

Supplemental Data

Quantitative Mass Spectrometry Reveals that Intact Histone H1 Phosphorylations are Variant Specific and Exhibit Single Molecule Hierarchical Dependence

Yu Chen^{§||}, Michael E. Hoover^{‡||}, Xibei Dang^{¶||}, Alan A. Shomo^{¶||}, Xiaoyan Guan[§], Alan G. Marshall^{§¶||}, Michael A. Freitas^{‡*}, and Nicolas L. Young^{§*}

Table S1. Relative abundance of proteoforms at different cell cycle stages of two cell lines(%)

Proteoforms	MDA-MB-231			MCF-10A		
	Asyn	S phase	M phase	Asyn	S phase	M phase
H12ac	16.9 ± 0.9	13.7 ± 1.0	10.5 ± 1.1	4.9 ± 0.6	4.5 ± 0.2	1.2 ± 0.2
H12acph	8.1 ± 1.2	4.3 ± 0.4	6.3 ± 0.6	7.9 ± 1.1	2.3 ± 0.3	2.6 ± 0.5
H12SNPac	0	0	0	4.4 ± 0.3	4.1 ± 0.3	2.2 ± 0.5
H12SNPacph	0	0	0	6.1 ± 0.7	1.8 ± 0.2	2.6 ± 0.8
H12SNPacph2	0	0	0	0	0	2.1 ± 0.2
H13ac	0	0	0	4.6 ± 0.4	2.2 ± 0.2	2.4 ± 0.3
H13acph	0	0	0	1.7 ± 0.5	1.2 ± 0.2	1.1 ± 0.1
H14ac	35.6 ± 0.8	48.2 ± 1.8	27.5 ± 2.8	11.8 ± 2.4	38.9 ± 1.4	10.2 ± 2.2
H14ph	2.3 ± 0.2	2.2 ± 0.1	1.6 ± 0.2	1.8 ± 0.4	3.8 ± 0.4	1.5 ± 0.4
H14acph	24.5 ± 1.4	22.2 ± 1.0	20.1 ± 0.5	26.5 ± 2.1	24.7 ± 1.7	25.6 ± 2.1
H14acph2	11.5 ± 0.8	8.7 ± 0.9	14.7 ± 2.0	22.3 ± 1.2	13.7 ± 0.7	26.6 ± 3.5
H14acph3	1.0 ± 0.5	0.7 ± 0.2	11.3 ± 2.4	8.2 ± 1.9	2.8 ± 0.5	15.3 ± 3.7
H14acph4	0	0	5.8 ± 0.7	0	0	5.4 ± 3.4
H14acph5	0	0	2.1 ± 0.2	0	0	1.3 ± 0.2

Table S2. PTM identification on histone H1.2SNPA18VN α -ac

	H12ac (<i>m/z</i>)	H12SNPac (<i>m/z</i>)	$\Delta m/z$	Δ mass (Da)
Asyn 1-1	608.86689	609.66750	0.80061	28.02135
Asyn 1-2	608.86739	609.66838	0.80099	28.03465
Asyn 1-3	608.86733	609.66820	0.80087	28.03045
Asyn 2-1	608.86640	609.66762	0.80122	28.04270
Asyn 2-2	608.86673	609.66782	0.80109	28.03815
Asyn 2-3	608.86734	609.66785	0.80051	28.01785
S phase 1-1	608.86597	609.66711	0.80114	28.03990
S phase 1-2	608.86624	609.66726	0.80102	28.03570
S phase 1-3	608.86637	609.66762	0.80125	28.04375
S phase 2-1	608.86607	609.66784	0.80177	28.06195
S phase 2-2	608.86656	609.66796	0.80140	28.04900
S phase 2-3	608.86678	609.66774	0.80096	28.03360

Note, charge state 35^+ , average $\Delta m/z$ is 28.03742 ± 0.01178 , 0.528σ for H12SNP and dimethylation, and 3.611σ for formylation, given the theoretical mass of H12SNP and dimethylation is 28.03132, whereas formylation is 27.9949.

Table S3. P-values of ANOVA and t-tests for proteoforms relative abundance at different cell cycle stages

Proteoforms	MDA-MB231		MCF10A	
	ANOVA-test	t-test	ANOVA-test	t-test
H12ac	4.95×10^{-8}	3.72×10^{-4}	8.15×10^{-11}	1.78×10^{-10}
H12acph	3.71×10^{-6}	7.64×10^{-5}	4.64×10^{-10}	0.13
H12SNPac	N/A	N/A	3.70×10^{-8}	6.64×10^{-6}
H12SNPacph	N/A	N/A	1.15×10^{-8}	0.05
H12SNPacph2	N/A	N/A	6.28×10^{-15}	3.48×10^{-10}
H13ac	N/A	N/A	8.30×10^{-10}	0.18
H13acph	N/A	N/A	0.01	0.25
H14ph	8.9×10^{-6}	4.97×10^{-5}	2.03×10^{-7}	2.71×10^{-6}
H14ac	5.92×10^{-11}	3.04×10^{-8}	1.57×10^{-13}	1.22×10^{-10}
H14acph	1.3×10^{-5}	1.15×10^{-3}	0.32	0.47
H14acph2	6.8×10^{-6}	5.92×10^{-5}	1.23×10^{-7}	4.52×10^{-6}
H14acph3	1.5×10^{-9}	9.39×10^{-7}	8.96×10^{-7}	8.86×10^{-6}
H14acph4	1.33×10^{-13}	2.65×10^{-9}	2.92×10^{-4}	3.29×10^{-3}
H14acph5	1.02×10^{-14}	4.81×10^{-10}	1.48×10^{-12}	1.31×10^{-8}

Table S4. P-values of ANOVA and t-tests for histone variants total phosphorylations at different cell cycle stages

Proteoforms	MDA-MB231		MCF10A	
	ANOVA-test	t-test	ANOVA-test	t-test
H12	2.31×10^{-6}	7.79×10^{-6}	2.26×10^{-15}	1.41×10^{-12}
H13	N/A	N/A	0.02	0.17
H14	7.07×10^{-11}	2.12×10^{-8}	1.49×10^{-13}	5.23×10^{-11}

Table S5. P-values of ANOVA and t-tests for total phosphorylations on different sites at different cell cycle stages

Proteoforms	MDA-MB231		MCF10A	
	ANOVA-test	t-test	ANOVA-test	t-test
H12S173	2.31×10^{-6}	7.79×10^{-6}	2.26×10^{-15}	1.41×10^{-12}
H14S2	1.25×10^{-6}	6.13×10^{-5}	1.94×10^{-6}	2.80×10^{-6}
H14S172	9.10×10^{-11}	2.45×10^{-8}	1.62×10^{-14}	3.72×10^{-11}
H14S187	7.74×10^{-12}	1.03×10^{-8}	7.20×10^{-11}	6.99×10^{-9}
H14T18	1.08×10^{-15}	5.94×10^{-11}	9.01×10^{-6}	7.64×10^{-5}
H14T146	6.48×10^{-14}	1.64×10^{-9}	5.35×10^{-5}	1.13×10^{-3}
H14T153	8.51×10^{-15}	4.26×10^{-10}	2.67×10^{-12}	1.93×10^{-8}

Table S6. P-values of t-tests for proteoform relative abundance between two cell lines

Proteoforms	Asynchronous	S phase	M phase
H12ac	8.01×10^{-11}	5.14×10^{-10}	2.42×10^{-9}
H12acph	0.71	2.58×10^{-6}	5.87×10^{-7}
H12SNPac	5.06×10^{-12}	5.66×10^{-12}	3.49×10^{-7}
H12SNPacph	1.05×10^{-9}	1.80×10^{-9}	1.48×10^{-5}
H12SNPacph2	N/A	N/A	3.48×10^{-10}
H13ac	3.24×10^{-11}	5.18×10^{-11}	6.55×10^{-9}
H13acph	6.48×10^{-6}	4.75×10^{-9}	1.96×10^{-11}
H14ph	0.04	3.23×10^{-6}	0.67
H14ac	5.02×10^{-10}	1.31×10^{-6}	3.39×10^{-7}
H14acph	0.08	0.01	1.14×10^{-4}
H14acph2	6.07×10^{-9}	9.62×10^{-7}	2.84×10^{-5}
H14acph3	4.69×10^{-6}	1.58×10^{-6}	0.05
H14acph4	N/A	N/A	0.77
H14acph5	N/A	N/A	5.99×10^{-5}

Table S7. P-values for histone variants total phosphorylations between two cell lines

Histone Variants	Asynchronous	S phase	M phase
H12	5.70×10^{-9}	8.35×10^{-8}	7.89×10^{-9}
H13	1.59×10^{-6}	4.70×10^{-9}	1.61×10^{-9}
H14	5.43×10^{-10}	5.99×10^{-8}	3.40×10^{-7}

Table S8. P-values for total phosphorylations on different sites between two cell lines

Proteoforms	Asynchronous	S phase	M phase
H12S173	5.7×10^{-9}	8.35×10^{-8}	7.89×10^{-9}
H14S2	0.19	6.89×10^{-6}	0.51
H14S172	1.15×10^{-10}	8.79×10^{-8}	6.58×10^{-7}
H14S187	1.26×10^{-8}	3.89×10^{-7}	1.21×10^{-4}
H14T18	1.22×10^{-5}	1.40×10^{-6}	0.49
H14T146	N/A	N/A	0.29
H14T154	N/A	N/A	3.94×10^{-5}

Legends for Supporting Information Figures

Figure S1. Broadband ESI positive ion 9.4 T FT-ICR mass spectra of histone H1 from asynchronous, s phase, and m phase cells from cell lines MDA-MB-231 and MCF-10A.

Figure S2. ECD fragmentation maps for different histone proteoforms from cell line MDA-MB-231.

Figure S3. ECD fragmentation maps for different proteoforms from cell line MCF-10A.

Figure S4. Mass scale-expanded segment of ECD product ion mass spectra of histone H1.2 SNP A18V from asynchronous cells from cell line MCF-10A, showing identification of C_{16}^{2+} , C_{18}^{2+} , C_{19}^{2+} , C_{20}^{2+} , C_{21}^{2+} , C_{21}^{3+} , C_{22}^{2+} , and C_{22}^{3+} ions.

Figure S5. Peak annotations for the ECD product ion mass spectrum of asynchronous histone H1.2 SNP A18V from cell line MCF-10A. .

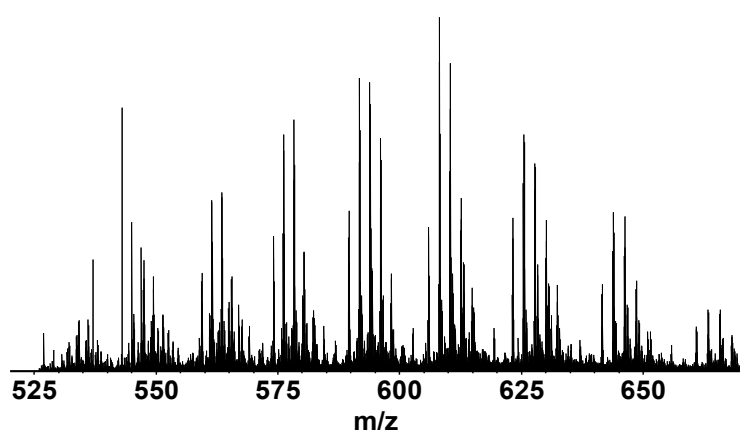
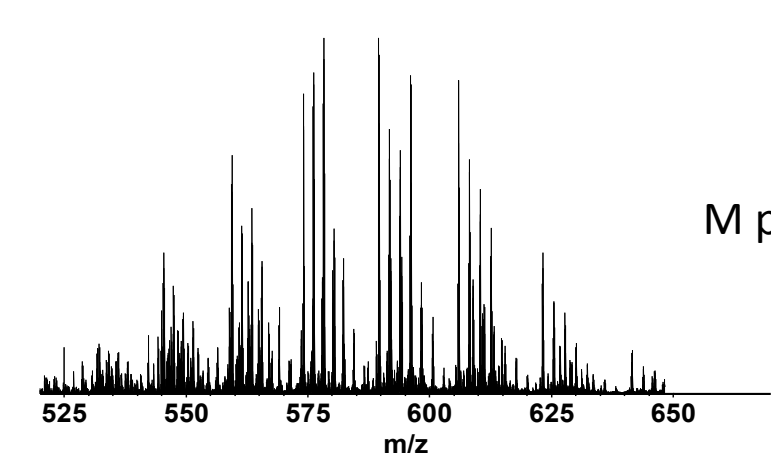
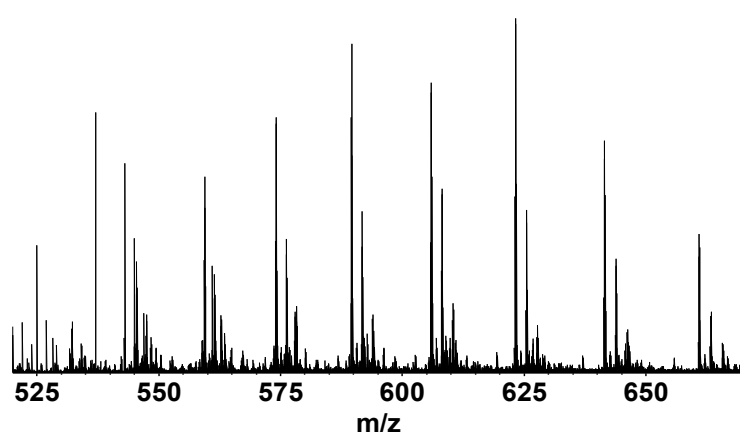
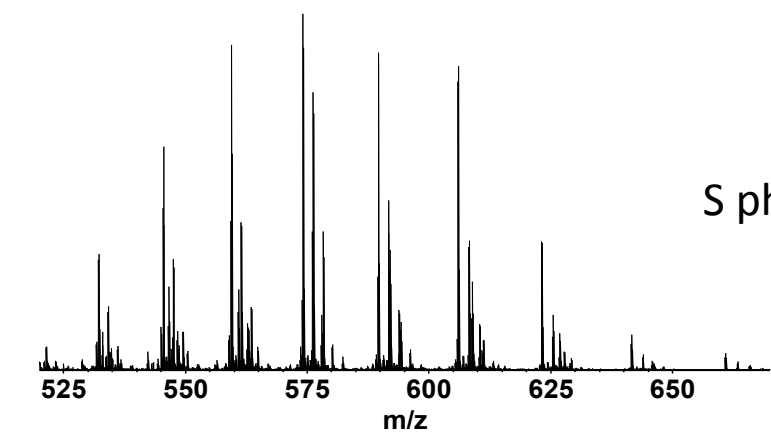
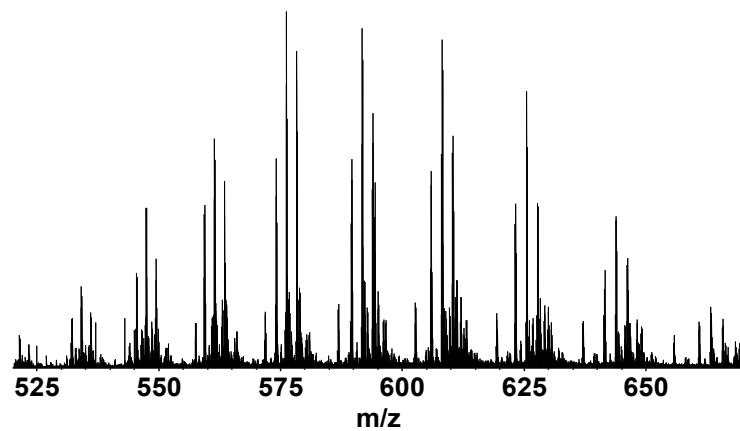
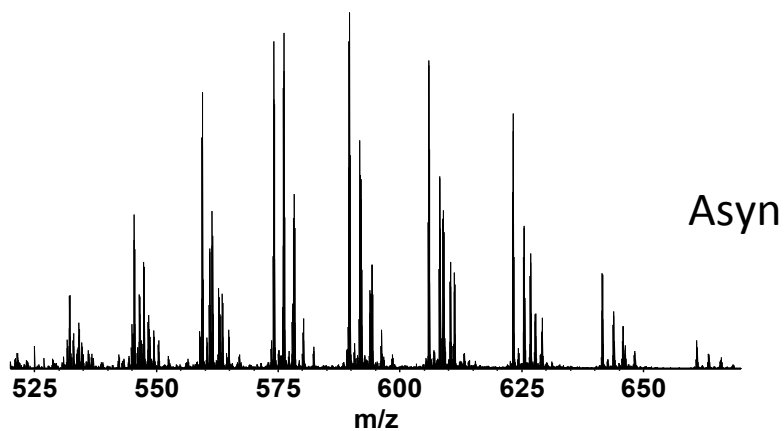
Figure S6. Peak annotations for the ECD product ion mass spectrum of S phase histone H1.2 SNP A18V from cell line MCF-10A. .

Figure S7. Peak annotations for the ECD product ion mass spectrum of asynchronous phosphorylated histone H1.2 SNP A18V from cell line MCF-10A.

MDA-MB-231

MCF-10A

Figure S1



H12ac_asyn

ac-S E T^{ph} A P A A P A^{ph} A A P P A E K^{ph} A P V K^{ph} K^{ph} A^{ph} A^{ph} K^{ph} K^{ph}
 A G^{ph} G^{ph} T P R^{ph} K^{ph} A S^{ph} G P P V^{ph} S^{ph} E^{ph} L I T K^{ph} A^{ph} V^{ph} A^{ph} A^{ph} S^{ph} K^{ph} E^{ph}
 R^{ph} S^{ph} G V S L^{ph} A^{ph} A^{ph} L K^{ph} K^{ph} A^{ph} L A A A G Y^{ph} D V^{ph} E^{ph} K^{ph} N^{ph} N^{ph} S^{ph} R
 I K^{ph} L G^{ph} L K S L V S K G T L V Q^{ph} T K G T G A S G S F
 K L N K K A A S G^{ph} E A^{ph} K P K V K K A G G T^{ph} K P K^{ph} K^{ph} P
 V G A A K^{ph} K^{ph} P K^{ph} K^{ph} A A G G A T P K K S^{ph} A K K^{ph} T P K^{ph} K^{ph}
 A K K P A A A T^{ph} V^{ph} T^{ph} K^{ph} K^{ph} V A K^{ph} S P K^{ph} K^{ph} A^{ph} K^{ph} V A^{ph} K^{ph} P^{ph} K^{ph} L
 K^{ph} A^{ph} A^{ph} K^{ph} S^{ph} A^{ph} A^{ph} K^{ph} A V^{ph} K^{ph} P K A A^{ph} K^{ph} P^{ph} K^{ph} V V^{ph} K^{ph} P^{ph} K^{ph} K^{ph} A^{ph} A^{ph}
 P^{ph} K^{ph} K^{ph} K^{ph}

H12acph asyn

ac-S E T^{ph} A P A A P A^{ph} A A P P A E K^{ph} A P V^{ph} K^{ph} K^{ph} A^{ph} A^{ph} K^{ph} K^{ph}
 A^{ph} G^{ph} G^{ph} T P R^{ph} K^{ph} A S^{ph} G P P V^{ph} S^{ph} E^{ph} L I T K^{ph} A^{ph} V^{ph} A^{ph} A^{ph} S^{ph} K^{ph} E^{ph}
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 I K^{ph} L G^{ph} L K S^{ph} L V S K G T L V Q^{ph} T K G T G A S G S F
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 P^{ph} K^{ph} K^{ph} K^{ph}

H120acT146ph asyn

ac-S E T^{ph} A P A A P A^{ph} A A P P A E K^{ph} A P V^{ph} K^{ph} K^{ph} A^{ph} A^{ph} K^{ph} K^{ph}
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 I K^{ph} L G^{ph} L K S^{ph} L V S K G T L V Q^{ph} T K G T G A S G S F
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 K^{ph} A^{ph} A^{ph} K^{ph} S^{ph} A^{ph} A^{ph} K^{ph} A V^{ph} K^{ph} P K A A^{ph} K^{ph} P^{ph} K^{ph} V V^{ph} K^{ph} P^{ph} K^{ph} K^{ph} A^{ph} A^{ph}
 P^{ph} K^{ph} K^{ph} K^{ph}

H14ph_asyn

^{ph} S E T A P A A P A^{ph} A P A P A E K^{ph} T P V K K K A R K S
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 K L N K K A A S G^{ph} E A^{ph} K P K A K K A G A A K A K K P
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 K P^{ph} K^{ph} K^{ph} A^{ph} A^{ph} K K K

H14ac_asyn

ac-S E T A P^{ph} A A P A A P A P A E K^{ph} T P V K^{ph} K^{ph} A^{ph} R^{ph} K S
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H14acph_asyn

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H14acphx2_asyn

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 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S F¹
 K L N K K A A S G¹E A¹K P¹K¹A K K A G¹A A¹K A K¹K P
 A G A A K K P K¹K¹A T G A A T P K K¹S A K K T P K¹K¹
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 K P¹K¹K A¹A¹K K K

H12ac_s phase

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 I K¹L G¹L K S¹L V S K G T L V¹Q¹T¹K G T¹G A S G¹S F
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 P¹K K K

H12acph_s phase

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 P¹K K K

H12acT146ph_s phase

ac-S E T A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹
 A¹G¹T P R¹K A S¹G P P V¹S¹E¹L I T¹K A V¹A A¹S¹K E¹
 R¹S¹G V¹S L¹A¹A¹L K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L G L K S L V S K G T L V¹Q T K G T G A S G S F
 K L N K K A A S G¹E A¹K P K V K K A G G T¹K P K¹K P
 V G A A K K P K¹K¹A A G G A¹T^{ph} P K K S A K K T P K K
 A K K P A A A T V T K K V A K S P K¹K¹A¹K V A¹K P¹K¹
 K¹A¹A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K¹K A¹A
 P¹K K K

MDA-MB-231

H14ph_s phase

^{ph}
 S E T A P A A P A A P A P A E K T P V K K K A R K S
 A G A A K R K A S G P P V S E L I T K A V A A S K E
 R S G V S L A A L K K A L A A A G Y D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G E A K P K A K K A G A A K A K K P
 A G A A K K P K K A T G A A T P K K S A K K T P K K
 A K K P A A A A G A K K A K S P K K A K A A K P K K
 A P K S P A K A K A V K P K A A K P K T A K P K A A
 K P K K A A A K K

H14ac_s phase

^{ac}-S E T A P A A P A A P A P A E K T P V K K K A R K S
 A G A A K R K A S G P P V S E L I T K A V A A S K E
 R S G V S L A A L K K A L A A A G Y D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G E A K P K A K K A G A A K K P
 A G A A K K P K K A T G A A T P K K S A K K T P K K
 A K K P A A A A G A K K A K S P K K A K A A K P K K
 A P K S P A K A K A V K P K A A K P K T A K P K A A
 K P K K A A A K K

H14acph_s phase

^{ac}-S E T A P A A P A A P A P A E K T P V K K K A R K S
 A G A A K R K A S G P P V S E L I T K A V A A S K E
 R S G V S L A A L K K A L A A A G Y D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G E A K P K A K K A G A A K K P
 A G A A K K P K K A T G A A T P K K S A K K T P K K
 A K K P A A A A G A K K A K S P K K A K A A K P K K
 A P K S P A K A K A V K P K A A K P K T A K P K A A
 K P K K A A A K K

H14acph2_s phase

^{ac}-S E T A P A A P A A P A P A E K T P V K K K A R K S
 A G A A K R K A S G P P V S E L I T K A V A A S K E
 R S G V S L A A L K K A L A A A G Y D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G E A K P K A K K A G A A K K P
 A G A A K K P K K A T G A A T P K K S A K K T P K K
 A K K P A A A A G A K K A K S P K K A K A A K P K K
 A P K S P A K A K A V K P K A A K P K T A K P K A A
 K P K K A A A K K

H12ac_m phase

ac-S E T¹A P A A P A¹A A P P¹A E K¹A P V¹K¹K¹A¹A¹K¹K¹
A¹G¹G¹T P¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G V¹S L¹A¹A¹L¹K¹K¹A¹L A A A G Y¹D V¹E¹K¹N¹N¹S R
I K¹L G¹L K S L V S K G T L V Q¹T¹K G T G A S G S F
K L N K K A A S G¹E A¹K P K V K K A G G T¹K P K¹K P
V G A A K¹K P K¹K¹A A G G A¹T P K K¹S¹A¹K K T P K¹K
A K¹K P A A A T V¹T¹K¹K V A K¹S P K¹K¹A K V A¹K P¹K¹
K¹A¹A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K¹K A¹A
P¹K K K

H12acph_m phase

ac-S E T¹A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹K¹
A¹G¹G¹T P¹R¹K¹A S¹G P P V¹S¹E¹L I T¹K A¹V¹A¹A¹S¹K¹E¹
R¹S¹G V¹S L¹A¹A¹L¹K¹K¹A¹L A A A G Y¹D V¹E¹K¹N¹N¹S R
I K¹L G¹L K S L V S K G T L V Q¹T¹K G T G A S G S F
K L N K K A A S G¹E A¹K P K V K K A G G T¹K P K¹K P
V G A A K¹K P K¹K¹A A G G A¹T P K K¹S¹A¹K K T P K¹K
A K¹K P A A A T V¹T¹K¹K V A K¹S P¹K¹K¹A¹K V A¹K P¹K¹
K¹A¹A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K¹K A¹A
P¹K K K

H12acT146ph_m phase

ac-S E T¹A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹K¹
A¹G¹G¹T P¹R¹K¹A S¹G P P V¹S¹E¹L I T¹K A¹V¹A¹A¹S¹K¹E¹
R¹S¹G V¹S L¹A¹A¹L¹K¹K¹A¹L A A A G Y¹D V¹E¹K¹N¹N¹S R
I K¹L G¹L K S L V S K G T L V Q¹T¹K G T G A S G S F
K L N K K A A S G¹E A¹K P K V K K A G G T¹K P K¹K P
V G A A K¹K P K¹K¹A A G G A¹T^{ph} P K K S A K K T P K¹K
A K K P A A A T V T K K V A K S P¹K¹K¹A¹K V A¹K P¹K¹
K¹A¹A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K¹K A¹A
P¹K K K

H14ph_m phase

^{ph}S E T A P A A P A¹A P A P A E K¹T P V K¹K K A R K S
A G A A K R¹K A S G P P V S¹E L I T K A V¹A A S¹K E¹
R S G V S L¹A A L K K A L A A A G Y¹D V E K N N S R
I K¹L G¹L K S L V S K G T L V Q¹T¹K G T G A S G S F
K L N K K A A S G¹E A¹K P K A K K A G A A K A K K P
A G¹A A K¹K P K K A T¹G A A T P K K¹S A K K T P K¹K
A K¹K P A A A A G¹A K K A K¹S P¹K¹K¹A¹K¹A A¹K P K¹K
A P K¹S P¹A¹K¹A¹K¹A V¹K P¹K¹A A¹K P K T A¹K P¹K A A¹
K P¹K¹K A¹A¹K K K

H14ac_m phase

ac-S E T A P¹A A P A¹A P A P A E K¹T P V K¹K K¹A R K¹S
A¹G¹A A K R¹K¹A S¹G P P V¹S¹E¹L I T¹K¹A V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A¹A G Y¹D V¹E¹K¹N¹N¹S¹R
I K¹L G¹L K¹S¹L¹V¹S¹K¹G T¹L V¹Q¹T¹K G T G¹A S G¹S¹F
K L N¹K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
A¹G¹A A K¹K P K¹K¹A T¹G A A¹T P K¹K¹S¹A¹K K T P K¹K
A K¹K P A¹A A¹A¹G¹A¹K¹K A¹K¹S P¹K¹K¹A¹K¹A A¹K P K¹K
A P K S P¹A¹K¹A¹K A V¹K P K A A K P K T A¹K P¹K A A¹
K P¹K¹K A¹A¹K K K

H14acph_m phase

ac-S E T¹A P¹A A P A¹A P A P A E K¹T P V K¹K K¹A¹R¹K S
A G¹A¹A¹K¹R¹K¹A S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A¹A¹G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S¹F
K L¹N K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
A G¹A A K¹K P K K A T¹G A A¹T P K¹K¹S¹A¹K K T P K¹K¹
A K K P A A A A¹A¹G¹A¹K¹K A K¹S¹ P¹K¹K¹A¹K¹A A¹K P K¹K
A P K S P¹A¹K¹A¹K A V¹K P¹K¹A A¹K P K T A¹K P¹K A A¹
K P¹K¹K A¹A¹K K K

H14acph2_m phase

ac-S E T¹A P A A P A¹A P¹A P A E¹K¹T P V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K E¹
R¹S¹G V¹S¹L¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K¹S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S¹F¹
K L¹N¹K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
A G A A K¹K P K¹K¹A T G A A T P K K¹S A K K T P K¹K¹
A K K P A A A¹A¹G¹A¹K¹A K¹A K¹S¹ P K¹K¹A¹K A A¹K P K K
A P K¹S¹ P¹A¹K¹A¹K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K¹A¹A¹K K K

H14acph3_m phase

ac-S E T¹A P A A P A A P A P A E¹K¹T^{ph} P¹V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K E¹
R¹S¹G V¹S¹L¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S¹F¹
K L¹N¹K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K K P
A G A A K¹K P K¹K¹A T G A A T P K¹K¹S¹A¹K¹K¹T P K¹K¹
A K K P A A¹A¹A¹G¹A¹K¹A K¹S¹ P¹K¹K¹A¹K A A¹K P¹K¹K
A P K¹S¹ P¹A¹K¹A¹K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K¹A¹A¹K K K

H14acph4 m phase

ac-S E T¹A P A A P A A P A P A E¹K¹T^{ph} P¹V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K E¹
R¹S¹G V¹S¹L¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S¹F¹
K L¹N¹K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
A G A A K¹K P K¹K¹A T G A A¹T^{ph} P K¹S A K K T P K¹K¹
A K¹K P A¹A¹A¹G¹A¹K¹A K¹S¹ P¹K¹K¹A¹K A A¹K P¹K¹K¹
A P K¹S¹ P¹A¹K¹A¹K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K¹A¹A¹K K K

H14acph5_m phase

ac-S E T¹A P A A P A A P A P A E¹K¹T^{ph} P¹V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K E¹
R¹S¹G V¹S¹L¹A¹L¹K¹A¹L A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S¹F
K L¹N¹K K A A S G¹E A¹K P¹K¹A K K A¹G A A K A K K P
A G A A K¹K P K¹K¹A T G A A¹T^{ph} P K¹K¹S A¹K¹K¹T^{ph} P K¹K¹
A K¹K P A A¹A¹A¹G¹A¹K¹A K¹A K¹S¹ P K¹K¹A¹K A A¹K P¹K K
A P K¹S¹ P¹A¹K¹A¹K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K¹A¹A¹K K K

H12 ac_asyn

ac-S E T A P A A P A A A P P A E K¹A P V K K¹K¹A¹K¹K¹
 A¹G¹G¹T P R¹K A S¹G P P P V¹S¹E¹L I T¹K A V¹A¹A¹S¹K¹E¹
 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L G¹L K S L V S K G T L V¹Q¹T K G T G A S G S F
 K L N K K A A S G¹E A K P K V K K A G G T¹K P K K P
 V G A A K¹K P K K¹A A G G A¹T P K K S A K K T P K K
 A K¹K P A A A T V¹T¹K¹K¹V A K¹S P K¹K¹A K V A¹K P K
 K A A K¹S¹A¹A¹K A V¹K P K A A¹K P K V V K P K K A¹A
 P¹K K K

H12 acph_asyn

ac-S E T¹A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹K¹
 A¹G¹G¹T P¹R¹K¹A S¹G P P P V¹S¹E¹L I T¹K¹A V¹A¹A¹S¹K¹E¹
 R¹S¹G V S L¹A¹A L K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L G¹L K S L V S K G T L V¹Q¹T K G T G A S G S F
 K L N K K A A S G¹E A¹K P K V K K A G G T¹K P K¹K P
 V G A A K K P K¹K¹A A G G A¹T P K K¹S¹A K K¹T P K¹K¹
 A K¹K P A A A¹T V¹T¹K¹K¹V A K¹S¹ P¹K¹K¹A¹K V A¹K P K
 K¹A A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K¹K A¹A
 P¹K K K

H12SNPac_asyn

ac-S E T¹A P A A P A A A P P A E K¹V P¹V¹K¹K¹A¹A¹K¹K¹
 A G¹G¹T P R¹K A¹S¹G P P P V¹S¹E¹L I T¹K A V¹A¹A¹S¹K¹E¹
 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K¹S¹L V¹S¹K G T L V¹Q¹T K G T G A S G¹S F¹
 K L N K K A A S G¹E A¹[K P¹K V K K A G G T¹K P K¹K P
 V G A A K¹K P K¹K¹A A G G A¹T P K K¹S A K K T P K K
 A K K P A A A T¹V¹T¹K¹K¹V A K¹S P K¹K A K V A K P¹K
 K A A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P K K A¹A
 P¹K K K

H12SNPacph_asyn

ac-S E T A P A A P A A A P P A E K¹V P¹V¹K¹K¹A¹A¹K¹K¹
 A G G¹T P R¹K A S¹G P P P V¹S¹E¹L I T¹K A V¹A¹A¹S¹K¹E¹
 R¹S¹G V S L¹A¹A¹L¹K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L G¹L K S L V S K G T L V¹Q¹T K G T G A S G S F
 K L N K K A A S G¹E A K P K V K K A G G T¹K P K¹K P
 V G A A K K P K K A A G G A¹T P K K¹S¹A K K T P K K
 A K¹K P A A A T¹V¹T¹K¹K¹V A K¹S¹ P¹K¹K¹A¹K V A¹K P K
 K A A K¹S¹A¹A¹K A V¹K P K A A¹K P K V V¹K P¹K K A¹A
 P¹K K K

H13 ac_asyn

ac-S E T A P¹L A P T I P A P A E K¹T P V K¹K¹A¹K¹K¹A¹
 G¹A¹T¹A¹G¹K¹R¹K A S G P P P V¹S¹E¹L I T¹K¹A V¹A¹A¹S¹K¹
 E¹R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A¹A G¹Y¹D V¹E¹K¹N¹N¹S
 R I K¹L G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S
 F¹K L N K K A A S G¹E G K P K A K K A G A A K P R K
 P A G A A K K P K¹K¹V A G A A T P K K¹S I K K T P K¹
 K V K K P A T A A G¹T¹K¹K V A¹K¹S¹A¹K¹K¹V K¹T P¹Q P
 K¹K A¹A K S P¹A¹K¹A K A P¹K P K A A¹K P K S G¹K P K
 V T¹K¹A¹K¹K A¹A P¹K K K

H14ac asyn

ac-S E T A P A A P A¹A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P P V¹S¹E¹L I T¹K¹A V¹A¹A¹S¹K¹E¹
 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A¹A G¹Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S F¹
 K L N K K A A S G¹E A K P K¹A K K A¹G¹A¹A¹K¹A K¹K P
 A G A A K¹K P K¹K¹A T G A A¹T P K¹K¹S¹A K K T P K¹K
 A K¹K P A A A¹A¹G¹A¹K¹K A K¹S P¹K¹K¹A¹K¹A A¹K P K¹K
 A P K¹S P¹A¹K¹A¹K A V¹K P K A A¹K P K T A¹K P¹K A A¹
 K P¹K¹K A¹A¹K K K

MCF-10A

Figure S3

H14acph_asyn

H14acph2_asyn

H14acph3_asyn

ac-S E T¹A P A A P A¹A P¹A P¹A E K¹T P V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I¹T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S F¹
K L N K K A A S G¹E A¹K P¹K¹A K K A G¹A A¹K A K¹K P
A G A A K¹K P K¹K¹A T G A A¹T P K¹K¹S¹A K K T P K¹K¹
A K K P A¹A¹A¹G¹A¹K¹K¹A K¹S¹P K¹K¹A¹K¹A¹A¹K P K K
A P K S P¹A¹K¹A¹K A V¹K P K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K A¹A¹A¹K K K

ac-S E T¹A P A A P A¹A P A P¹A E K¹T P V K¹K¹A¹R¹K¹S¹
A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I¹T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S F¹
K L N K K A A S G¹E A K P K A K K A G¹A A¹K A K K P
A G A A K¹K P K¹K¹A T G A A¹T P K K¹S A K¹K¹T P K K¹
A K¹K P A A A¹A¹G¹A¹K¹K A K¹S¹P K¹K¹A¹K A A¹K P K K
A P K¹S¹P¹A¹K¹A¹K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
K P¹K¹K A¹A¹A¹K K K

ac-S E T¹A P A A P A A P A P¹A E K¹T P V K¹K¹A R¹K¹S¹
A¹G¹A A K¹R¹K A S¹G P P V¹S¹E¹L I T K A V¹A¹A¹S K E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S L V S¹K G T L V¹Q¹T K G T G A S G S F
K L N K K A A S G¹E A K P K A K K A G A A K A K K P
A G A A K K P K K¹A T G A A T P K K¹S A K K T P K K
A K K P A A A¹A¹G¹A K K¹A K¹S¹P K¹K¹A¹K A A¹K P K K
A P K¹S¹P¹A¹K¹A¹K A V¹K P K A A¹K P K T A¹K P K A A¹
K P K K A¹A¹A¹K K K

MCF-10A s phase

H12ac_s phase

H12acph_s phase

H12SNPac_s phase

ac-S E T A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹
A¹G¹T P R¹K A S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L A A A G¹Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S F¹
K L N K K A A S G¹E A K P K V K K A G G T K P K¹K P
V G A A K¹K P K K¹A A G G A¹T P K¹K¹S A K K T P K¹K
A K K P A A A T V¹T¹K¹K V A K¹S¹P K¹K¹A K V A¹K P¹K¹
K¹A A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K K A¹A
P¹K K K

ac-S E T A P A A P A A A P P A E K¹A P V¹K¹K¹A¹A¹K¹
A¹G¹T P R K A S¹G P P V¹S¹E¹L I T K A V¹A A S¹K E¹
R S G V S L¹A¹A L K¹K A L A A A G Y¹D V E K N N S R
I K L G L K S L V S K G T L V Q¹T K G T G A S G S F
K L N K K A A S G¹E A K P K V K K A G G T K P K K P
V G A A K K P K K A A G G A T P K K¹S A K K T P K K
A K K P A A A T V¹T¹K¹K V A K¹S¹P K¹K¹A¹K V A¹K P K
K A A K¹S¹A¹A¹K A V¹K P K A A¹K P K V V¹K P K K A¹A
P¹K K K

ac-S E T¹A P A A P A A A P P A E K¹V P¹V¹K¹K¹A¹A¹K¹
A¹G¹T P R¹K¹A S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
R¹S¹G¹V¹S¹L¹A¹A¹L¹K¹K¹A¹L A A A G Y¹D V¹E¹K¹N¹N¹S R
I K¹L¹G¹L K¹S¹L¹V¹S¹K G T L V¹Q¹T K G T G A S G¹S F¹
K L N K K A A S G¹E A¹K P¹K V K K A G G T K P K¹K P
V G¹A¹A K¹K P K¹K¹A A G G A¹T P K K S A K K T P K¹K
A K K P A A A T V¹T¹K¹K V A K¹S¹P K¹K¹A¹K V A¹K P¹K
K¹A A K¹S¹A¹A¹K A V¹K P K A A¹K P¹K V V¹K P¹K K A¹A
P¹K K K

MCF-10A

H13ac_s phase

ac-S E T¹A P¹L A P T I P A P A E K¹T P V K¹K¹A¹K¹K A
 G¹A¹T¹A¹G¹K¹R¹K A S G P P V¹S¹E¹L I T¹K¹A V¹A A¹S¹K
 E¹R¹S¹G V S¹L¹A¹A¹L K¹K¹A¹L A A A G¹Y¹D V¹E¹K¹N¹N¹S
 R I K¹L¹G¹L K S L V¹S K G T L V¹Q¹T¹K G T G A S G¹S
 F¹K L N K K A A S G¹E G¹K P K¹A K K A G A A K P R K
 P A G A A K K P K¹K V A G A A T P K K¹S I K K T P K¹
 K V K K P A T¹A A¹G¹T¹K¹K V A K¹S¹A¹K¹K¹V K¹T P¹Q P
 K¹K¹A¹A¹K¹S P A¹K¹A¹K A P¹K P K A A¹K P K S G¹K P K
 V T¹K¹A¹K¹K A¹A P¹K K K

H14ac_s phase

ac-S E T¹A P¹A A P A¹A P¹A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T G A S G¹S F¹
 K L N K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
 A G A A K¹K P K¹K¹A T¹G A A¹T P K¹K¹S¹A K K¹T P¹K¹K
 A K¹K P A A A¹A¹G¹A¹K¹K A K¹S P¹K¹K¹A¹K¹A A¹K P K K
 A P K S P¹A¹K¹A K A V¹K P K A A¹K P K T A¹K P¹K A A¹
 K P¹K¹K A¹A¹K K K

H14acph_s phase

ac-S E T¹A P A A P A¹A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
 R¹S¹G V¹S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S¹L V S¹K G T L V¹Q¹T¹K G T G A S G¹S F
 K L N K K A A S G¹E A¹K P¹K¹A K K A¹G¹A A¹K A K¹K P
 A G A A K¹K P K¹K¹A T¹G A A T P K K¹S A K K T P K¹K
 A K K P A A A¹A¹G¹A¹K¹K A K¹S P¹K¹K¹A¹K¹A A¹K P K¹K
 A P K S P¹A¹K¹A¹K A V¹K P K A A K P K T A¹K P¹K A A¹
 K P¹K¹K A¹A¹K K K

H14acph2_s phase

ac-S E T¹A P A A P A¹A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T¹K¹A¹V¹A¹A¹S¹K¹E¹
 R¹S¹G V S¹L¹A¹A¹L¹K¹K¹A¹L¹A A A G¹Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S¹L¹V¹S¹K G T L V¹Q¹T¹K G T¹G A S G¹S F¹
 K L N¹K K A A S G¹E A¹K P K A K K A G¹A A¹K A K K P
 A G A A K K P K¹K¹A T¹G A A T P K K¹S A K K T P K¹K¹
 A K K P A¹A A¹A¹G¹A¹K¹K A K¹S P¹K¹K¹A¹K A A¹K P K K
 A P K¹S P¹A¹K¹A K A V¹K P¹K A A¹K P K T A¹K P¹K A A¹
 K P¹K¹K A¹A¹K K K

MCF-10A m phase

H14ac_m phase

ac-S E T A P A A P A A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K¹A V¹A¹S¹K¹E¹
 R S G V S L¹A A L K K A L A A A G Y¹D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G¹E A K P K A K K A G A A K A K K P
 A G A A K K P K K¹A T G A A T P K K S A K K T P K K
 A K K P A A A A G A¹K K A K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K
 A P K S P A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K

H14acph_m phase

ac-S E T A P A A P A A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K A V A A S¹K¹E¹
 R S G V S L¹A¹A L K K A L A A A G Y¹D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G¹E A K P K A K K A G A A K A K K P
 A G A A K K P K K A T G A A T P K K S A K K T P K K
 A K K P A A A¹A¹G¹A¹K K¹A¹K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K
 A P K S P A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K

H14acph2_m phase

ac-S E T¹A P A A P A A P A P A E K¹T P V K¹K¹A¹R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K¹A V¹A¹S¹K¹E¹
 R¹S G V S L¹A¹A L K¹K¹A L A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L G L K S¹L V S K G T L V Q¹T K G T G A S G S F
 K L N K K A A S G¹E A K P K A K K A G A A K A K K P
 A G A A K K P K K¹A T G A A T P K K S A K K T P K K
 A K K P A A A¹A¹G¹A¹K K¹A¹K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K
 A P K¹S¹P¹A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K

H14acph3_m phase

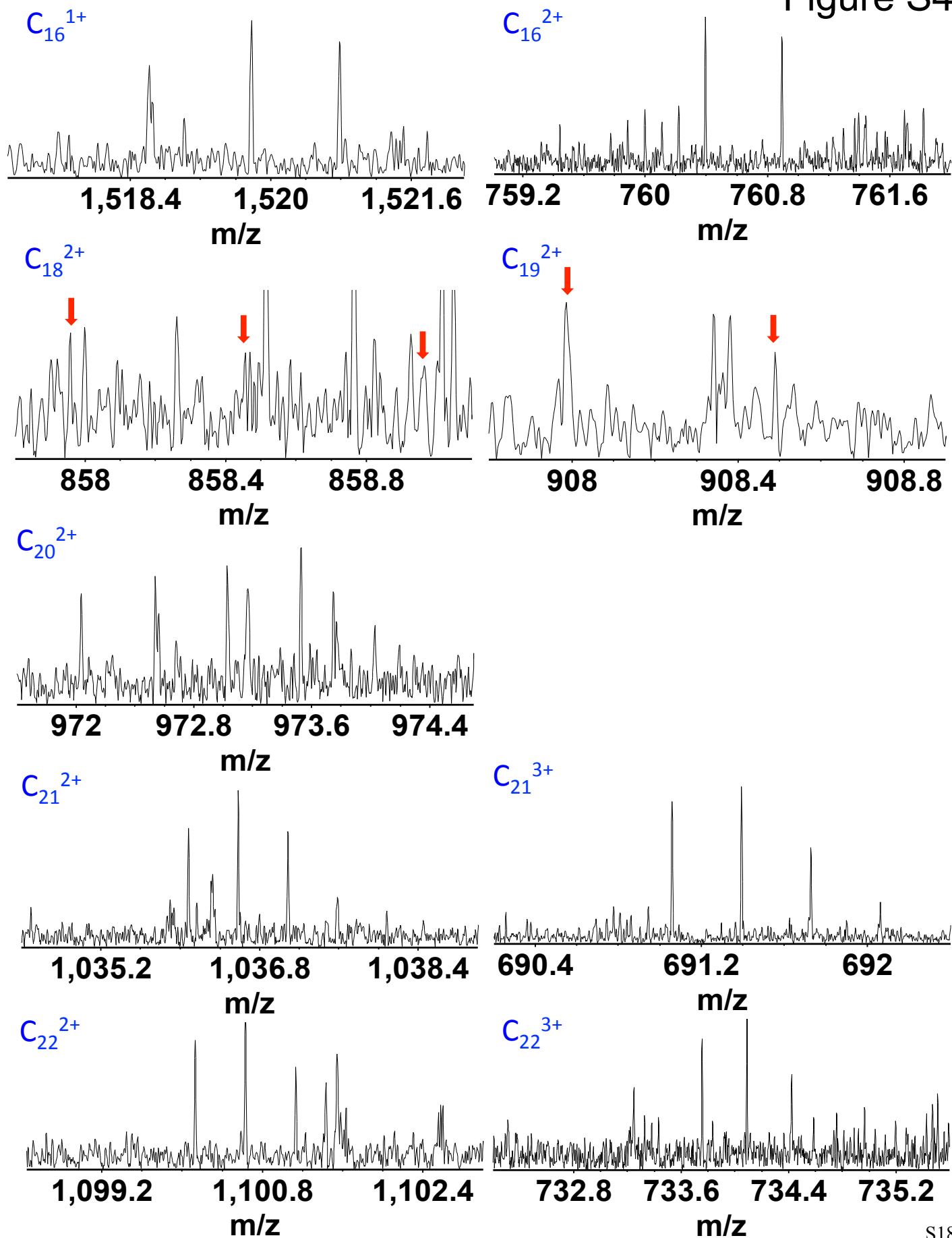
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 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K A V¹A¹A¹S¹K¹E¹
 R¹S G V¹S¹L¹A¹A L¹K¹K¹A¹L¹A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S L¹V¹S¹K G T L V Q¹T¹K G T G A S G¹S¹F¹
 K L N K K A A S G¹E A K P K A K K A G¹A A K A K K P
 A G A A K K P K¹K¹A T G A A T P K¹K¹S A K K T P K¹K¹
 A K K P A A A¹A¹G¹A¹K K¹A¹K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K¹
 A P K¹S¹P¹A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K

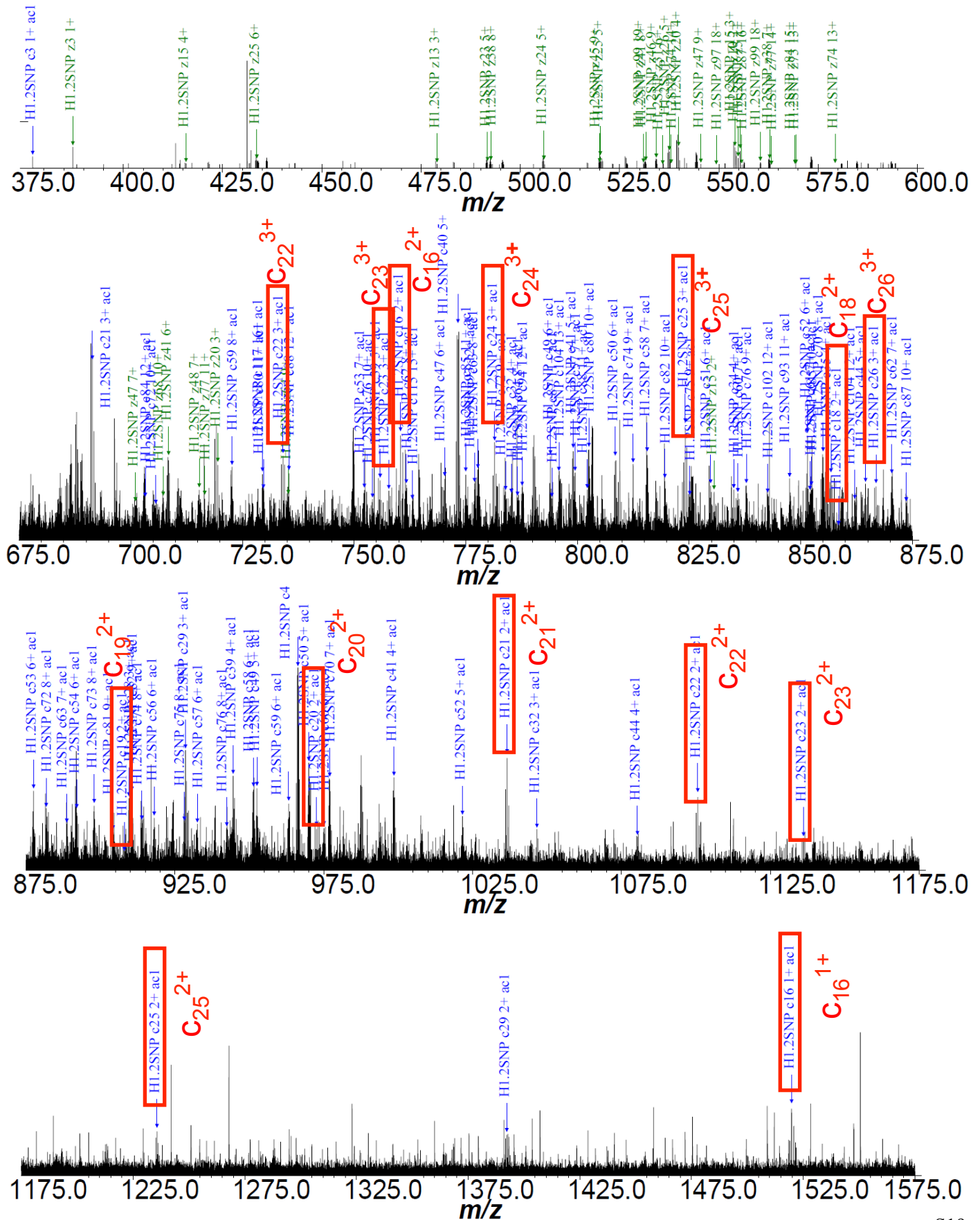
H14acph4_m phase

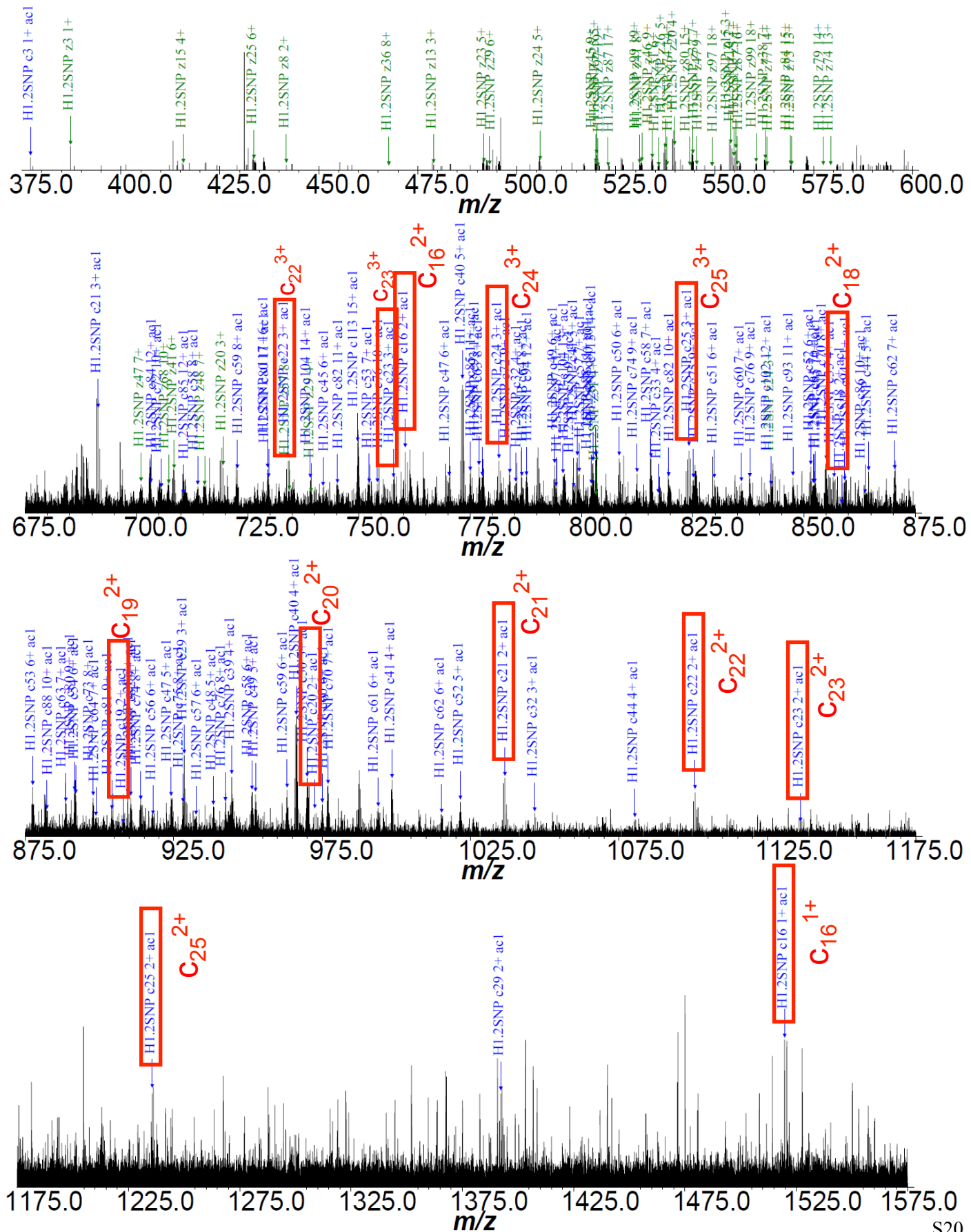
ac-S E T A P A A P A A P A P A E K¹T^{ph} P V K¹K¹K A R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K¹A V¹A¹A¹S¹K¹E¹
 R¹S G V¹S¹L¹A¹A L¹K¹K¹A¹L¹A A A G Y¹D V¹E¹K¹N¹N¹S R
 I K¹L¹G¹L K S L¹V¹S¹K G T L V Q¹T¹K G T G A S G¹S¹F¹
 K L N K K A A S G¹E A K P K A K K A G¹A A K A K K P
 A G A A K K P K¹K¹A T G A A T^{ph} P K¹K¹S A K K T P K¹K¹
 A K K P A A A¹A¹G¹A¹K K A K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K
 A P K¹S¹P¹A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K

H14acph5_m phase

ac-S E T¹A P A A P A A P A P A E K¹T^{ph} P V K¹K¹K A R¹K¹S¹
 A¹G¹A¹A¹K¹R¹K¹A¹S¹G P P V¹S¹E¹L I T K A V A A S¹K¹E¹
 R S G V S L A A L K K A L A A A G Y D V E K N N S R
 I K L G L K S L V S K G T L V Q T K G T G A S G S F
 K L N K K A A S G E A K P K A K K A G A A K A K K P
 A G A A K K P K K A T G A A T^{ph} P K K S A K K T^{ph} P K¹K¹
 A K¹K¹P A A A¹A¹G¹A¹K K¹A¹K¹S¹P¹K¹K¹A¹K¹A¹K¹P K K
 A P K¹S¹P¹A¹K¹A¹K A V¹K¹P K A A¹K¹P K T A¹K¹P K A A¹
 K P¹K¹K¹A¹A¹A¹K K K







Asynchronous H1.2SNP A18V N_α-ac

Figure S7

