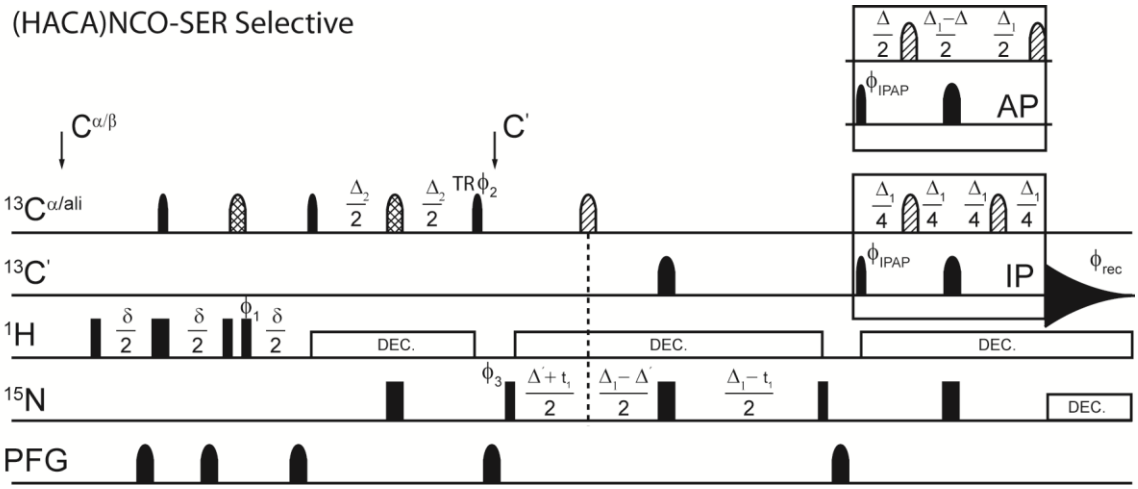

Figure S14. Pulse sequence for the (HACA)NCO-S-IPAP experiment. The delays are δ = 7.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 16.4 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. The pulses filled with hashed lines achieve selection of serine. These band selective pulses are 180° Q3 shaped pulses, centered at 60 ppm and applied for 1200 μs on a system opperating at 11.7 T static field strength. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(45), 2(135), 2(225), 2(315); φ_2 = 8(x),8(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 2(x, -x, -x, x), 2(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

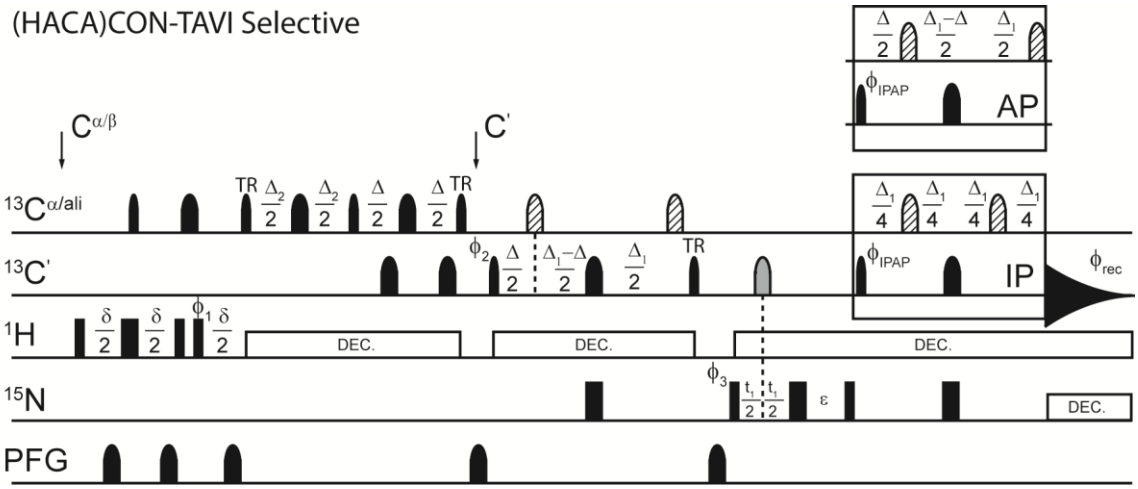

Figure S15. Pulse sequence for the (HACA)CON-TAVI-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, Δ_2 = 11 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C′ and ^{13}C$^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x), 12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

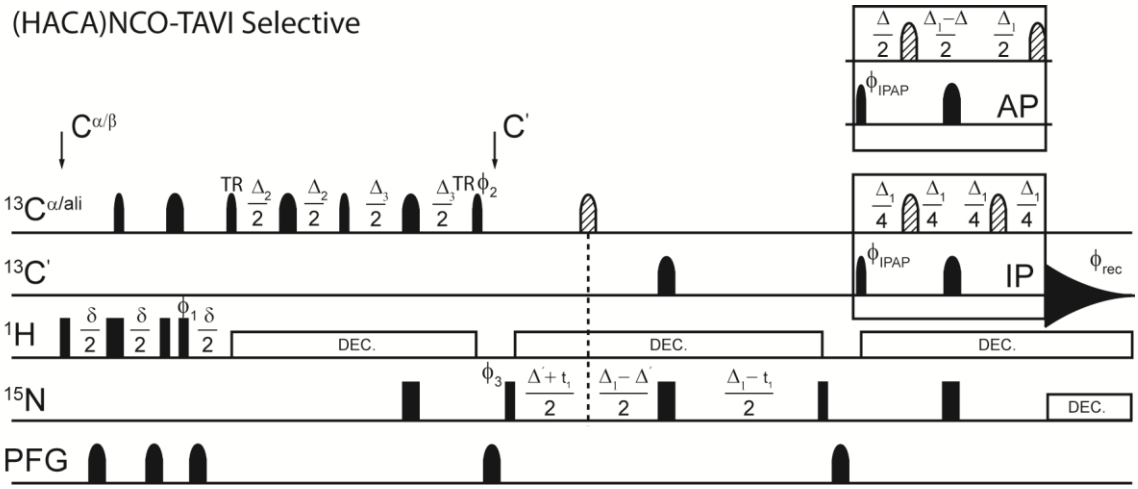

Figure S16. Pulse sequence for the (HACA)NCO-TAVI-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 11 ms, Δ_3 = 15 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x), 12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

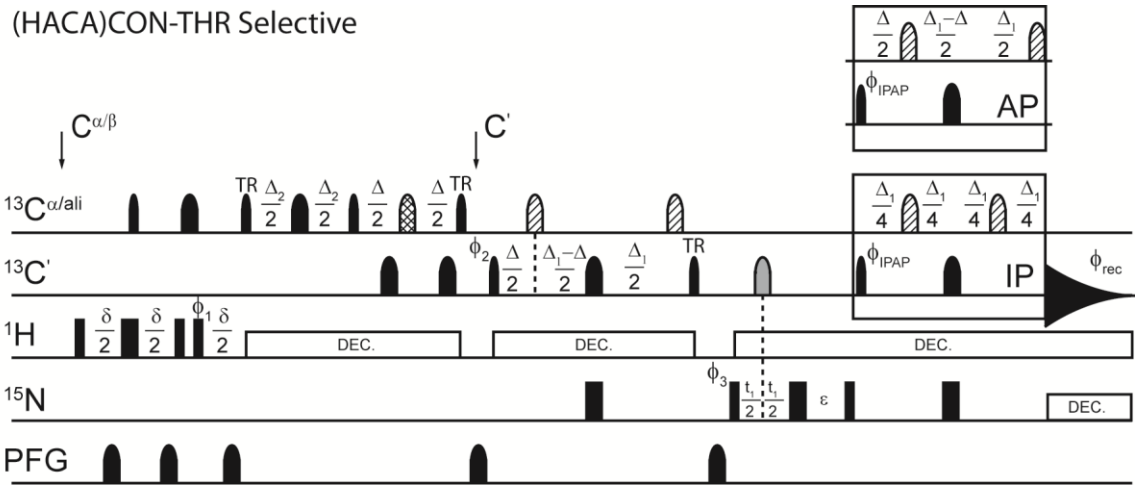

Figure S17. Pulse sequence for the (HACA)CON-T-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 25 ms, Δ_2 = 11 ms, and ε = $t_1(0)$ + pC180. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. The gray pulse on ^{13}C indicates a band-selective ^{13}C´ and ^{13}C$^{\alpha}$ inversion pulse. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulse filled with hashed lines achieves selection of threonine. This band selective pulse is a 180° Q3 shaped pulse, centered at 68.5 ppm and applied for 1200 µs on a system opperating at 11.7 T static field strength. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp- sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x), 12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.

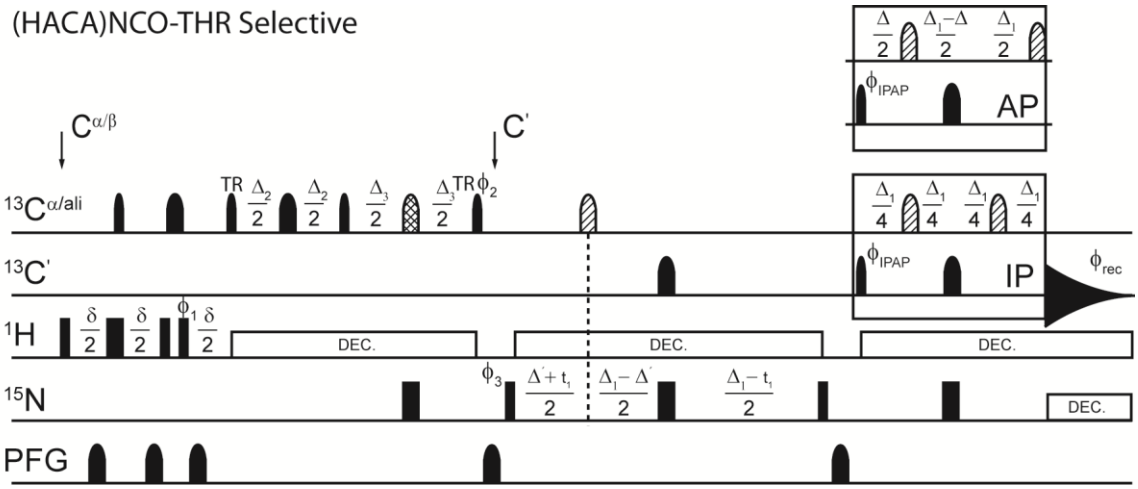

Figure S18. Pulse sequence for the (HACA)NCO-T-IPAP experiment. The delays are δ = 8.0 ms, Δ = 9.0 ms, Δ_1 = 32 ms, Δ_2 = 11 ms, Δ_3 = 15 ms, and Δ´ = 26.6 ms. Pulses are applied at the frequency indicated on the left of each line, with narrow and wide rectangles or shapes representing 90° and 180° pulses, respectively. Pulses filled with diagonal lines are off-resonance 180° Q3 shaped pulses, centered at 54 ppm. The pulse filled with hashed lines achieves selection of threonine. This band selective pulse is a 180° Q3 shaped pulse, centered at 68.5 ppm and applied for 1200 µs on a system opperating at 11.7 T static field strength. Composite pulse decoupling of ^{1}H and ^{15}N was achieved by the use of 3.57 kHz waltz-65 and 1.25 kHz garp-sequences, respectively. Pulses labeld 'TR' are time-reversed versions of the standard 90° Q5 shaped pulse. All pulses are applied with x-phase unless otherwise indicated. The phase cycle is φ_1 = 2(30), 2(90), 2(150), 2(210), 2(270), 2(330); φ_2 = 12(x), 12(-x); φ_3 = x, -x; φ_{IPAP}(IP) = x, φ_{IPAP}(AP) = -y; φ_{REC} = 3(x, -x, -x, x), 3(-x, x, x, -x). Quadrature detection in the indirect dimension is obtained by States-TPPI incrementation of φ_3.