
Supplementary information

An atlas of substrate specificities for the human serine/threonine kinome

In the format provided by the
authors and unedited

Supplementary Figure 1:

Compendium of experimental peptide phosphorylation motifs for the human serine/threonine kinome (compressed file)

See high resolution images at <https://kinase-library.phosphosite.org/site>

[Click name of kinase to go to results page](#)

GENE	PROTEIN	UNIPROT ID	GENE	PROTEIN	UNIPROT ID
AAK1	AAK1	Q2M2I8	CDK4	CDK4	P11802
ACVR1	ALK2	Q04771	CDK5	CDK5	Q00535
ACVR1B	ALK4	P36896	CDK6	CDK6	Q00534
ACVR2A	ACVR2A	P27037	CDK7	CDK7	P50613
ACVR2B	ACVR2B	Q13705	CDK8	CDK8	P49336
AKT1	AKT1	P31749	CDK9	CDK9	P50750
AKT2	AKT2	P31751	CDKL1	CDKL1	Q00532
AKT3	AKT3	Q9Y243	CDKL5	CDKL5	Q3UTQ8
ALPK1	ALPHA3	Q96QP1	CHEK1	CHK1	O14757
ATM	ATM	Q13315	CHEK2	CHK2	O96017
ATR	ATR	Q13535	CHUK	IKKA	O15111
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BMP2K	BIKE	Q9NSY1	CLK3	CLK3	P49761
BMPR1A	BMPR1A	P36894	CLK4	CLK4	Q9HAZ1
BMPR1B	BMPR1B	O00238	CSNK1A1	CK1A	P48729
BMPR2	BMPR2	Q13873	CSNK1A1L	CK1A2	Q8N752
BRAF	BRAF	P15056	CSNK1D	CK1D	P48730
BRSK1	BRSK1	Q8TDC3	CSNK1E	CK1E	P49674
BRSK2	BRSK2	Q8IWQ3	CSNK1G1	CK1G1	Q9HCP0
BUB1	BUB1	O43683	CSNK1G2	CK1G2	P78368
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CAMK1D	CAMK1D	Q8IU85	CSNK2A1	CK2A1	P68400
CAMK1G	CAMK1G	Q96NX5	CSNK2A2	CK2A2	P19784
CAMK2A	CAMK2A	Q9UQM7	DAPK1	DAPK1	P53355
CAMK2B	CAMK2B	Q13554	DAPK2	DAPK2	Q9UIK4
CAMK2D	CAMK2D	Q13557	DAPK3	DAPK3	O43293
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CAMK4	CAMK4	Q16566	DCLK2	DCAMKL2	Q8N568
CAMKK1	CAMKK1	Q8N5S9	DMPK	DMPK1	Q09013
CAMKK2	CAMKK2	Q96RR4	DSTYK	DSTYK	Q6XUX3
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CDC42BPB	MRCKB	Q9Y5S2	DYRK1B	DYRK1B	Q9Y463
CDC7	CDC7	O00311	DYRK2	DYRK2	Q92630
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CDK12	CDK12	Q9NYV4	EEF2K	EEF2K	O00418
CDK13	CDK13	Q14004	EIF2AK1	HRI	Q9BQI3
CDK14	CDK14	O94921	EIF2AK2	PKR	P19525
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CDK18	CDK18	Q07002	ERN1	IRE1	O75460
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CDK3	CDK3	Q00526	GAK	GAK	O14976

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GRK7	GRK7	Q8WTQ7
GSK3A	GSK3A	P49840
GSK3B	GSK3B	P49841
HASPIN	HASPIN	Q8TF76
HIPK1	HIPK1	Q86Z02
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HIPK4	HIPK4	Q8NE63
HUNK	HUNK	P57058
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IKBKE	IKKE	Q14164
IRAK1	IRAK1	P51617
IRAK4	IRAK4	Q9NWZ3
LATS1	LATS1	O95835
LATS2	LATS2	Q9NRM7
LRRK2	LRRK2	Q5S007
MAK	MAK	P20794
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MAP2K2	MEK2	P36507
MAP2K5	MEK5	Q13163
MAP3K1	MEKK1	Q13233
MAP3K10	MLK2	Q02779
MAP3K11	MLK3	Q16584
MAP3K12	DLK	Q12852
MAP3K14	NIK	Q99558
MAP3K15	MAP3K15	Q6ZN16
MAP3K19	YSK4	Q56UN5
MAP3K2	MEKK2	Q9Y2U5
MAP3K20	ZAK	Q9NYL2
MAP3K21	MLK4	Q5TCX8
MAP3K3	MEKK3	Q99759
MAP3K5	ASK1	Q99683
MAP3K6	MEKK6	O95382
MAP3K7	TAK1	O43318
MAP3K8	COT	P41279
MAP3K9	MLK1	P80192
MAP4K1	HPK1	Q92918
MAP4K2	GCK	Q12851
MAP4K3	KHS2	Q8IVH8
MAP4K4	HGK	O95819
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MAPK1	ERK2	P28482
MAPK10	JNK3	P53779
MAPK11	P38B	Q15759

GENE	PROTEIN	UNIPROT ID
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MAPK14	P38A	Q16539
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MAPK3	ERK1	P27361
MAPK7	ERK5	Q13164
MAPK8	JNK1	P45983
MAPK9	JNK2	P45984
MAPKAPK2	MAPKAPK2	P49137
MAPKAPK3	MAPKAPK3	Q16644
MAPKAPK5	MAPKAPK5	Q8IW41
MARK1	MARK1	Q9POL2
MARK2	MARK2	Q7KZI7
MARK3	MARK3	P27448
MARK4	MARK4	Q96L34
MASTL	MASTL	Q96GX5
MELK	MELK	Q14680
MINK1	MINK	Q8N4C8
MKNK1	MNK1	Q9BUB5
MKNK2	MNK2	Q9HBH9
MOK	MOK	Q9UQ07
MOS	MOS	P00540
MTOR	MTOR	P42345
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MYLK3	CAMLCK	Q32MK0
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MYO3B	MYO3B	Q8WXR4
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NEK11	NEK11	Q8NG66
NEK2	NEK2	P51955
NEK3	NEK3	P51956
NEK4	NEK4	P51957
NEK5	NEK5	Q6P3R8
NEK6	NEK6	Q9HC98
NEK7	NEK7	Q8TDX7
NEK8	NEK8	Q86SG6
NEK9	NEK9	Q8TD19
NIM1K	NIM1	Q8IY84
NLK	NLK	Q9UBE8
NUAK1	NUAK1	O60285
NUAK2	NUAK2	Q9H093
OXSRI	OSR1	O95747
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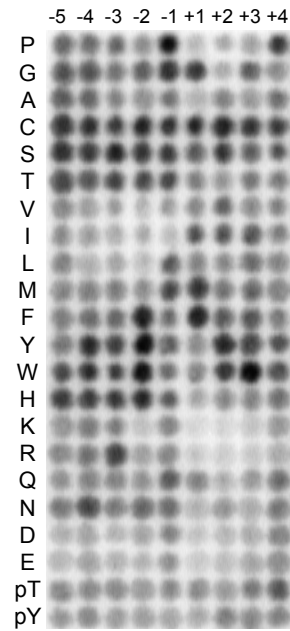
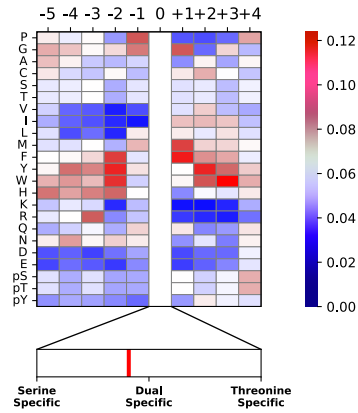
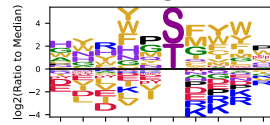
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PIM1	PIM1	P11309
PIM2	PIM2	Q9P1W9
PIM3	PIM3	Q86V86
PINK1	PINK1	E0W1I1
PKN1	PKN1	Q16512
PKN2	PKN2	Q16513
PKN3	PKN3	Q6P5Z2
PLK1	PLK1	P53350
PLK2	PLK2	Q9NYY3
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PLK4	PLK4	O00444
PNCK	CAMK1B	Q6P2M8
PRKAA1	AMPKA1	Q13131
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PRKACA	PKACA	P17612
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PRKCG	PKCG	P05129
PRKCH	PKCH	P24723
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RIPK4	ANKRD3	P57078
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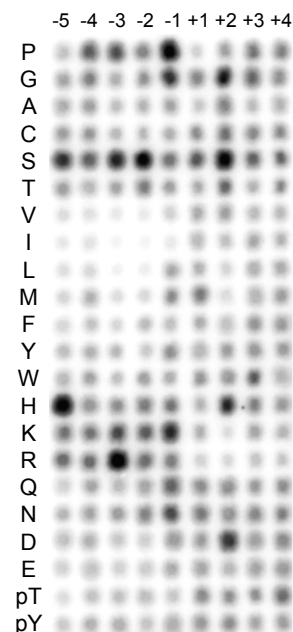
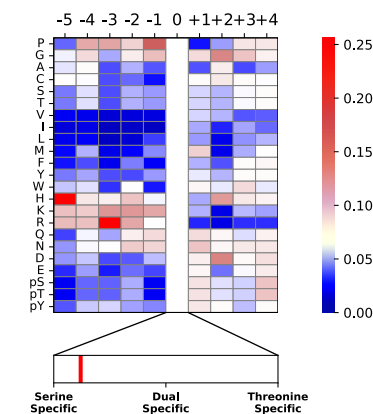
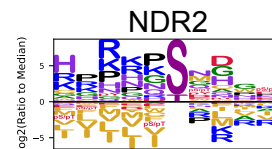
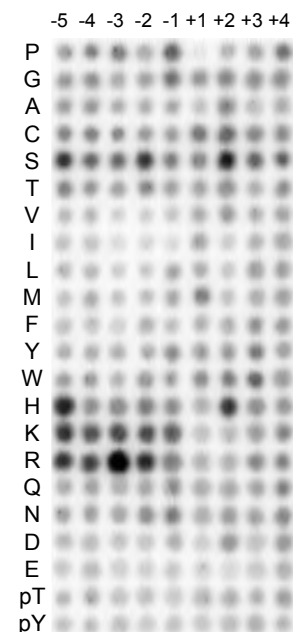
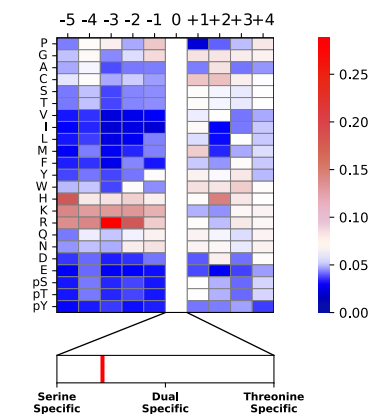
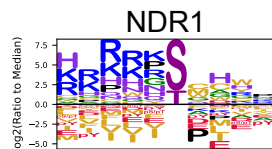
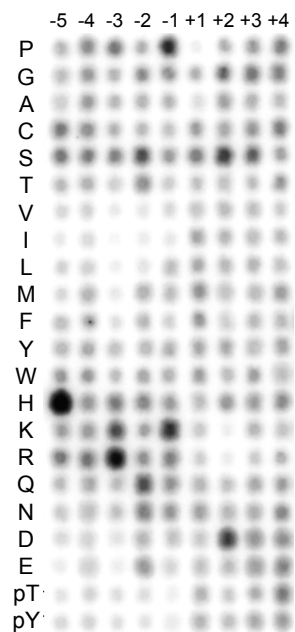
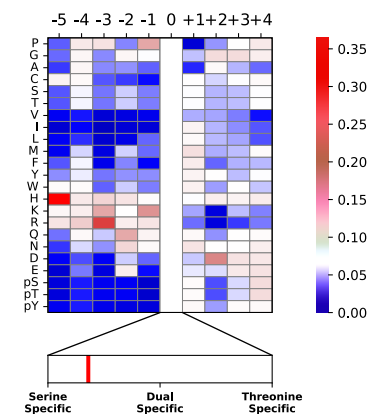
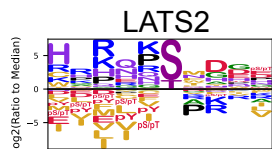
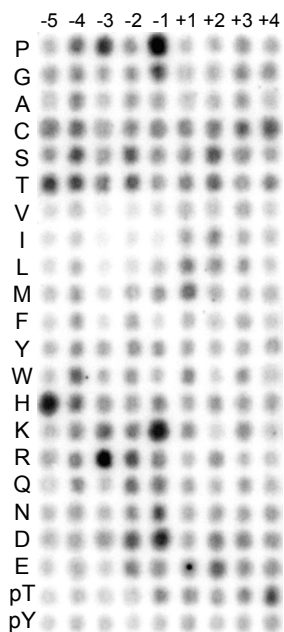
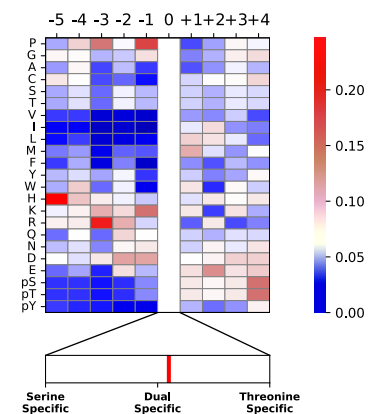
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RPS6KB2	P70S6KB	Q9UBS0
SBK1	SBK	Q52WX2
SGK1	SGK1	O00141
SGK3	SGK3	Q96BR1
SIK1	SIK	P57059
SIK2	QIK	Q9H0K1
SIK3	QSK	Q9Y2K2
SLK	SLK	Q9H2G2
SMG1	SMG1	Q96Q15
SNRK	SNRK	Q9NRH2
SRPK1	SRPK1	Q96SB4
SRPK2	SRPK2	P78362
SRPK3	SRPK3	Q9UPE1
STK10	LOK	O94804
STK11	LKB1	Q15831
STK16	MPSK1	O75716
STK17A	DRAK1	Q9UEE5
STK24	MST3	Q9Y6E0
STK25	YSK1	O00506
STK26	MST4	Q9P289
STK3	MST2	Q13188
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STK32C	YANK3	Q86UX6
STK33	STK33	Q9BYT3
STK38	NDR1	Q15208
STK38L	NDR2	Q9Y2H1
STK39	STLK3	Q9UEW8
STK4	MST1	Q13043
TAOK1	TAO1	Q7L7X3
TAOK2	TAO2	Q9UL54
TAOK3	TAO3	Q9H2K8
TBK1	TBK1	Q9UHD2
TGFBR1	TGFBR1	P36897
TGFBR2	TGFBR2	P37173
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TLK2	TLK2	Q86UE8
TNIK	TNIK	Q9UKE5
TP53RK	PRPK	Q96S44
TRPM6	CHAK2	Q9BX84
TRPM7	CHAK1	Q96QT4
TSSK1B	TSSK1	Q9BXA7
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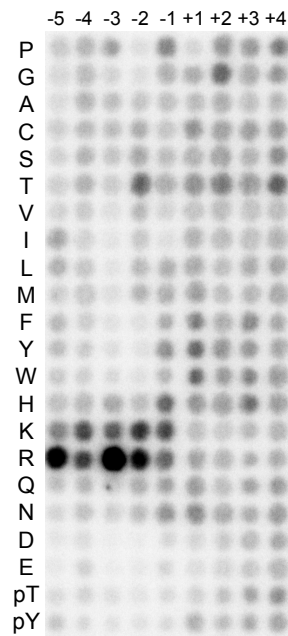
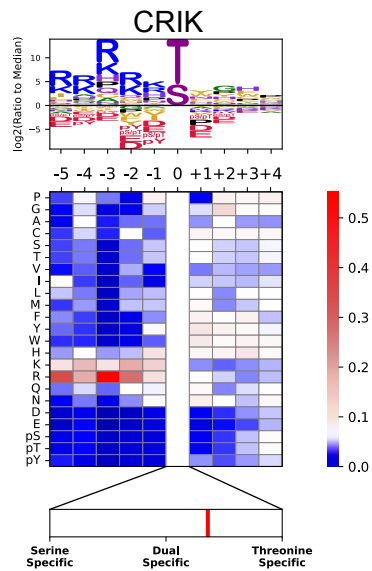
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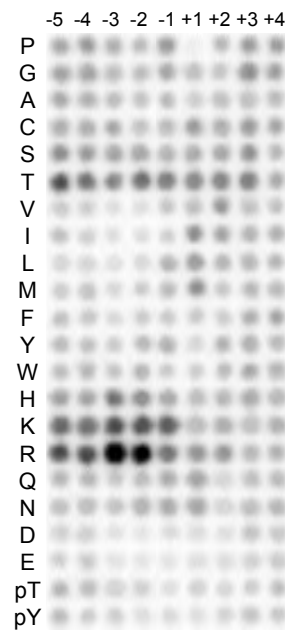
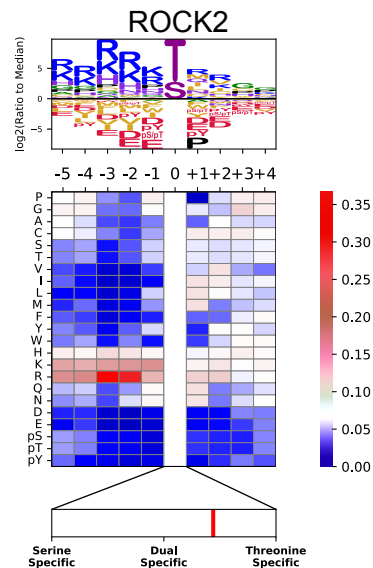
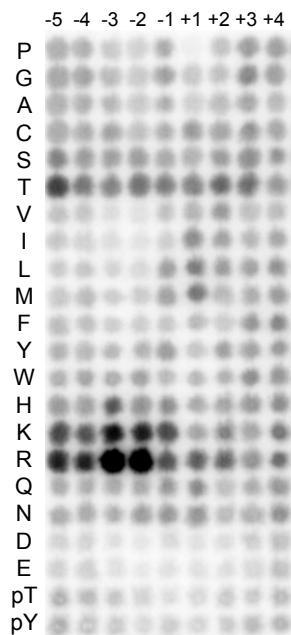
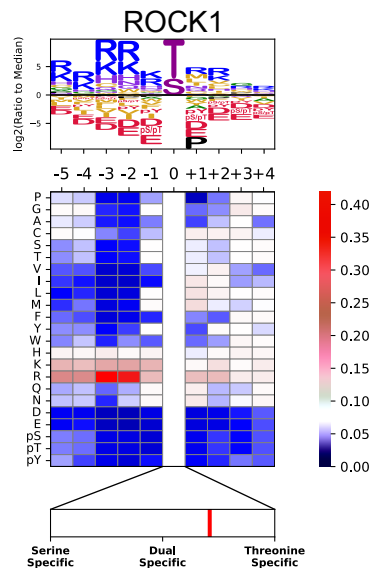
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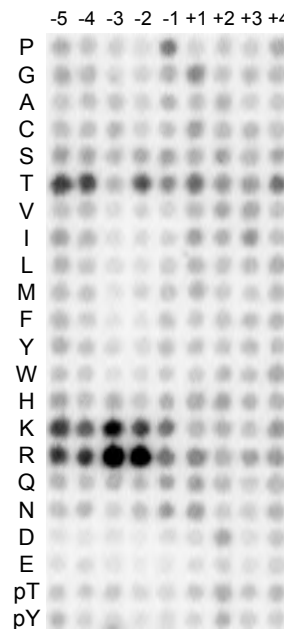
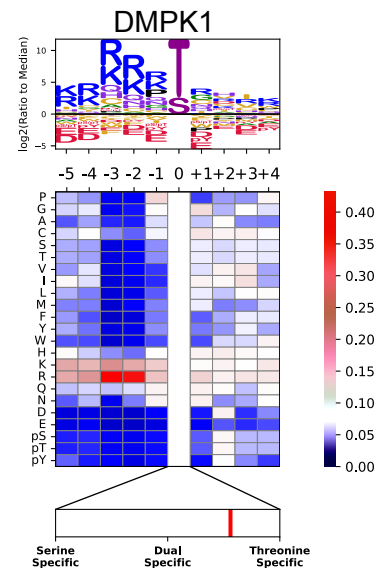
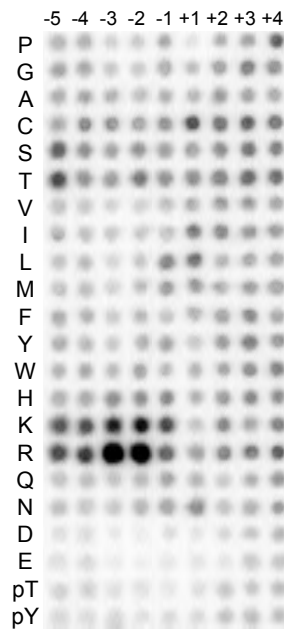
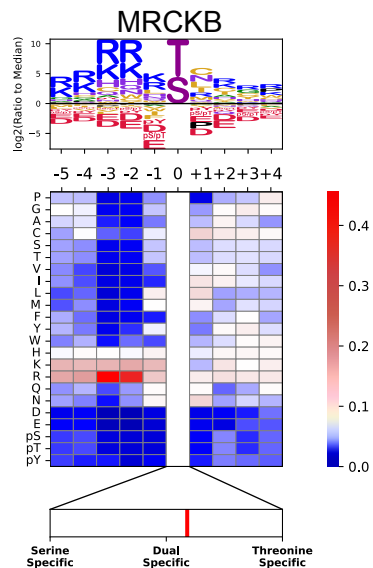
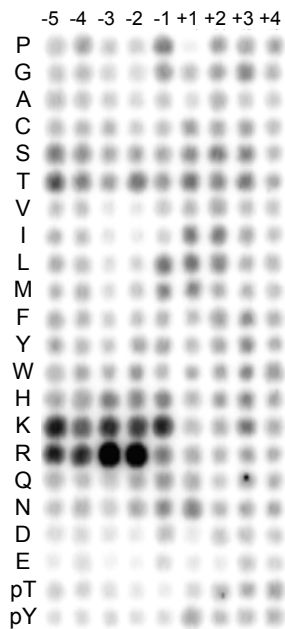
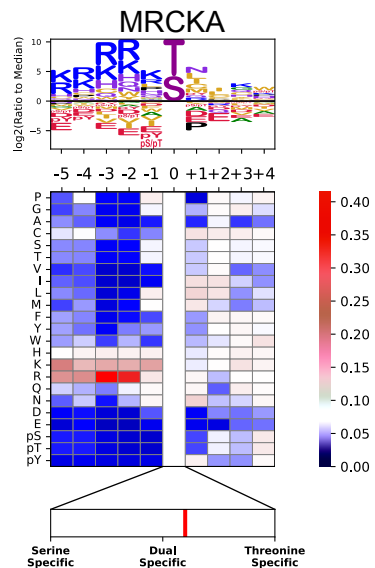
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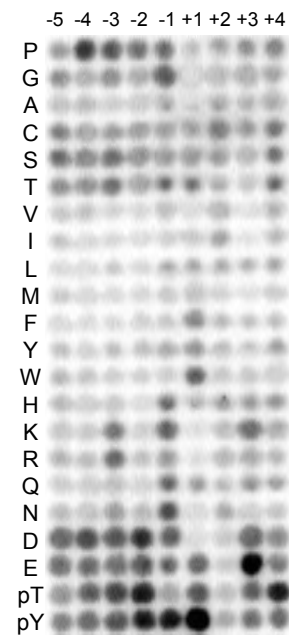
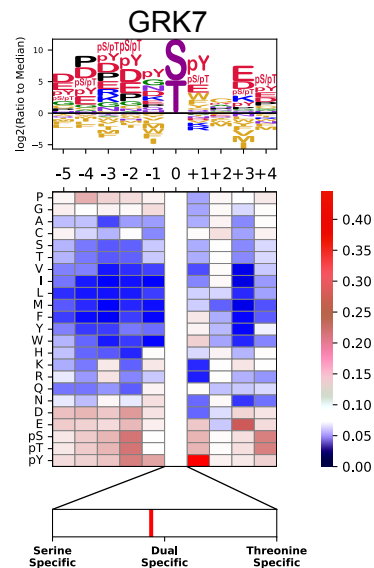
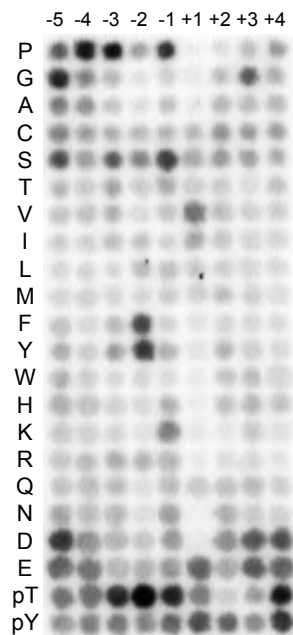
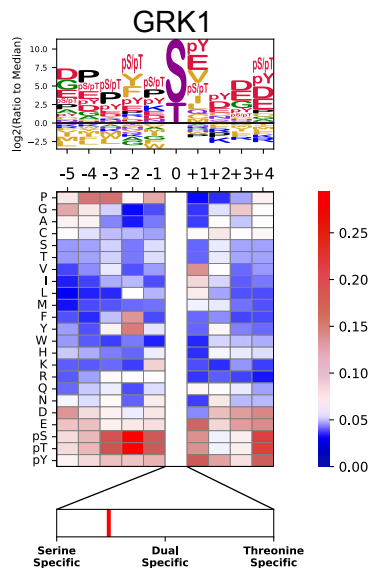


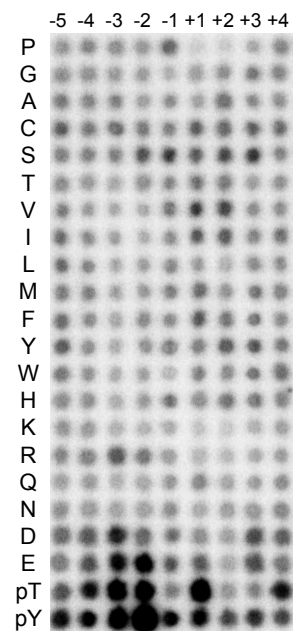
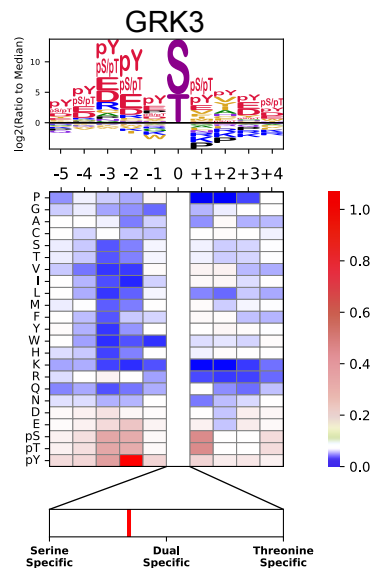
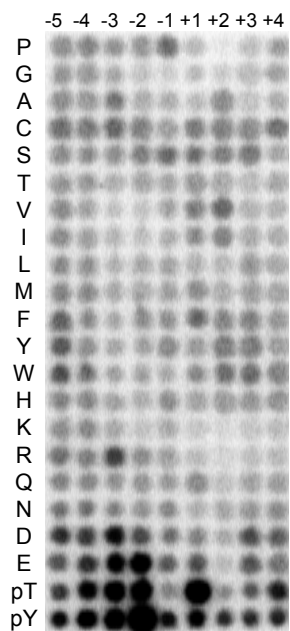
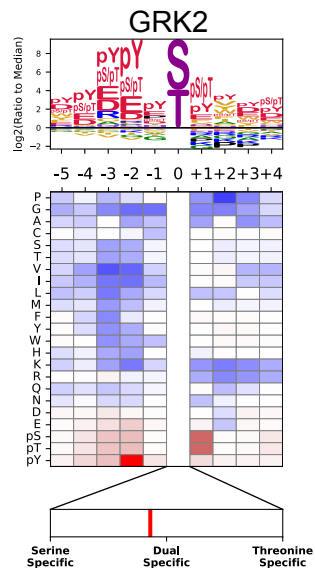


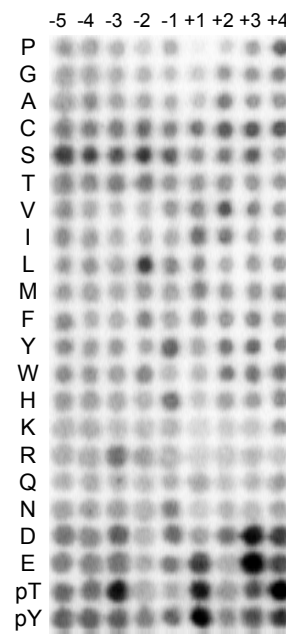
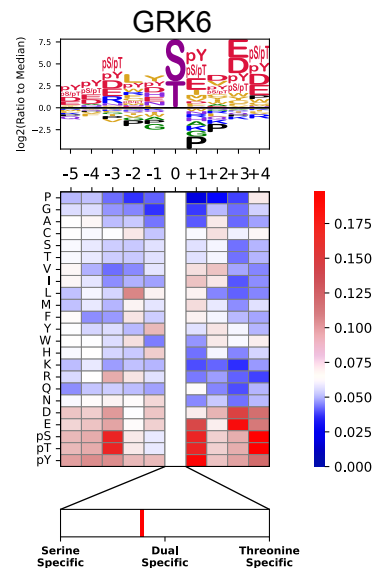
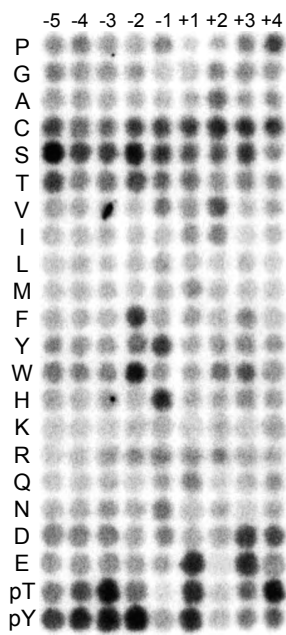
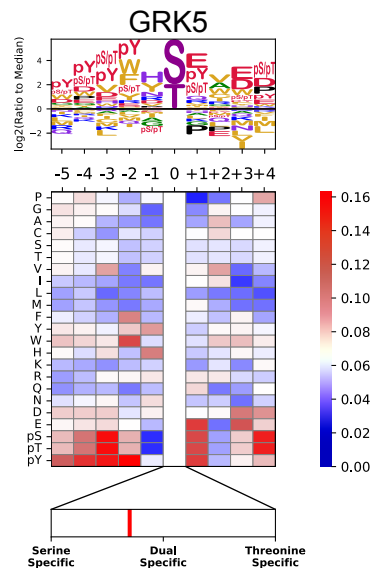
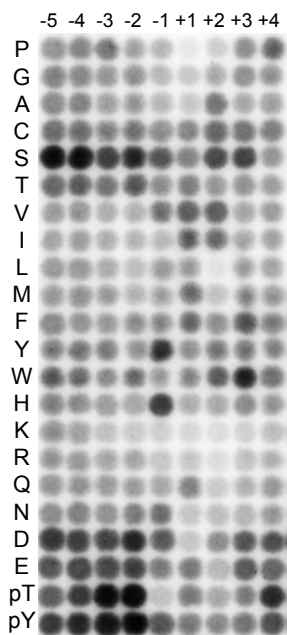
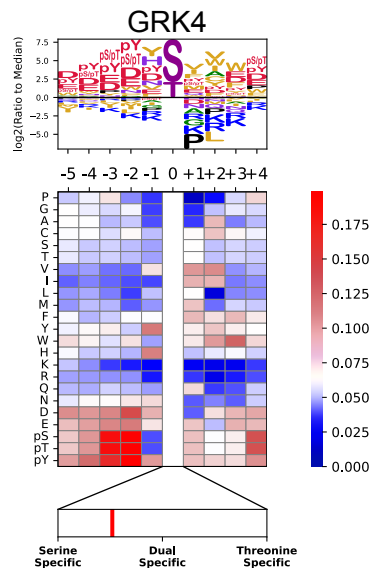




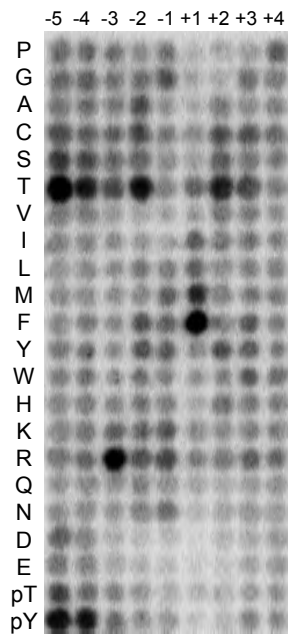
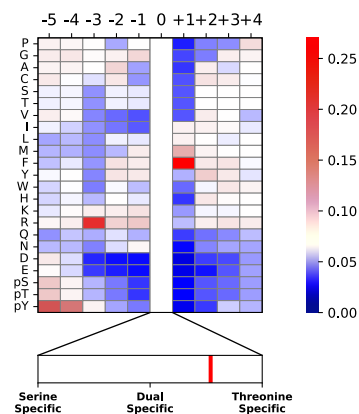


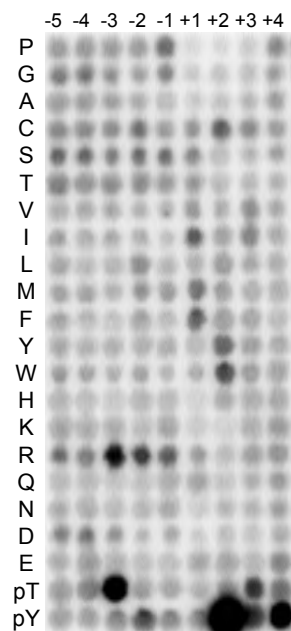
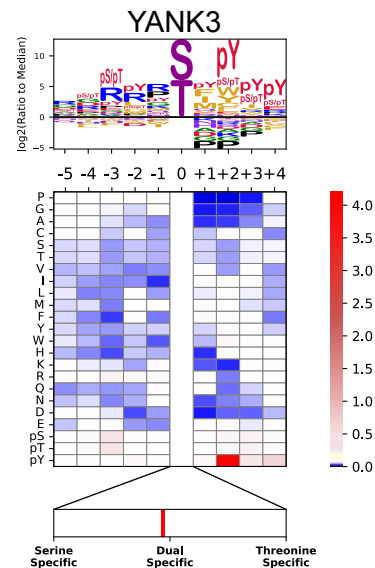
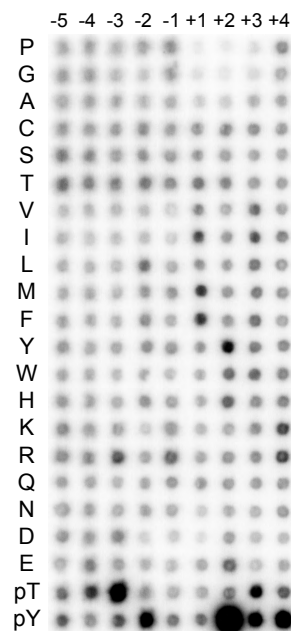
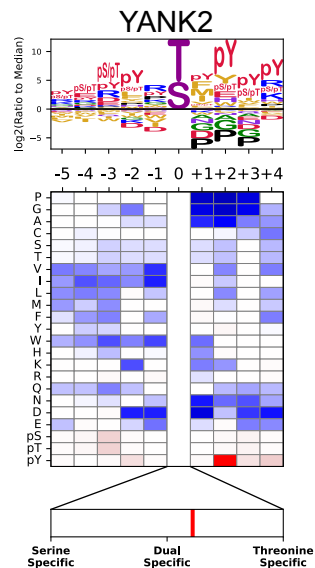


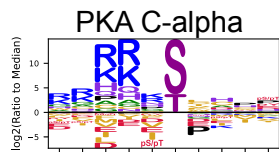




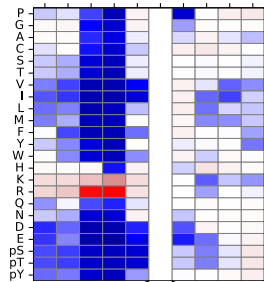
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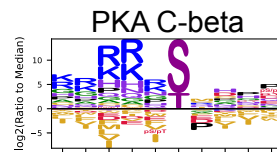




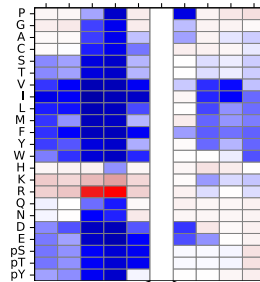
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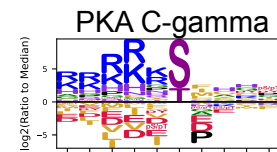
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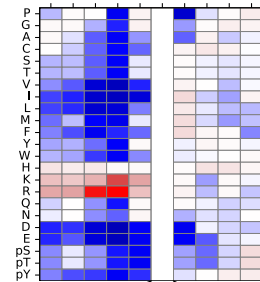
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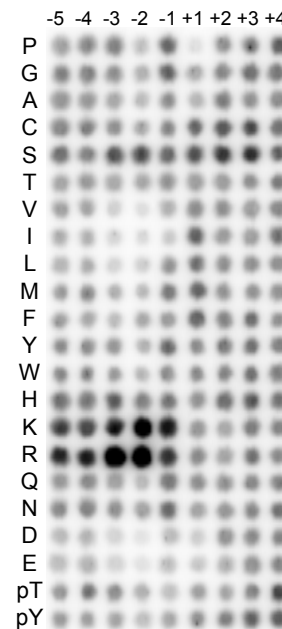
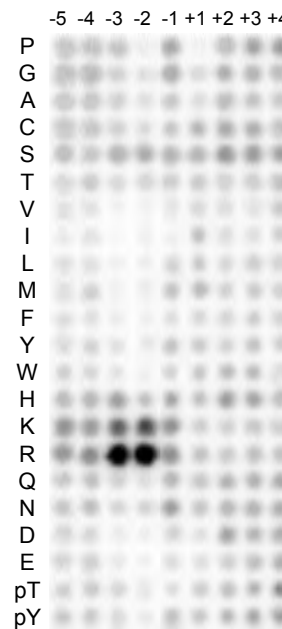
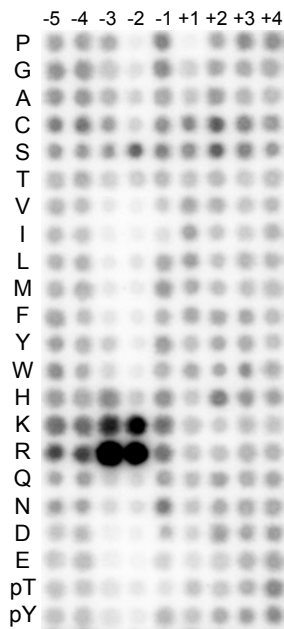
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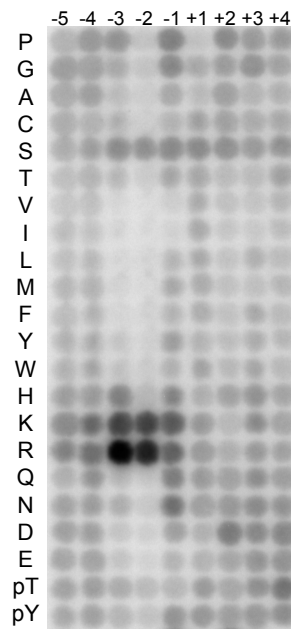
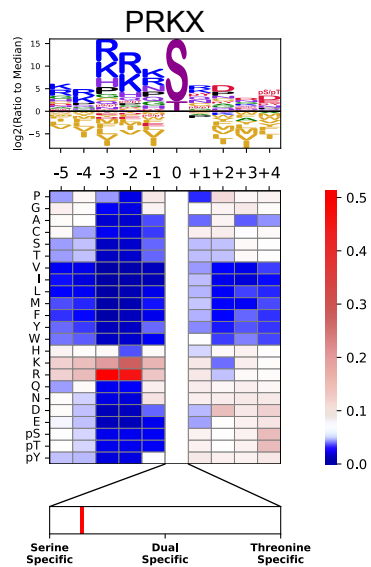


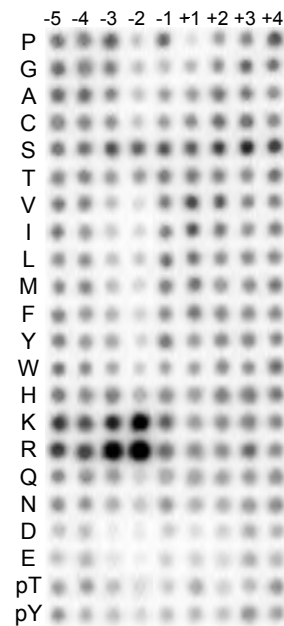
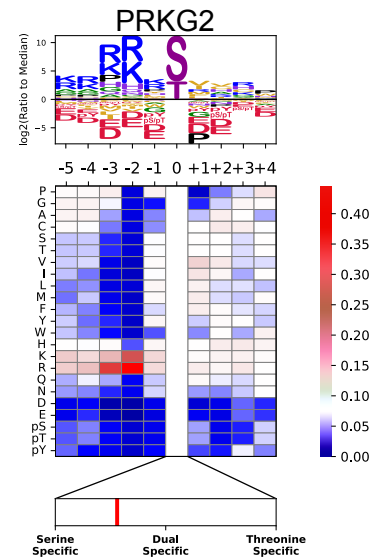
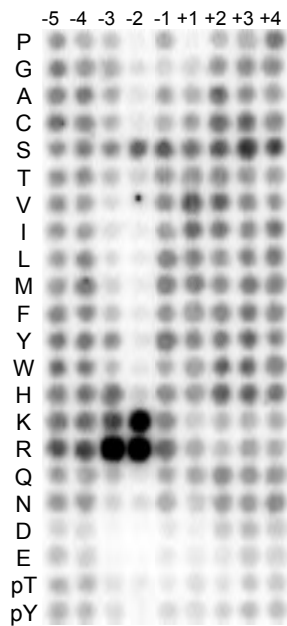
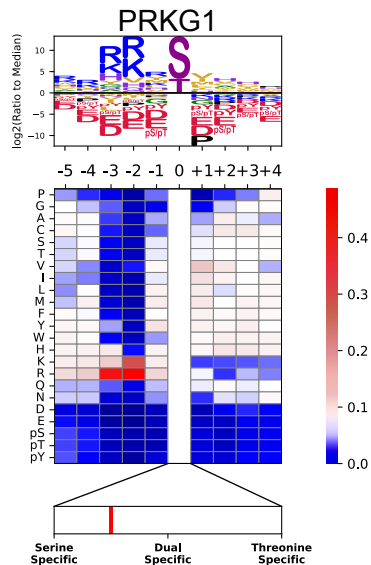
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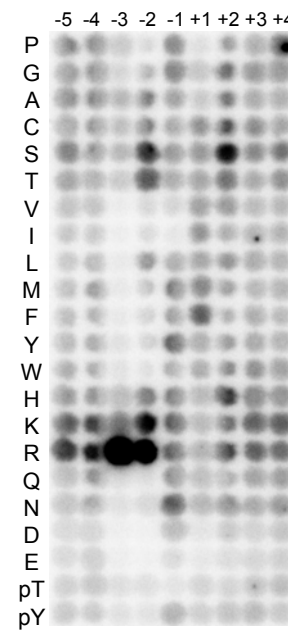
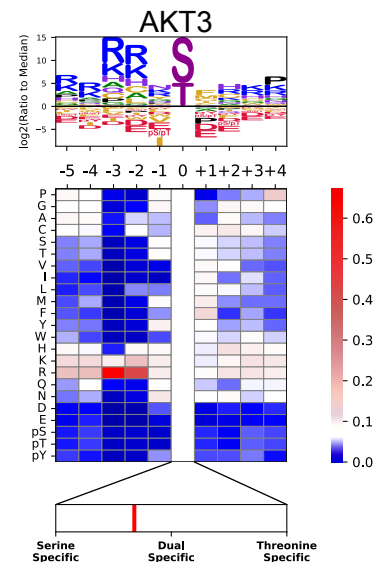
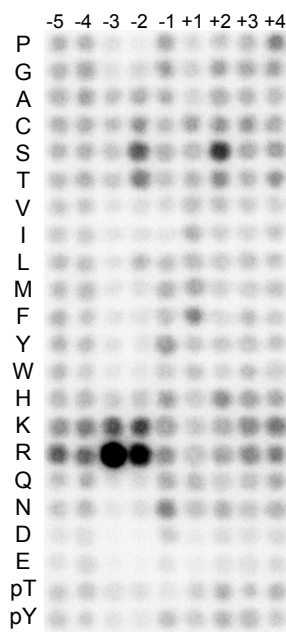
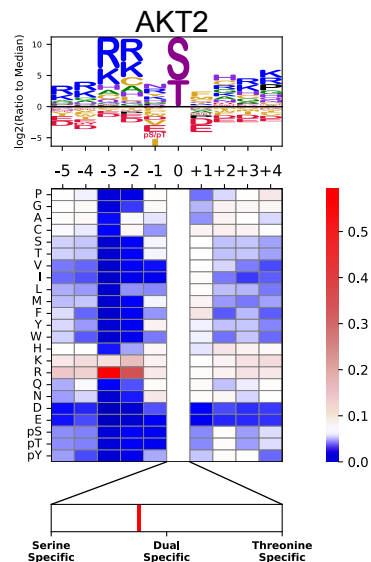
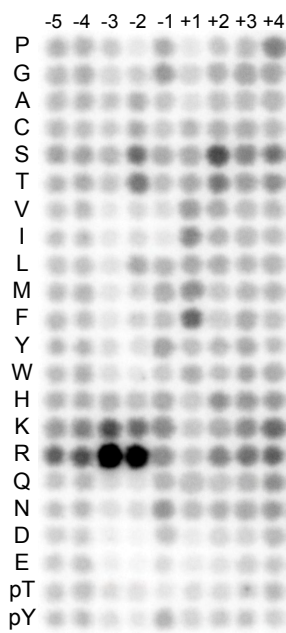
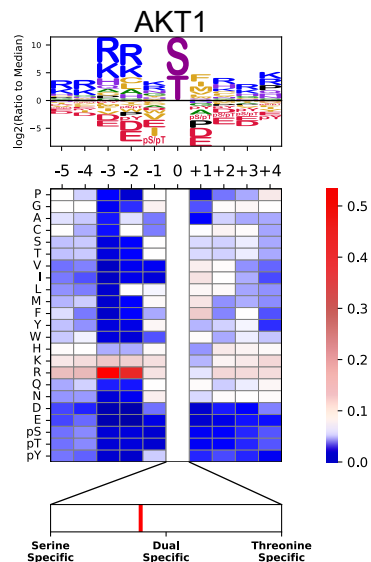


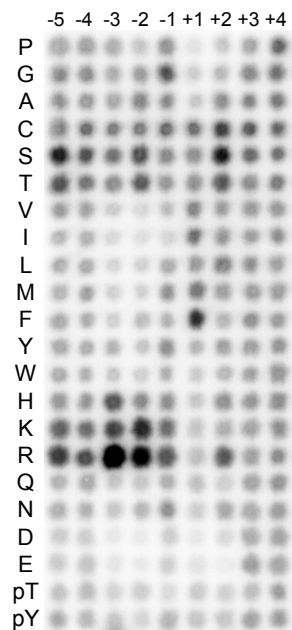
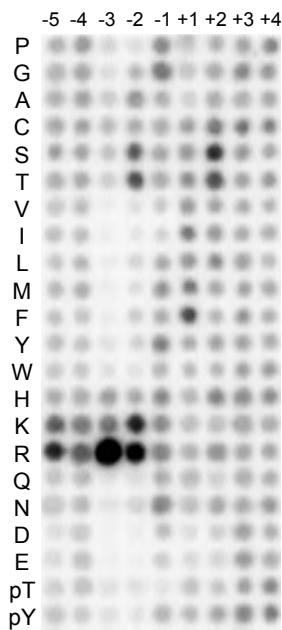
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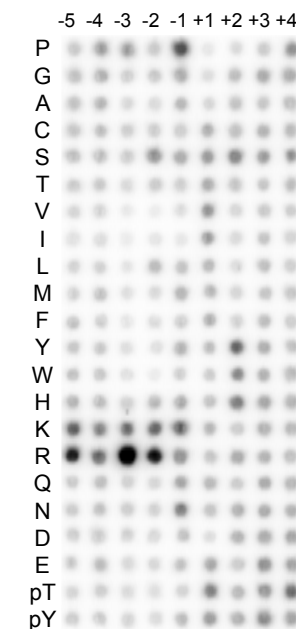
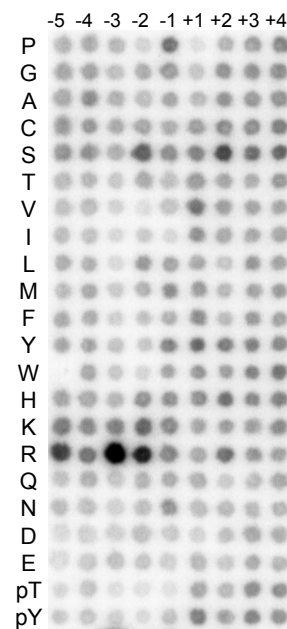
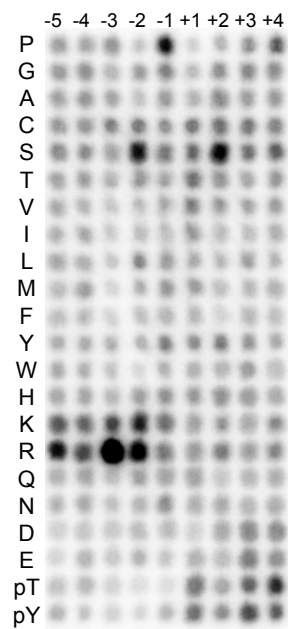
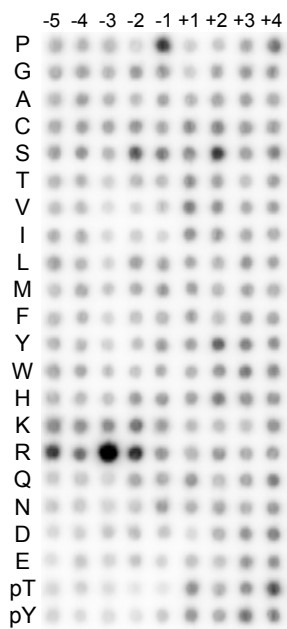
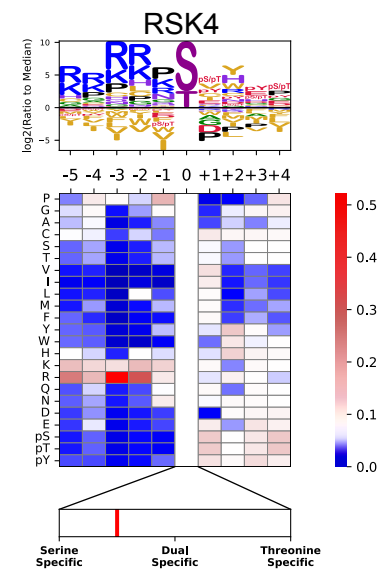
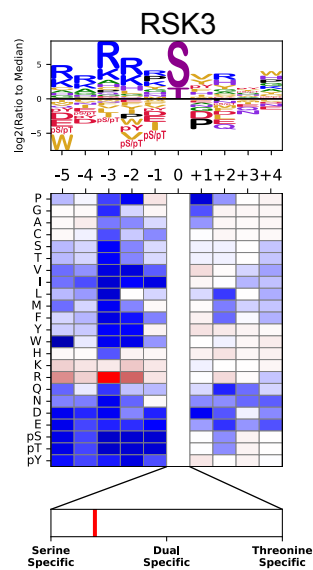
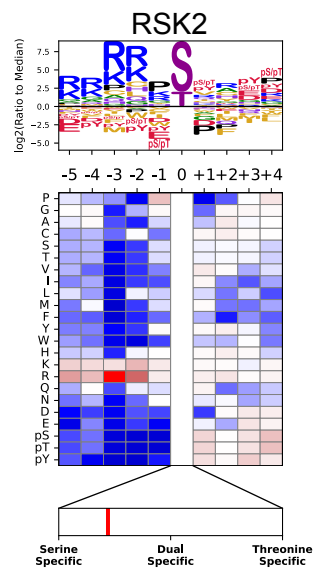
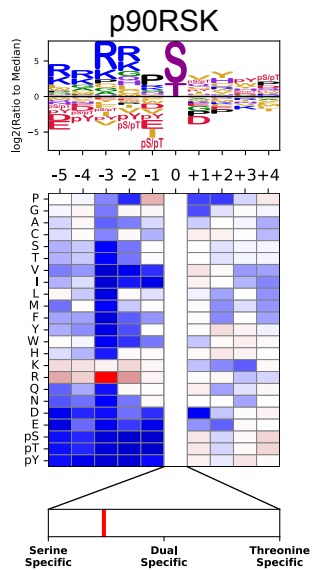


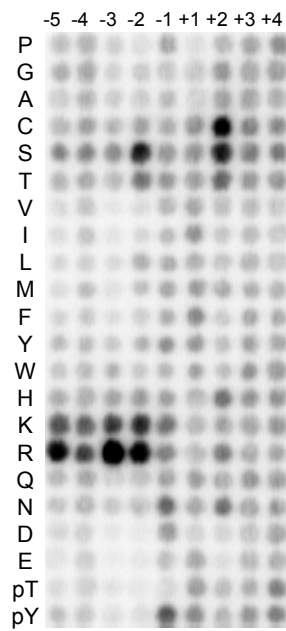
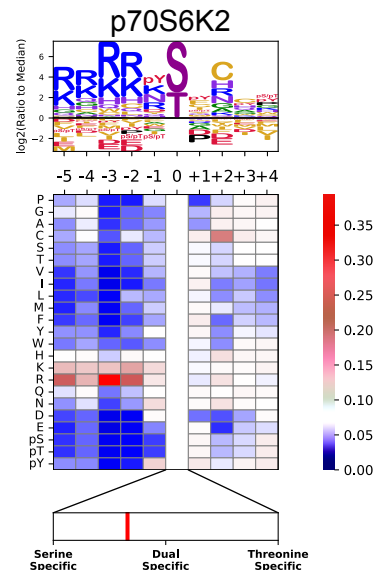
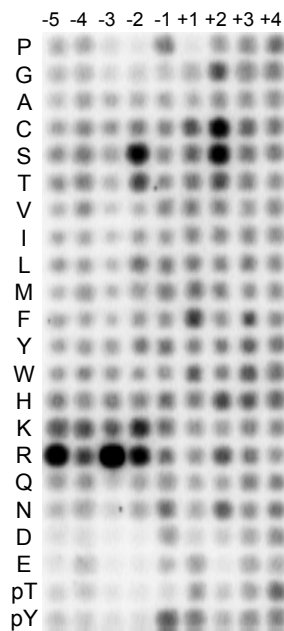
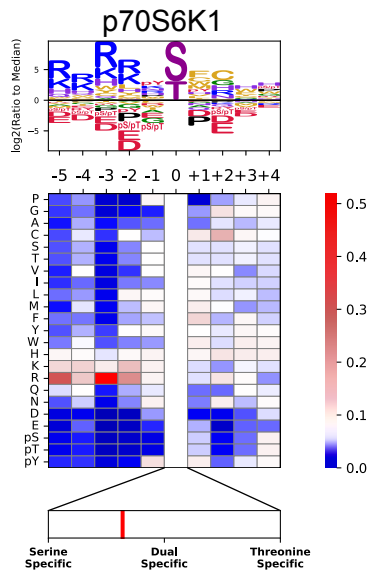


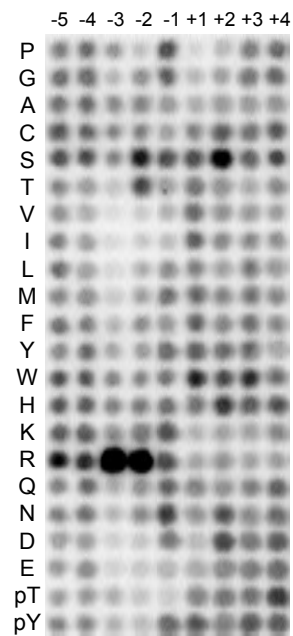
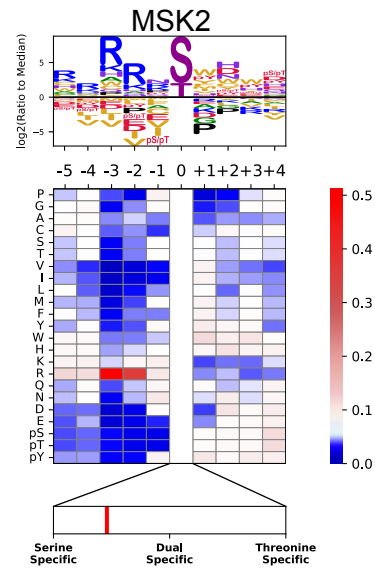
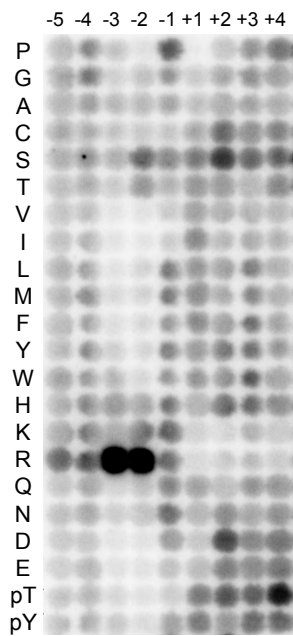
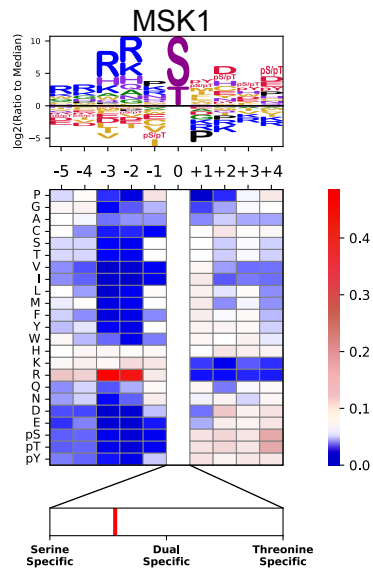


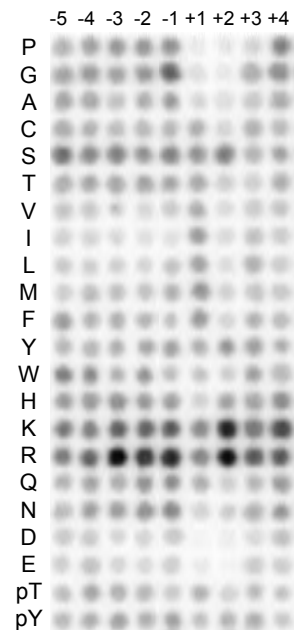
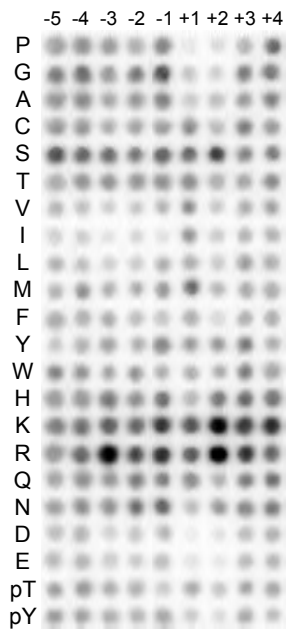
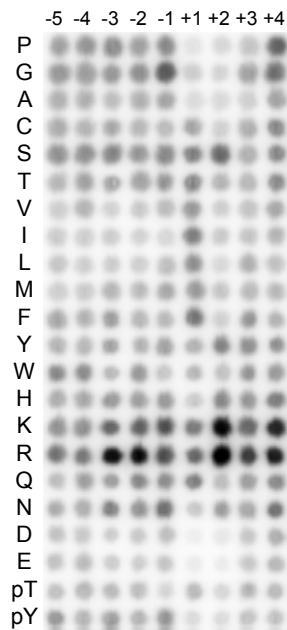
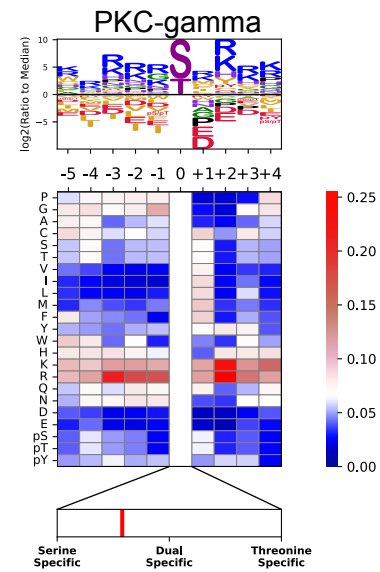
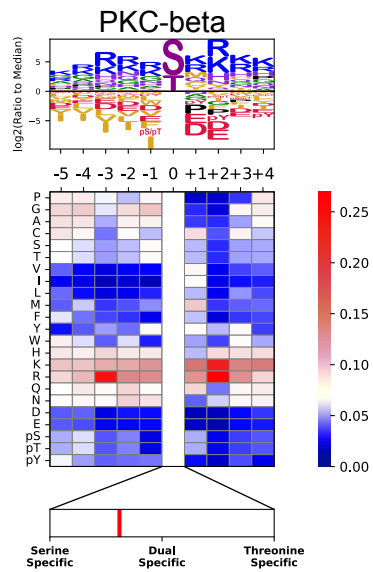
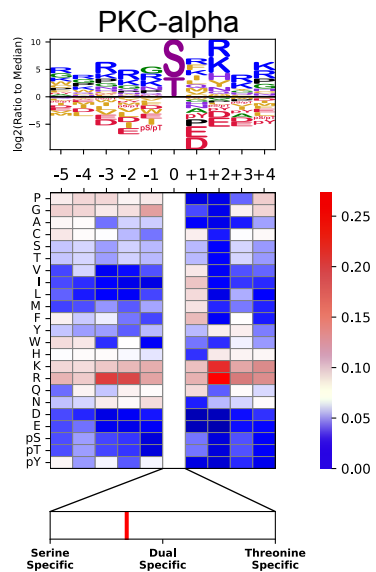


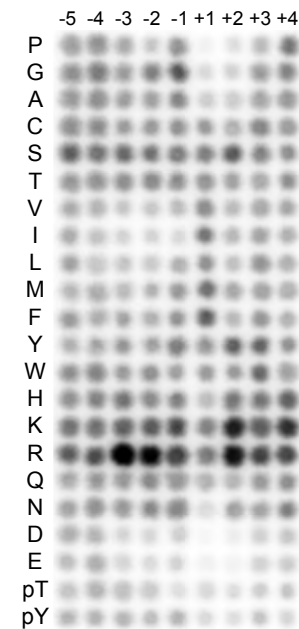
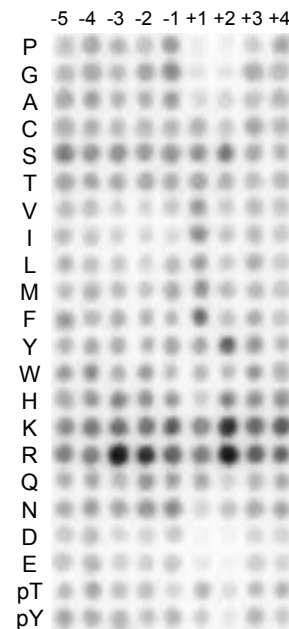
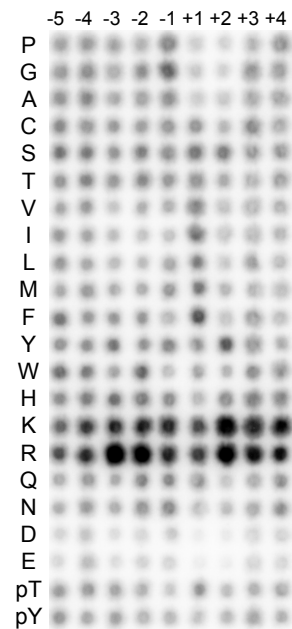
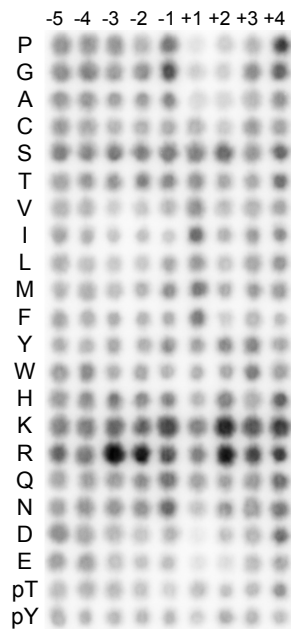
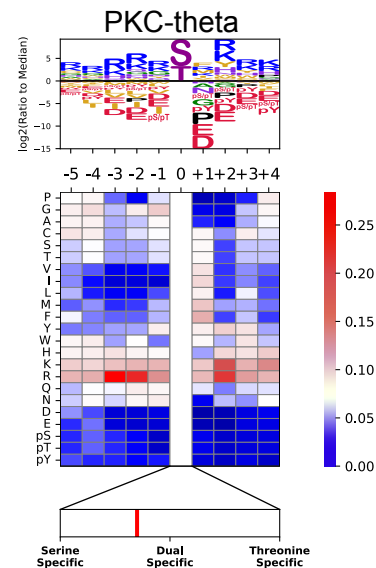
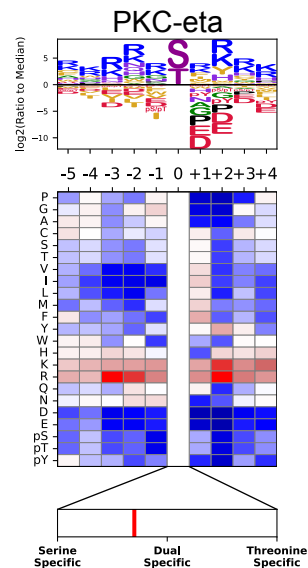
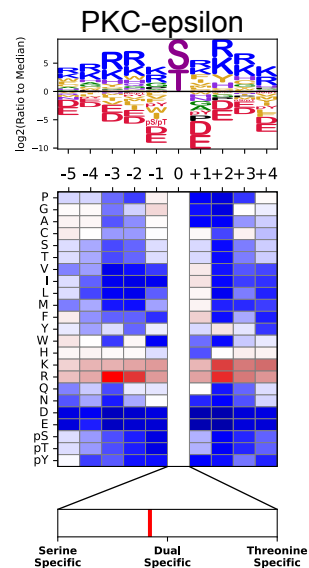
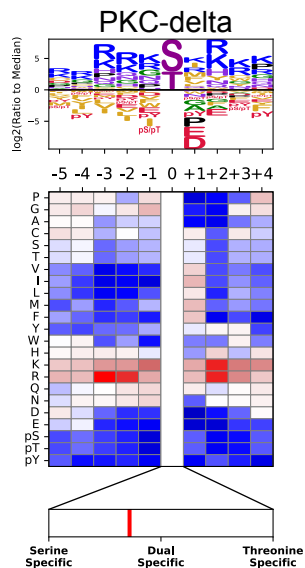


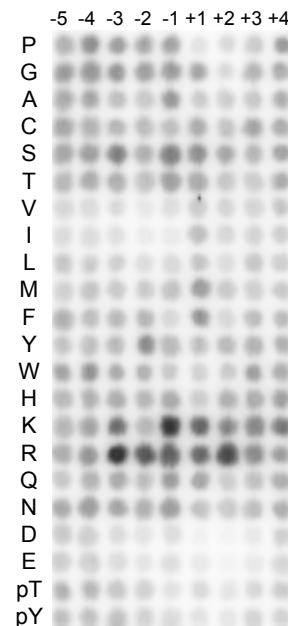
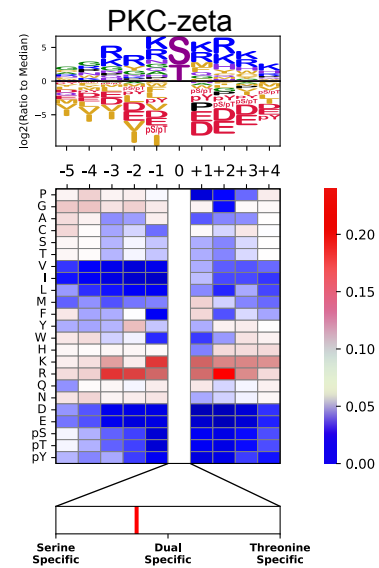
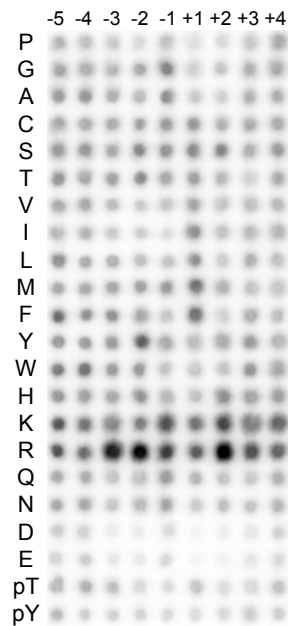
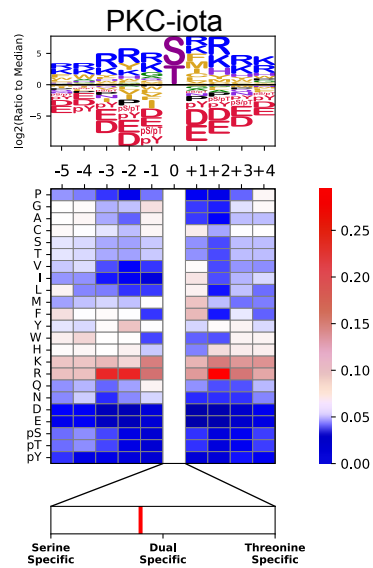


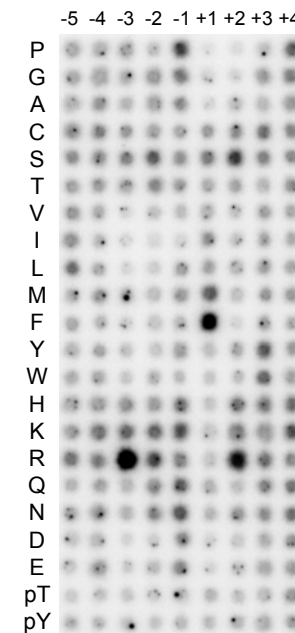
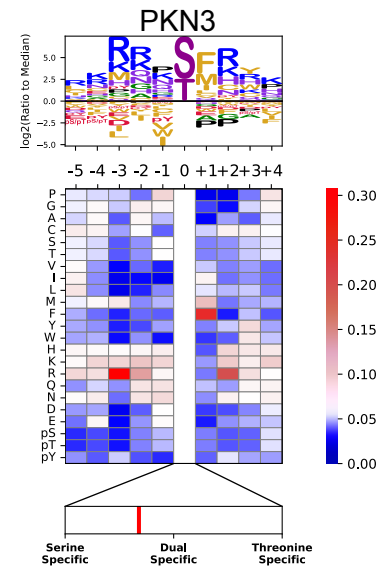
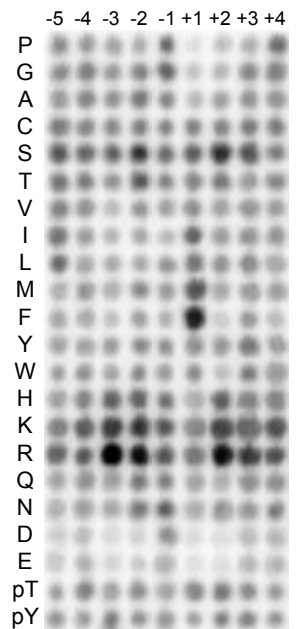
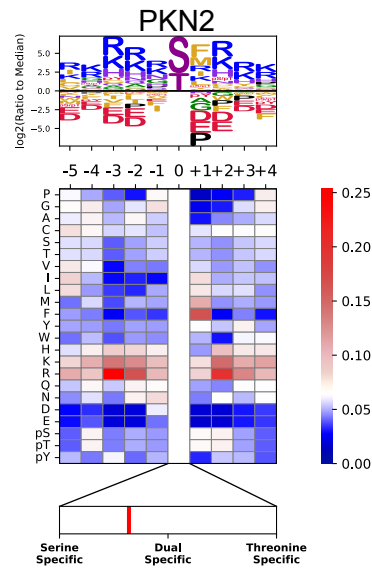
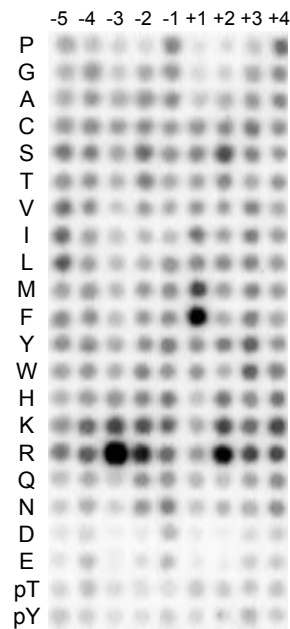
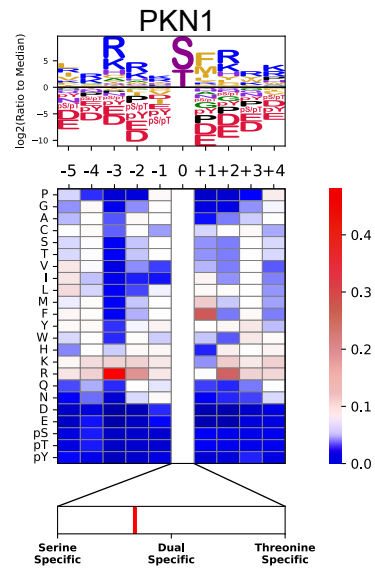




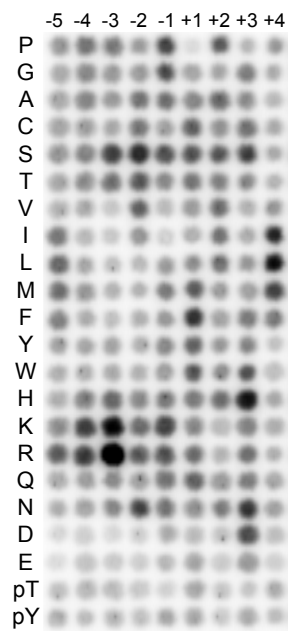
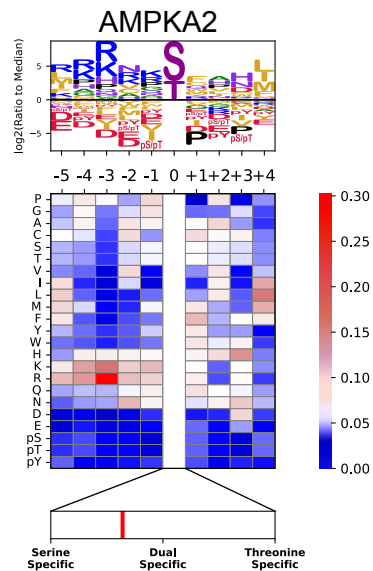
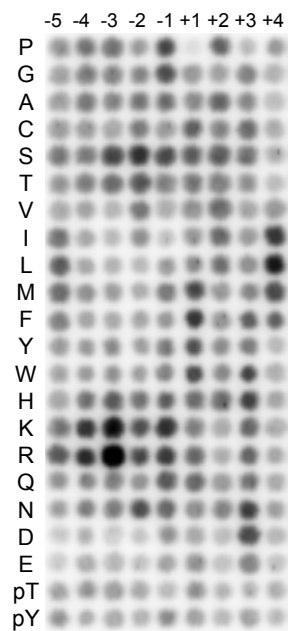
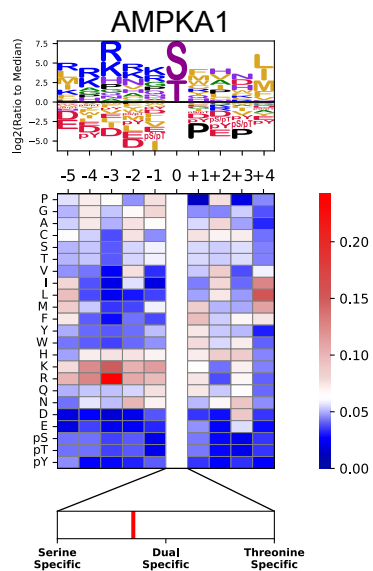


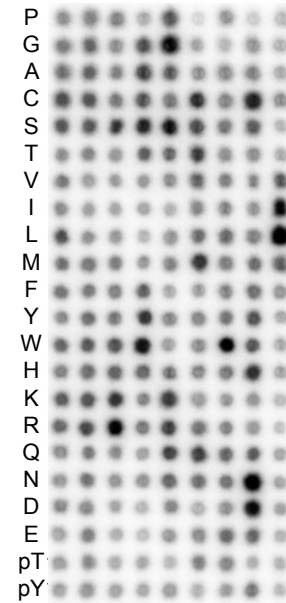
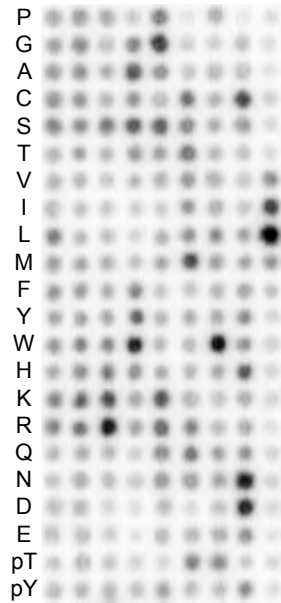
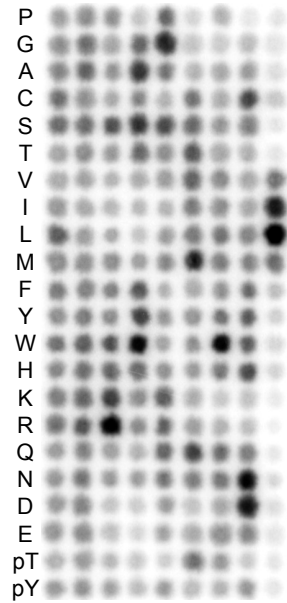
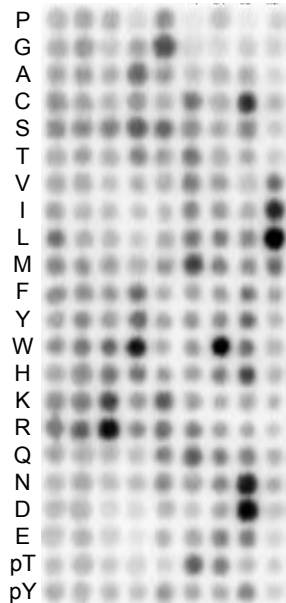
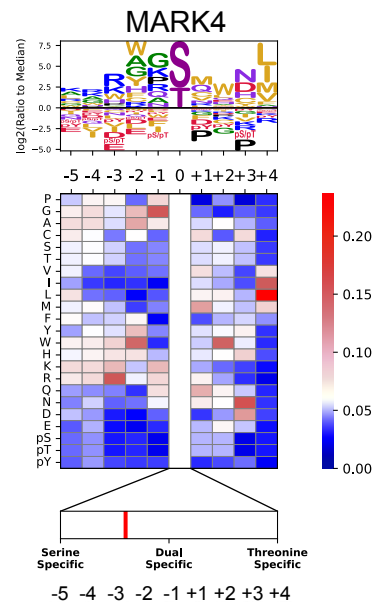
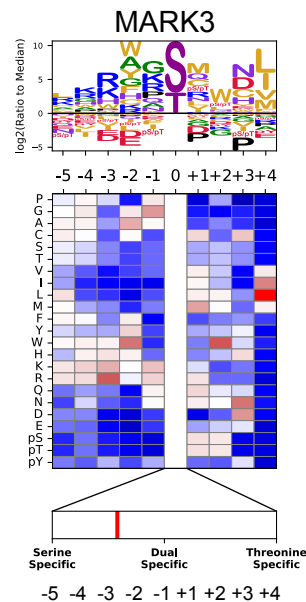
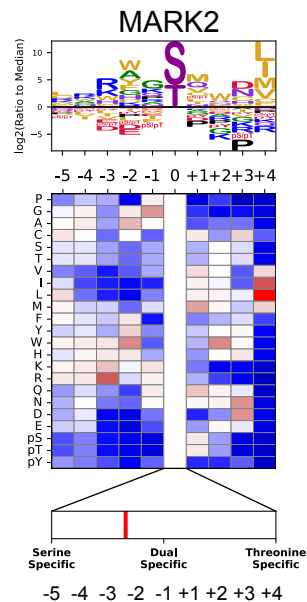
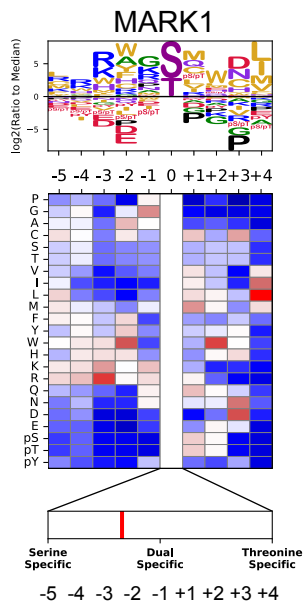


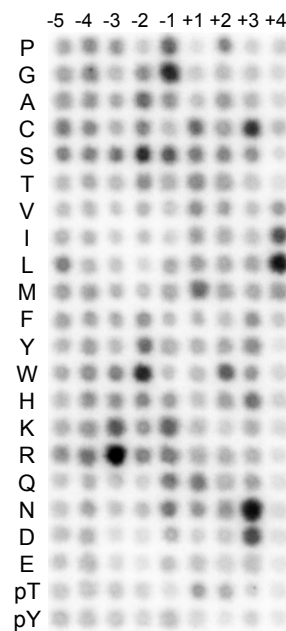
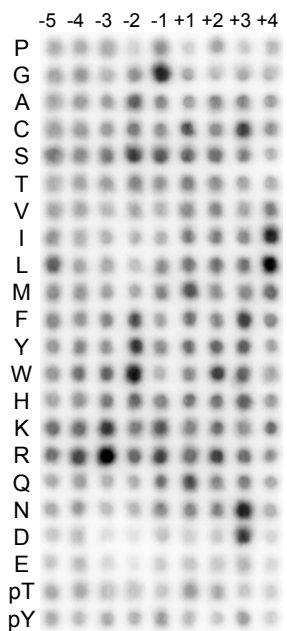
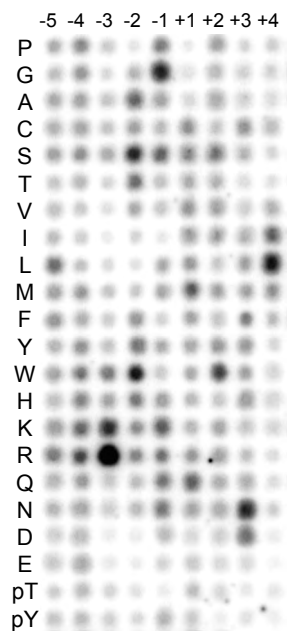
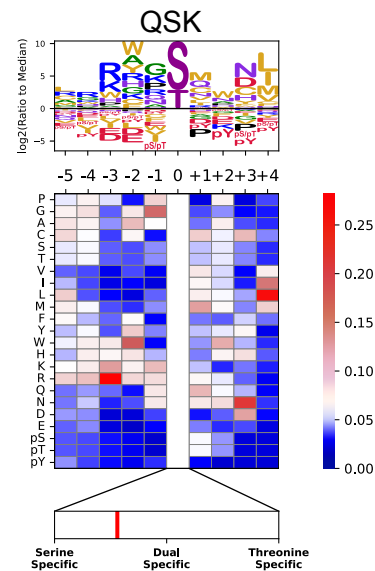
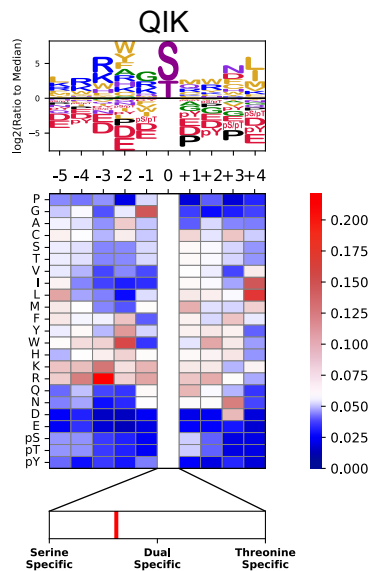
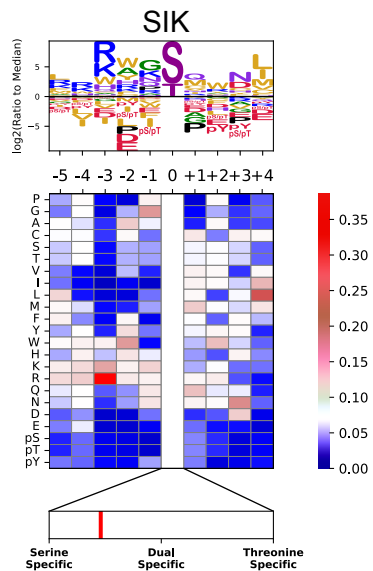


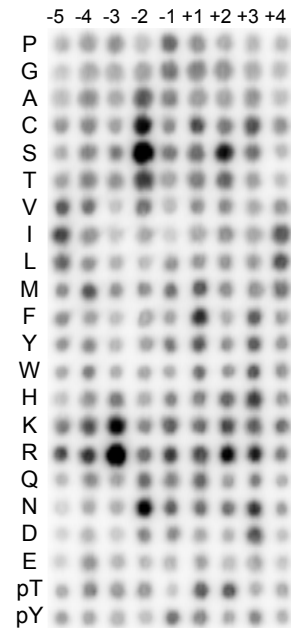
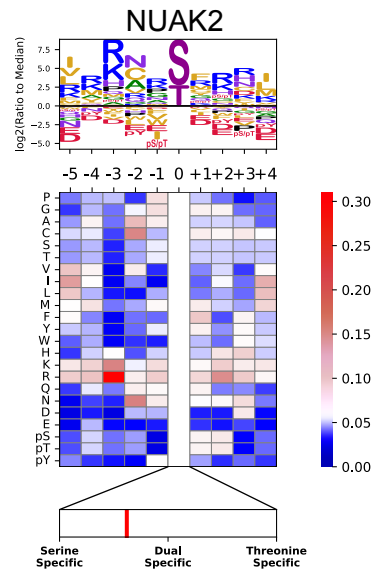
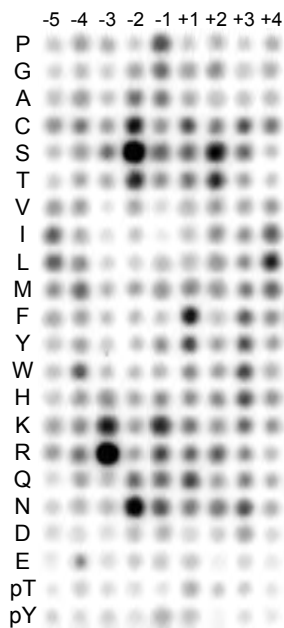
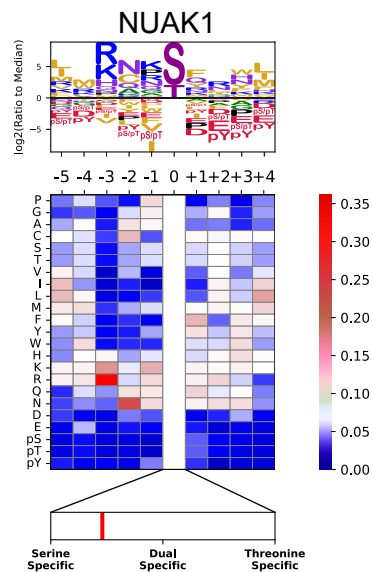


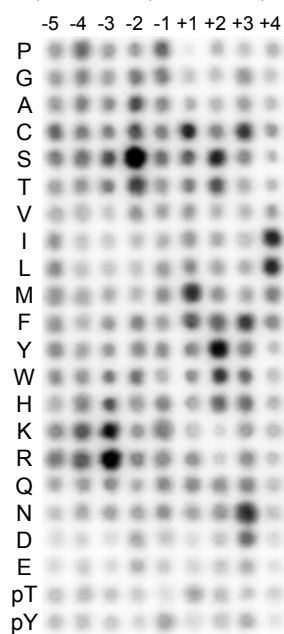
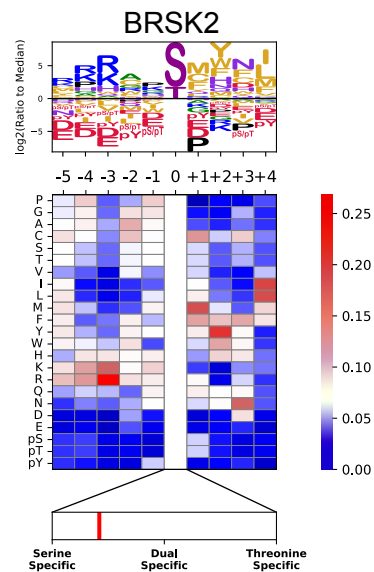
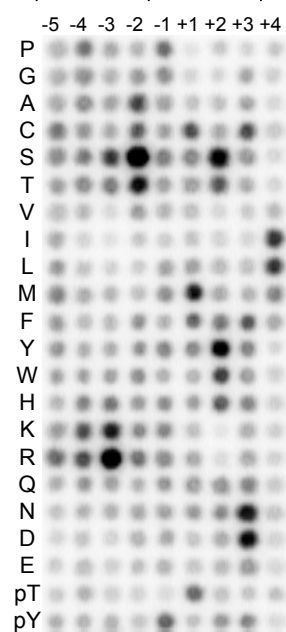
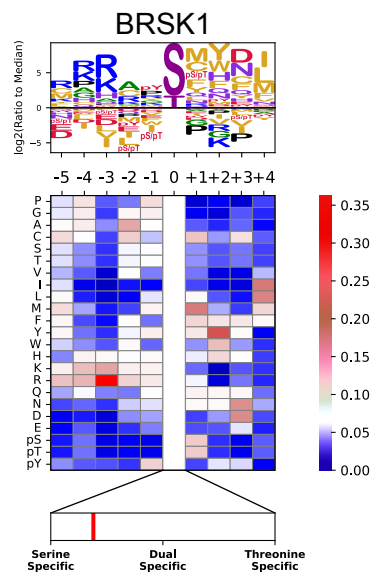
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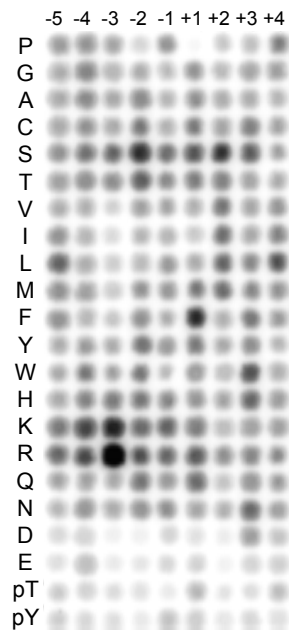
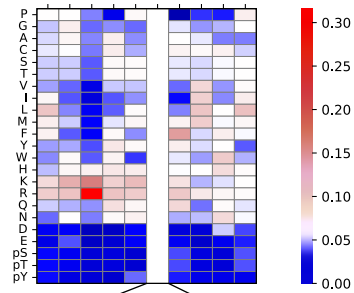
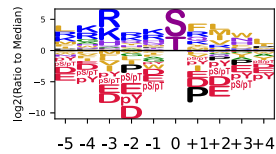


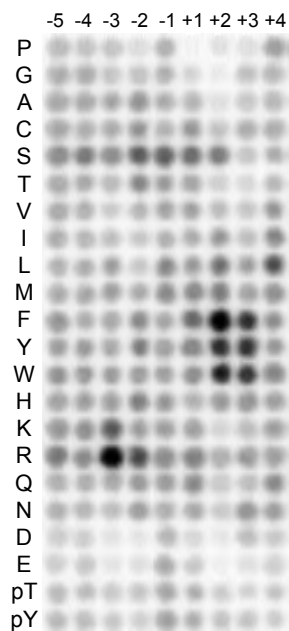
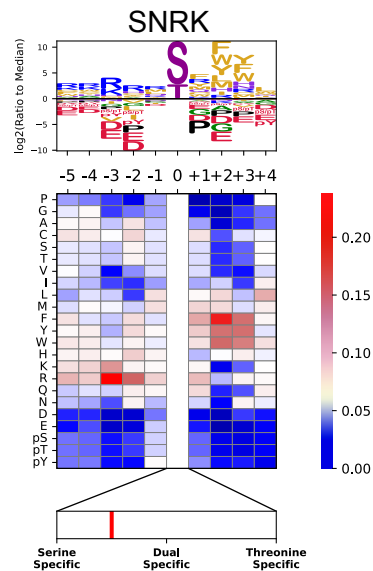
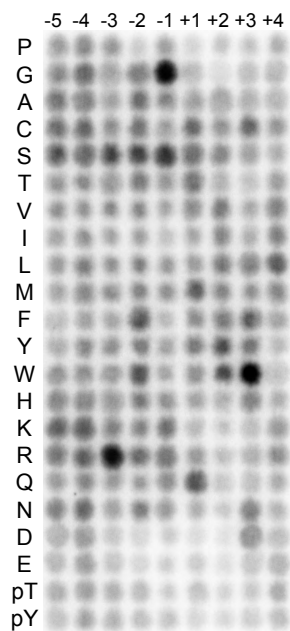
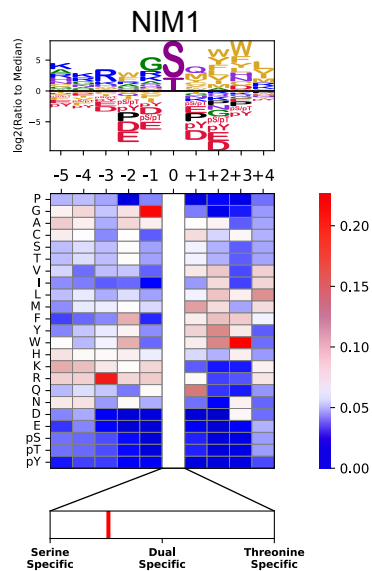




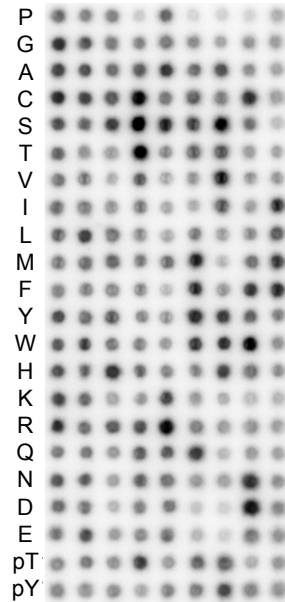
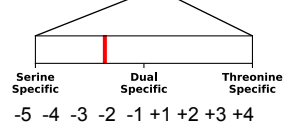
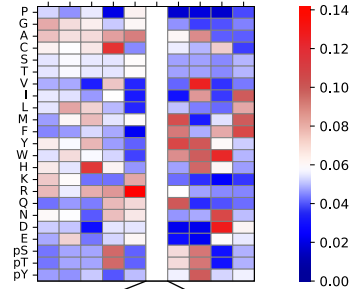
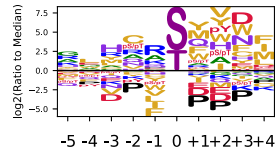


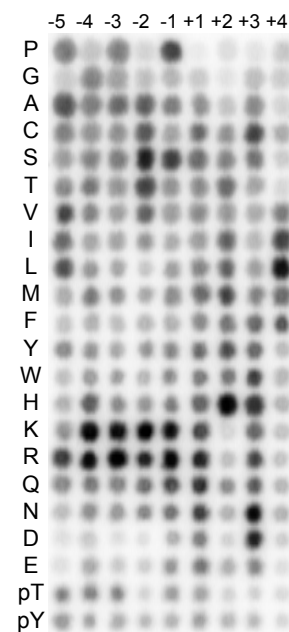
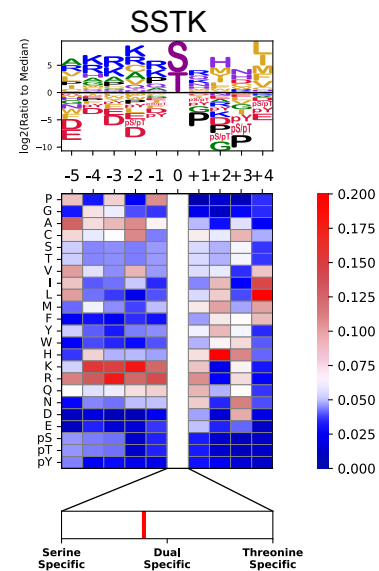
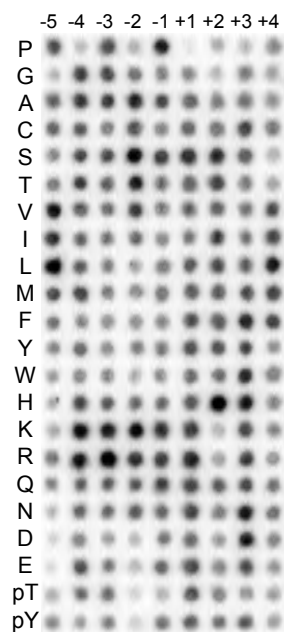
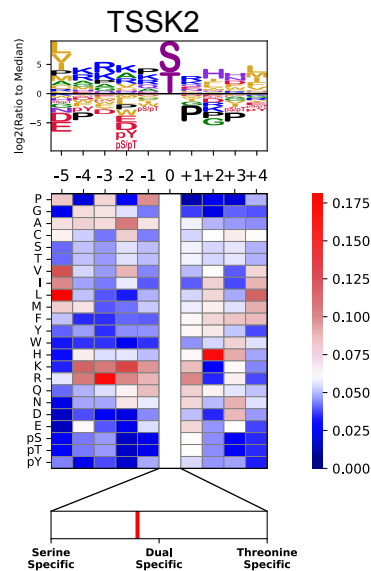
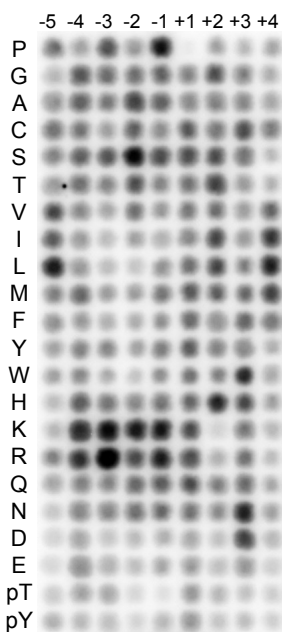
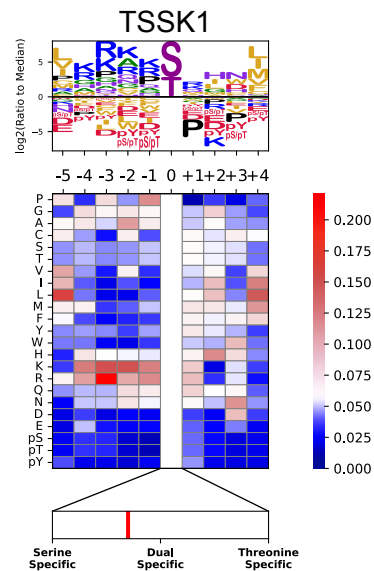
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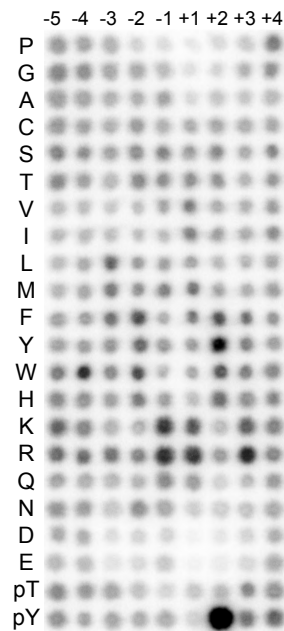
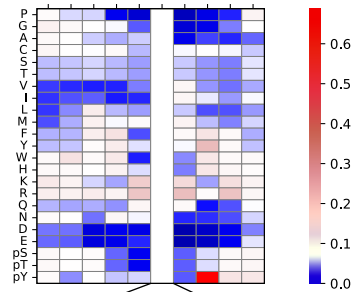
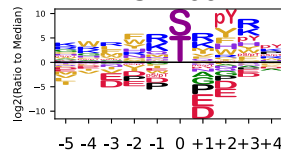


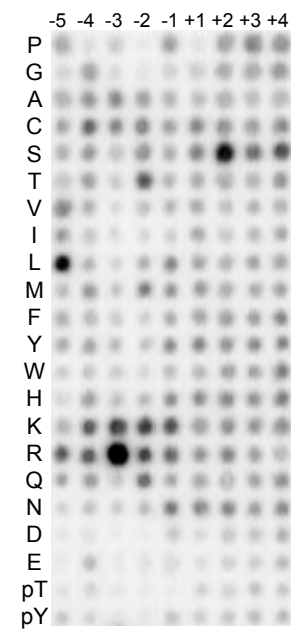
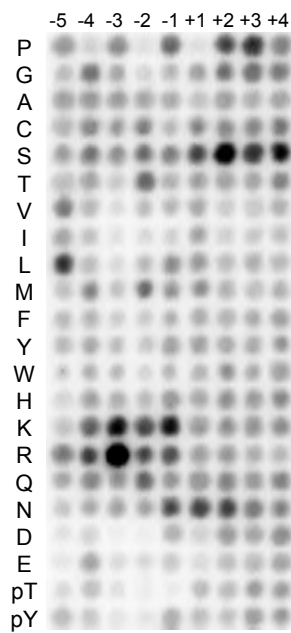
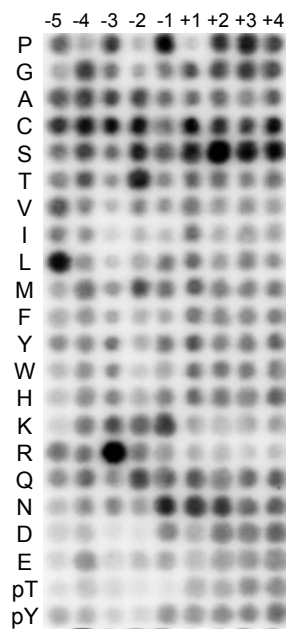
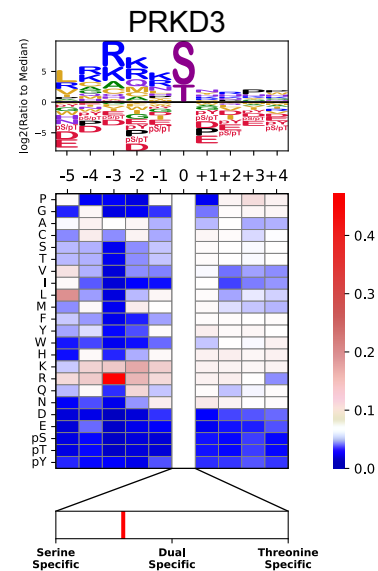
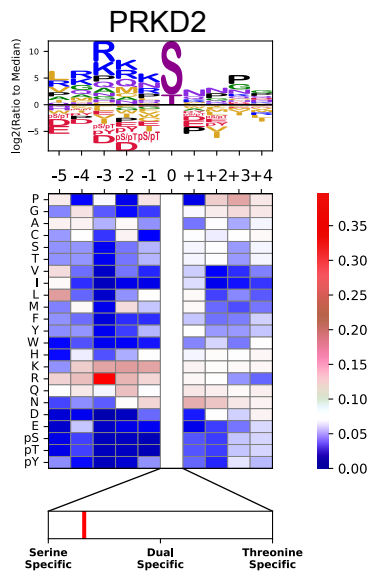
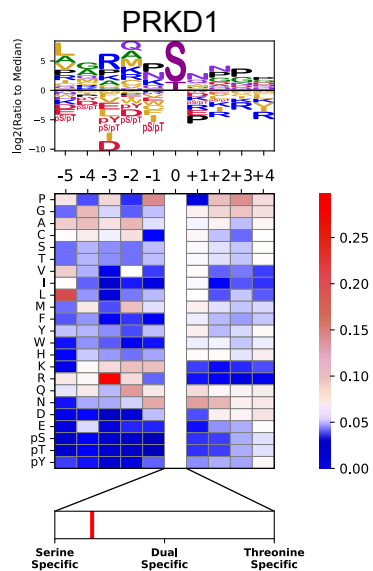
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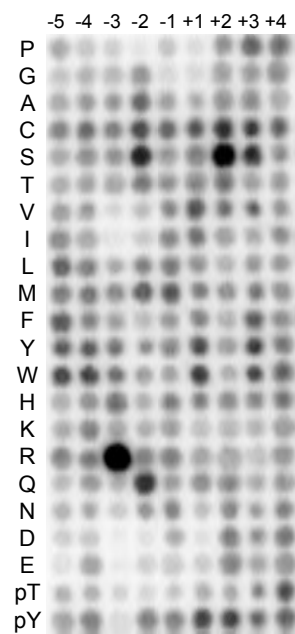
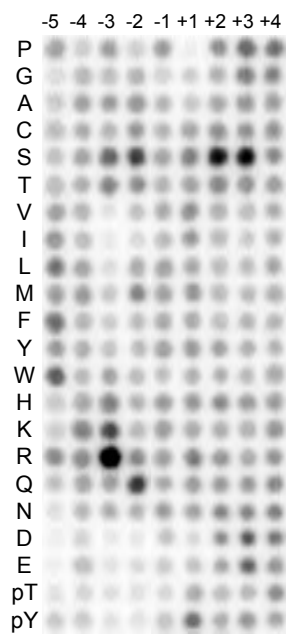
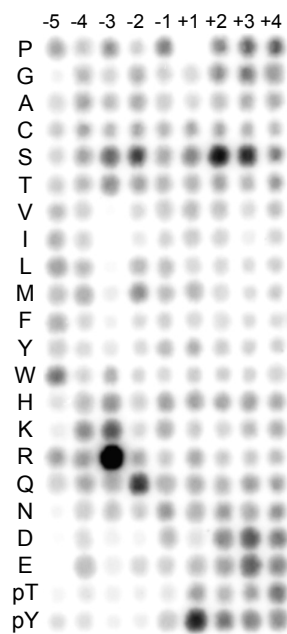
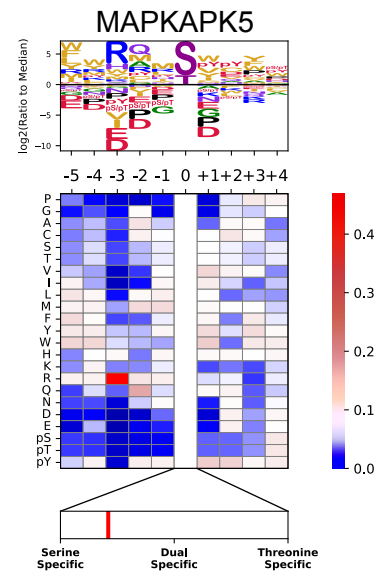
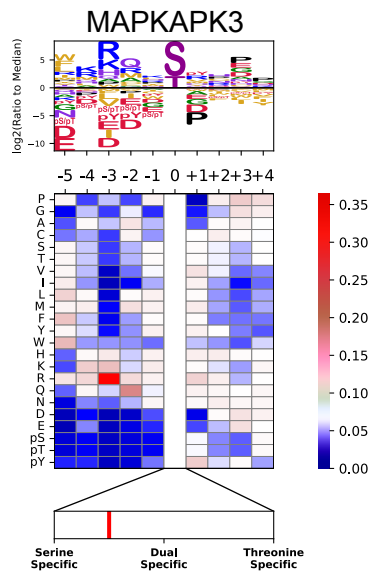
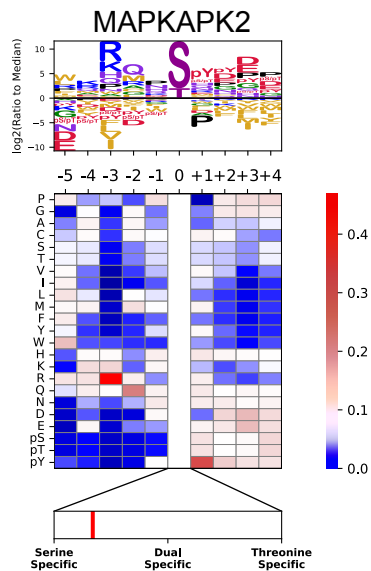


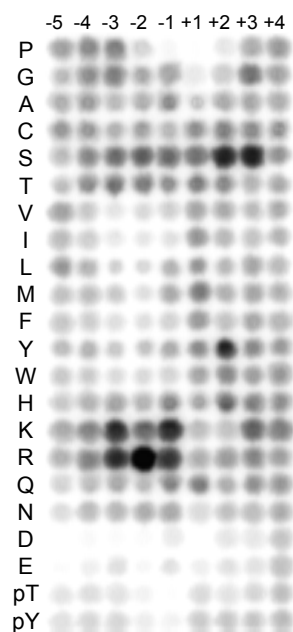
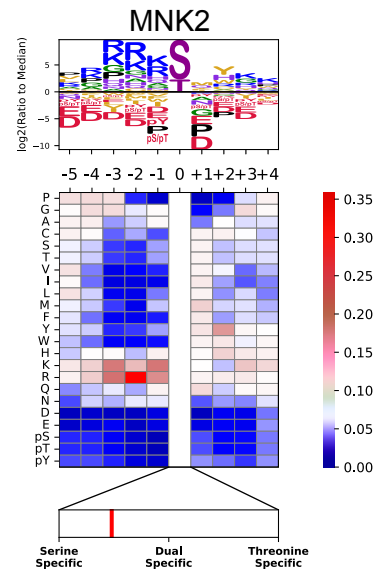
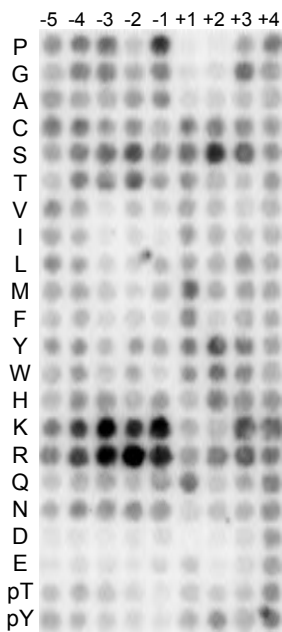
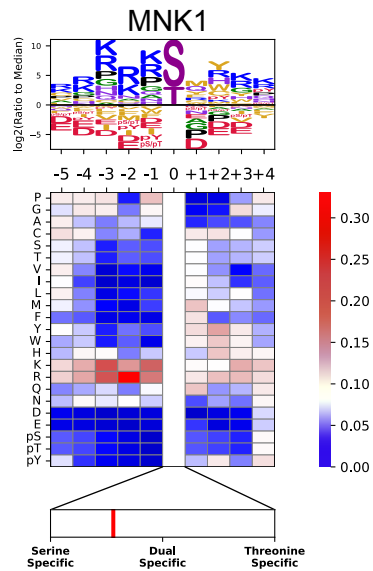


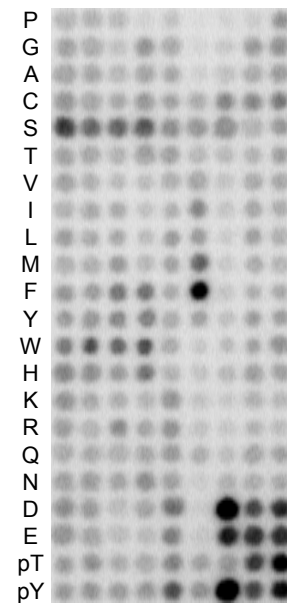
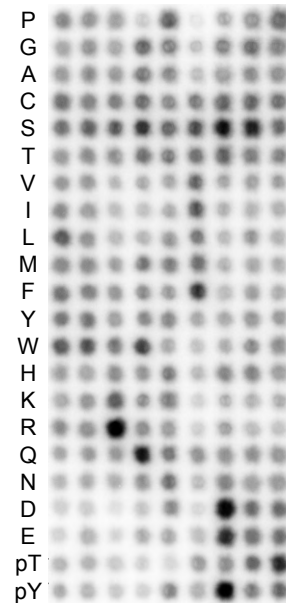
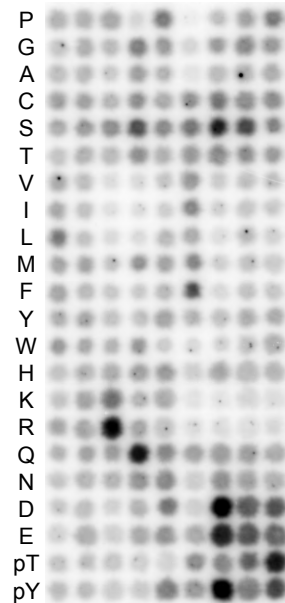
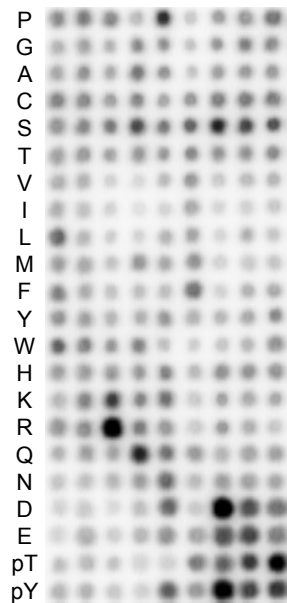
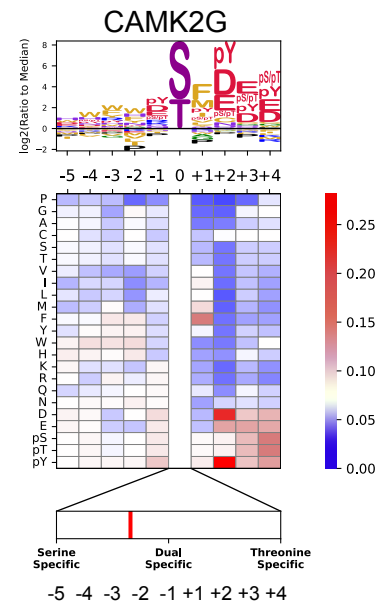
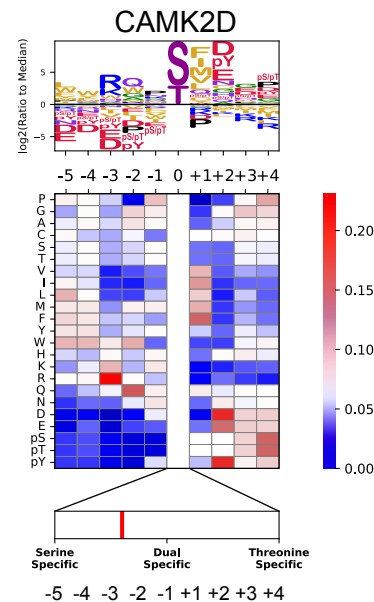
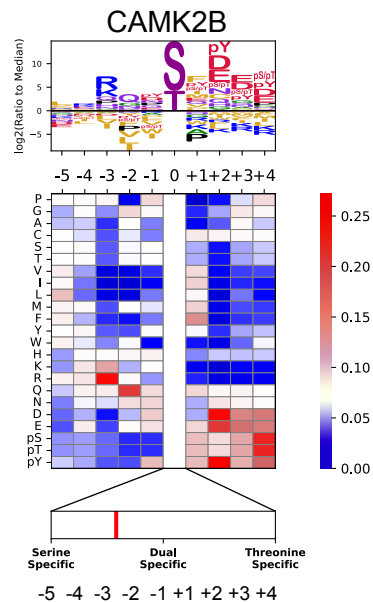
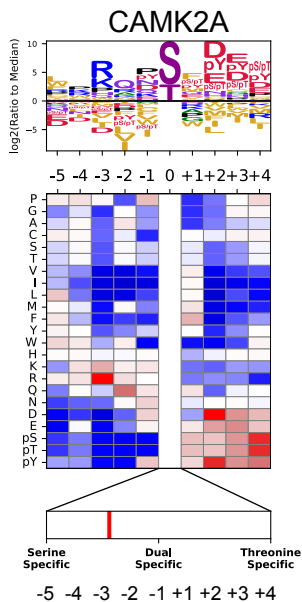
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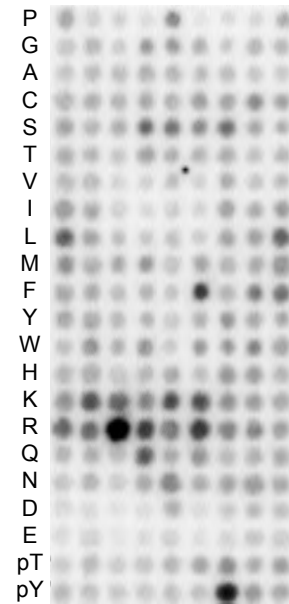
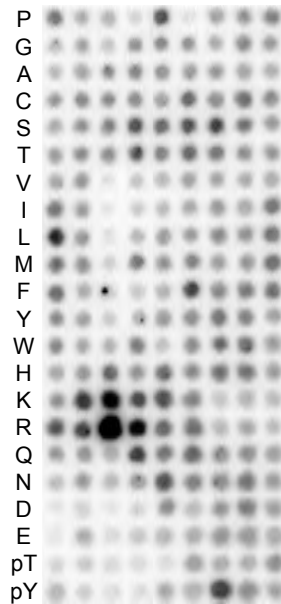
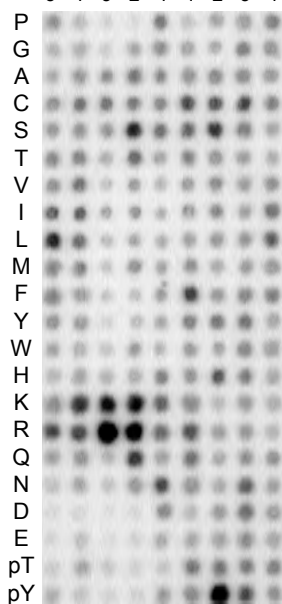
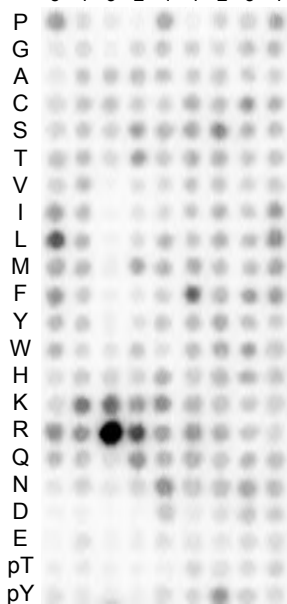
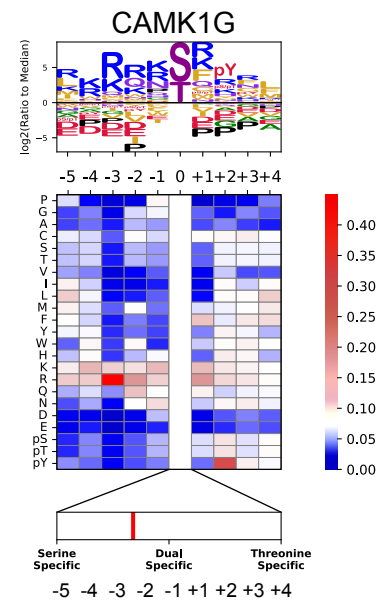
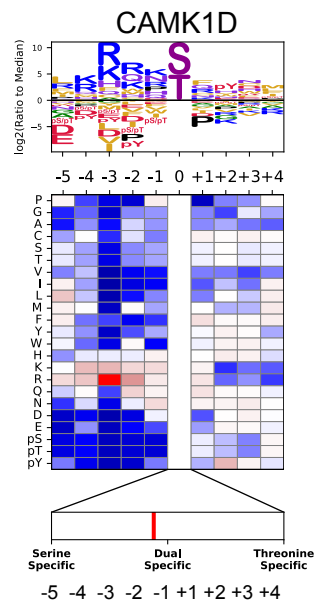
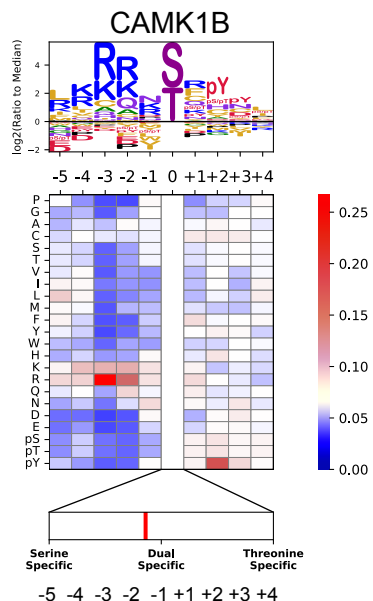
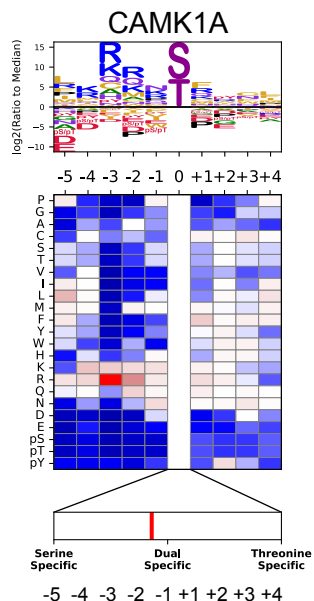




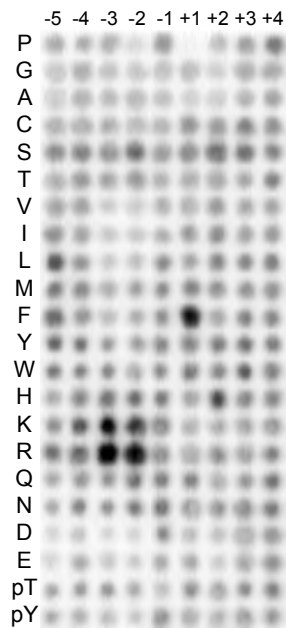
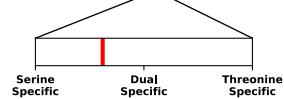
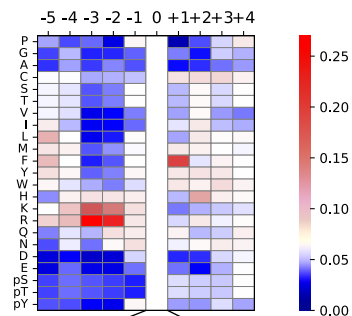


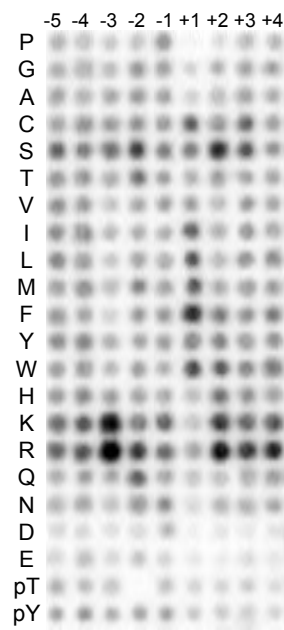
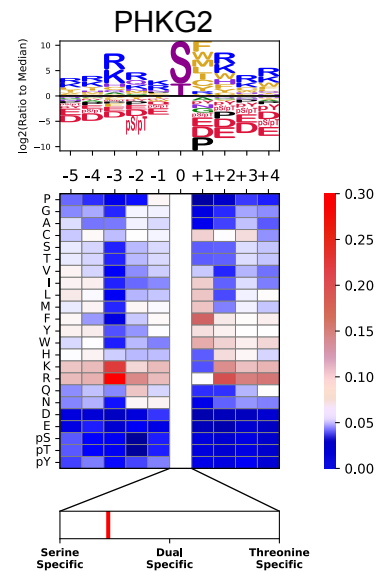
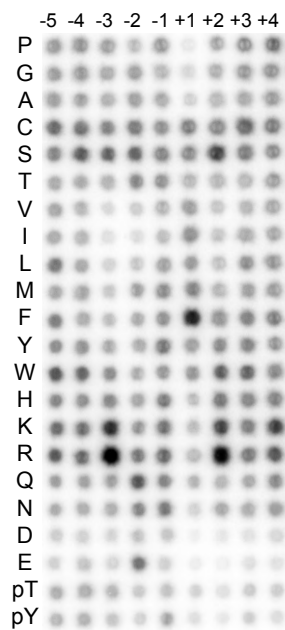
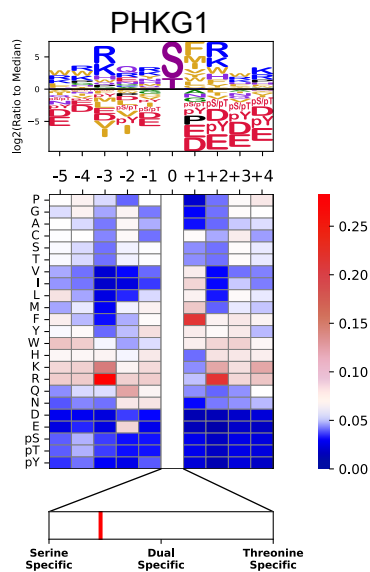


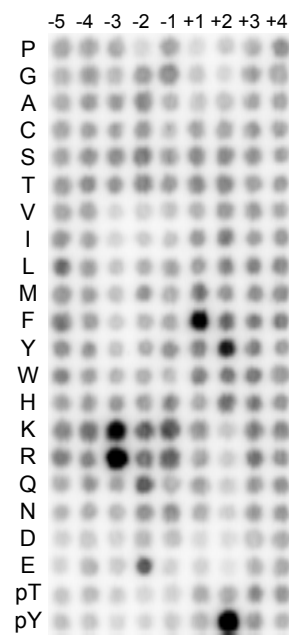
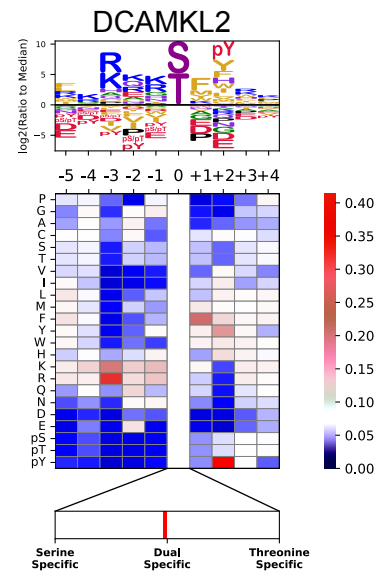
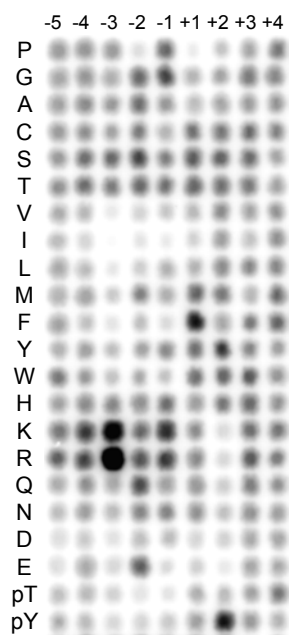
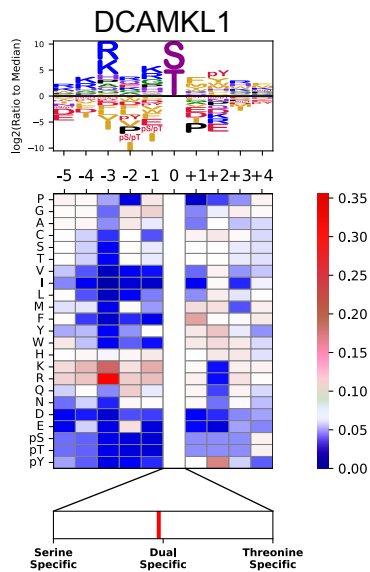


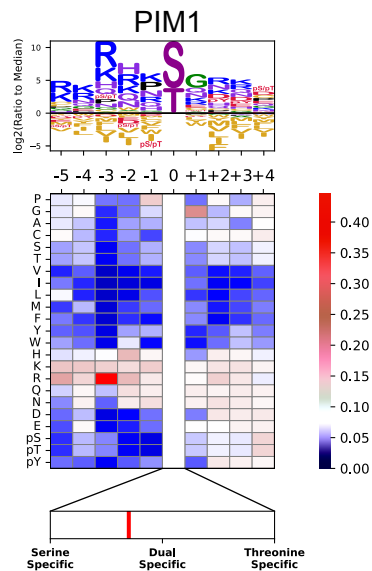


CAMK4

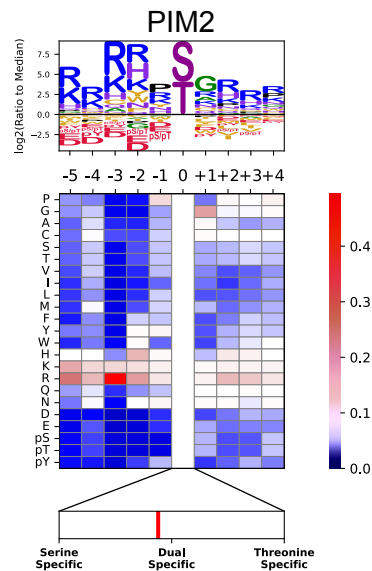
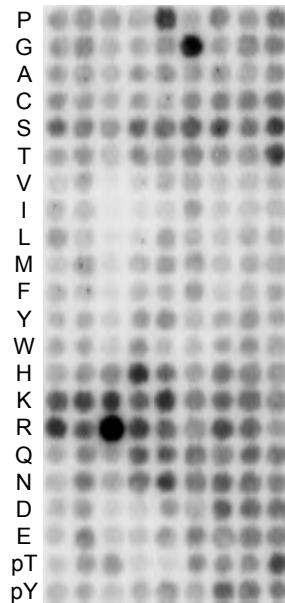




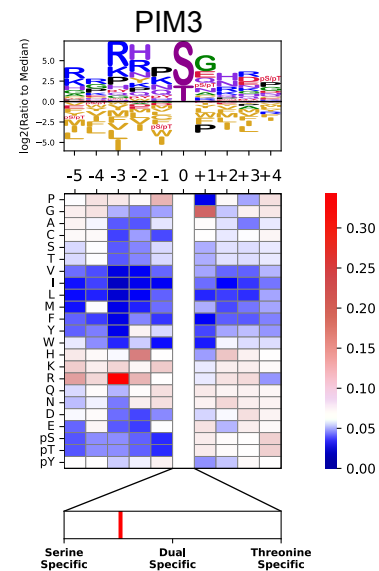
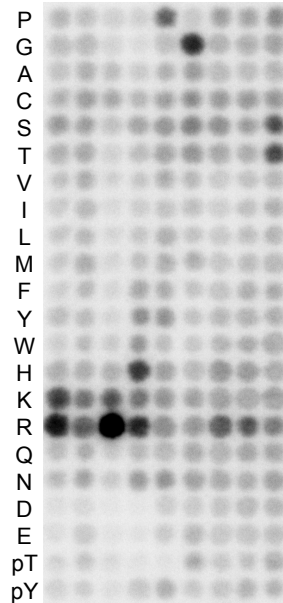




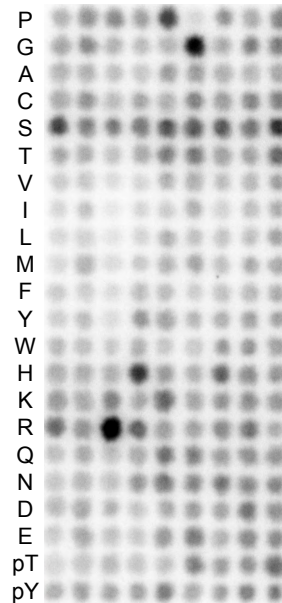
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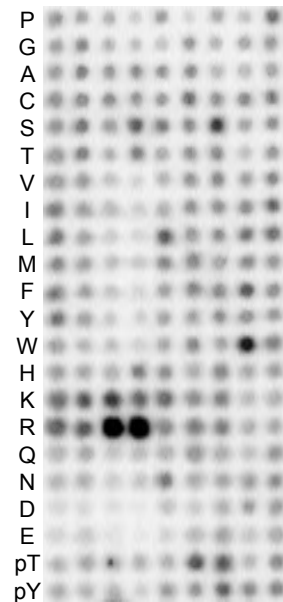
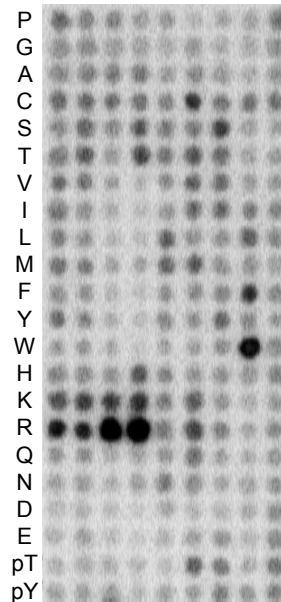
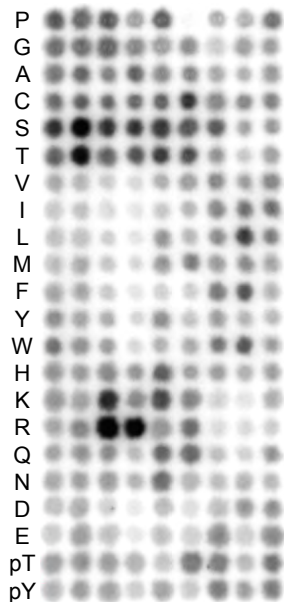
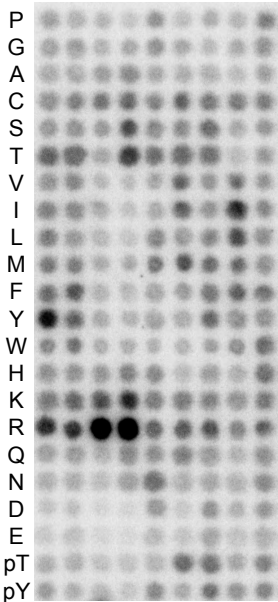
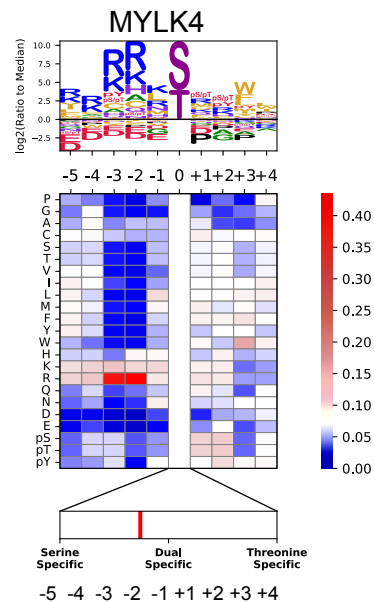
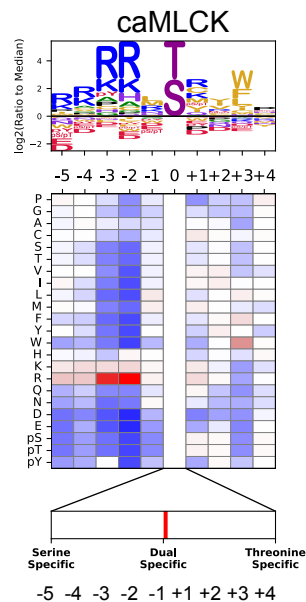
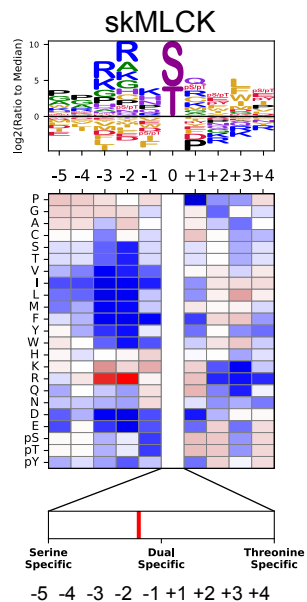
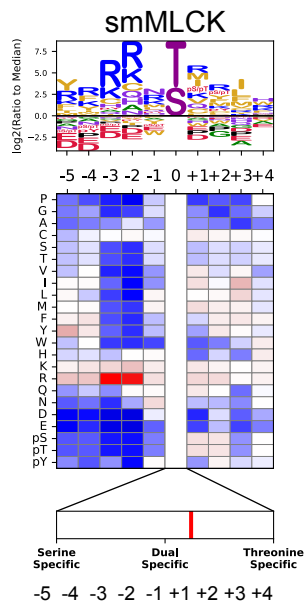


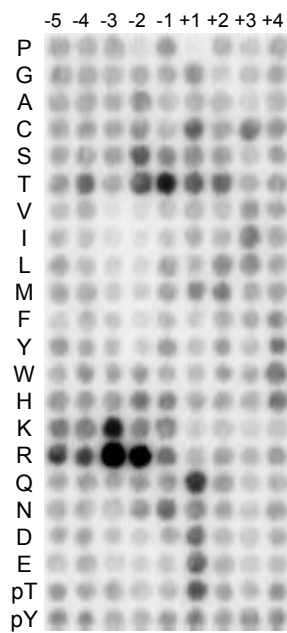
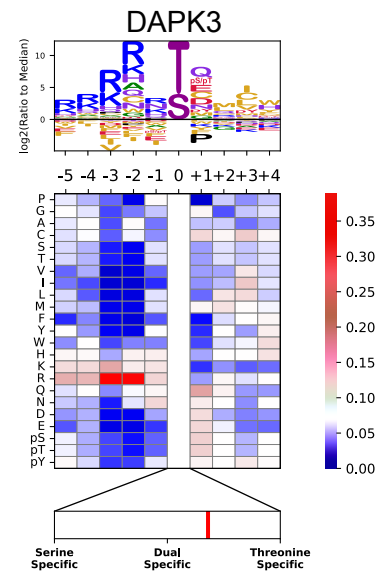
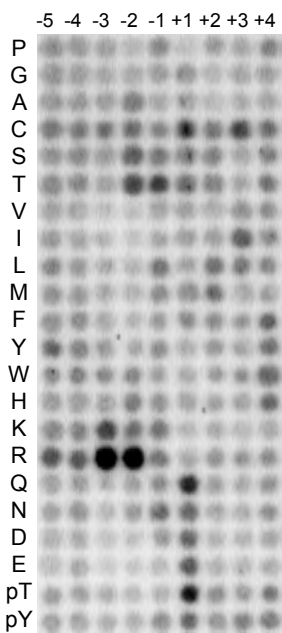
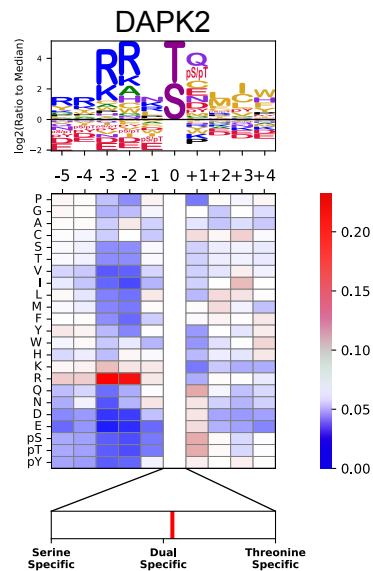
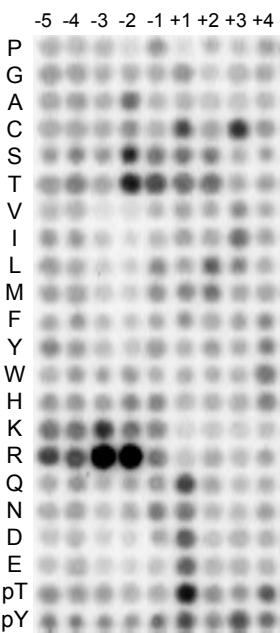
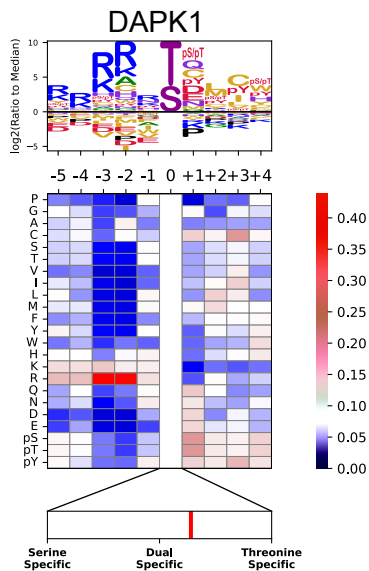
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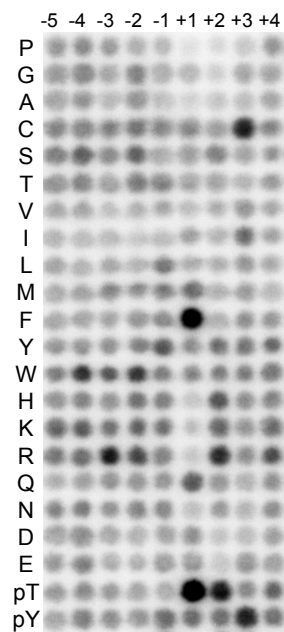
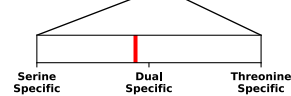
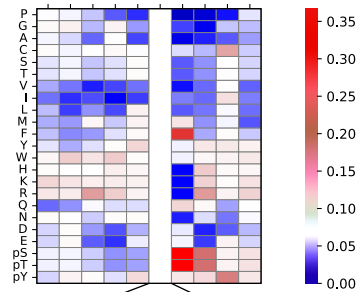
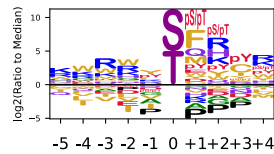
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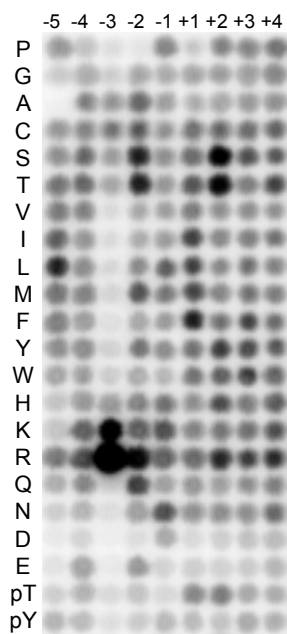
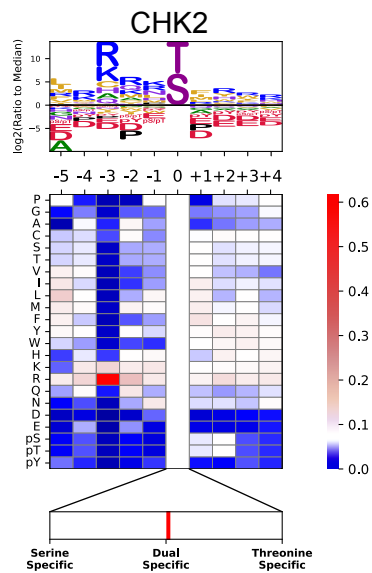




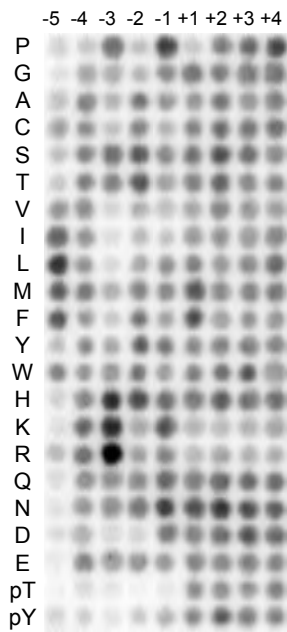
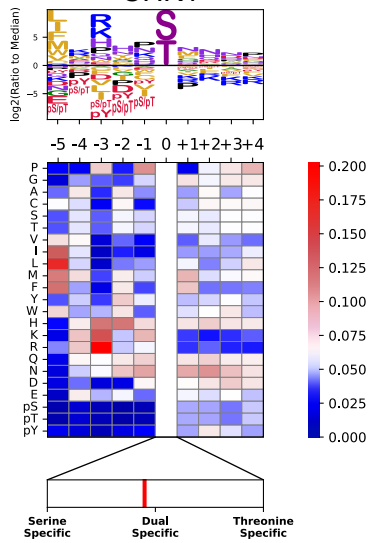


DRAK1

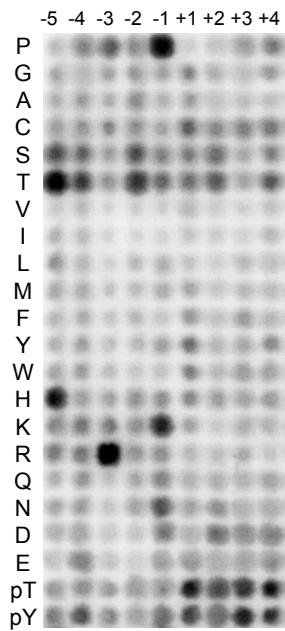
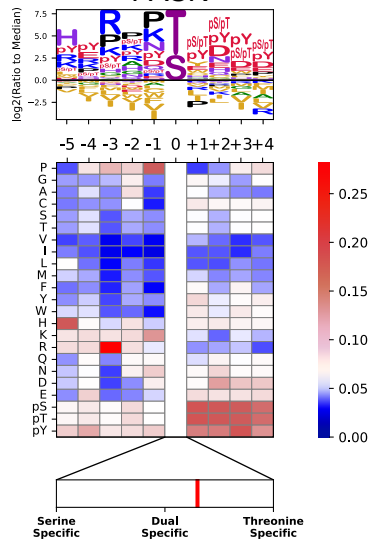




CHK1



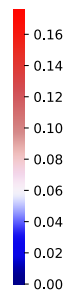
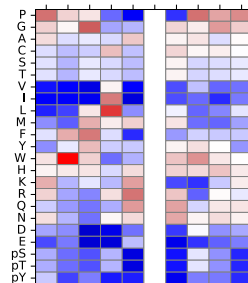
PASK



LKB1

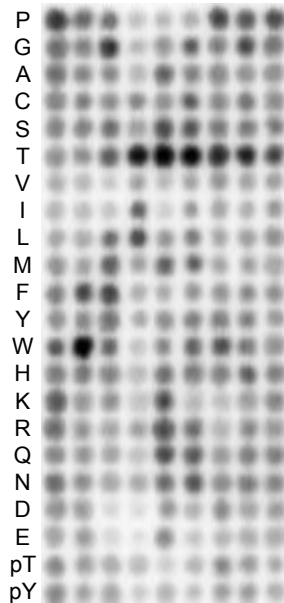


-5 -4 -3 -2 -1 0 +1 +2 +3 +4

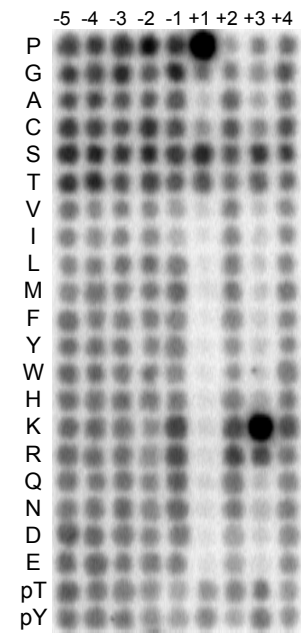
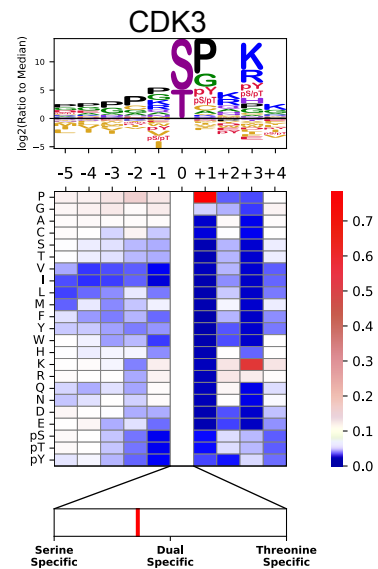
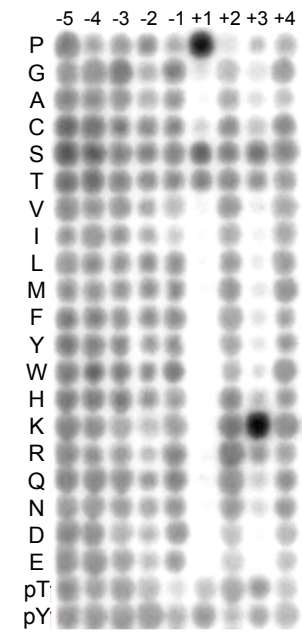
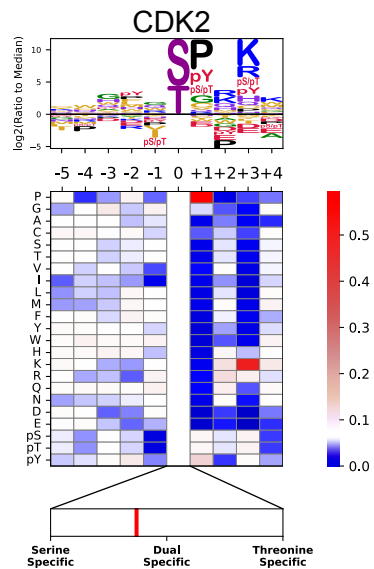
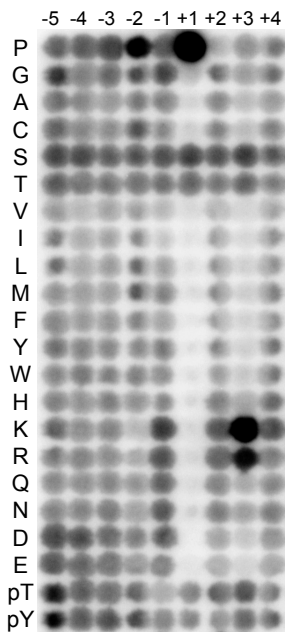
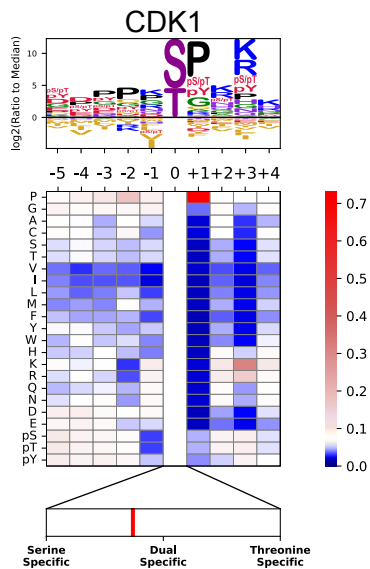


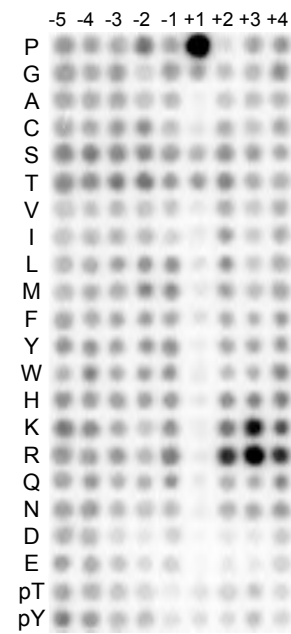
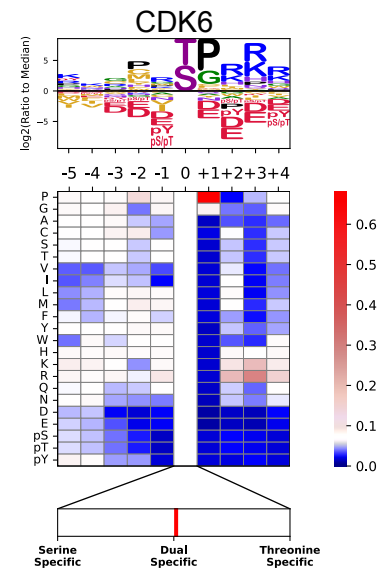
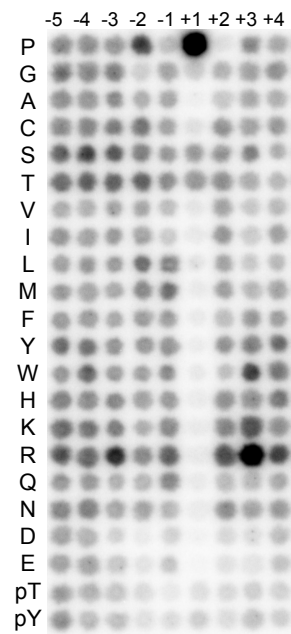
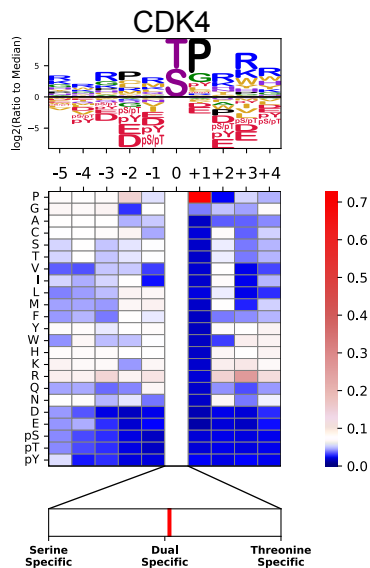
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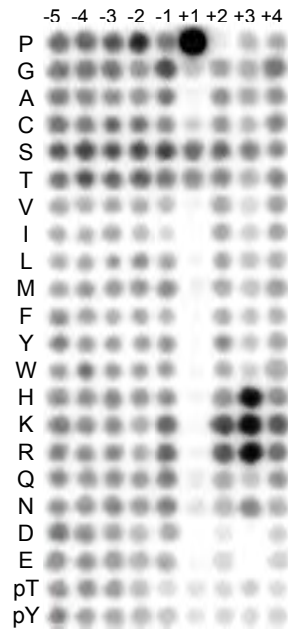
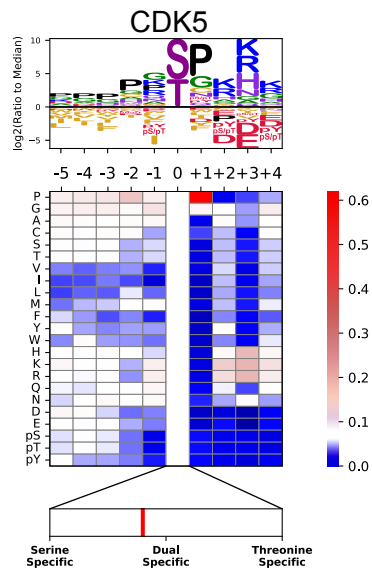
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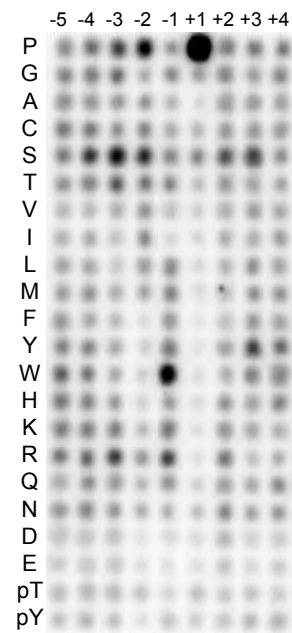
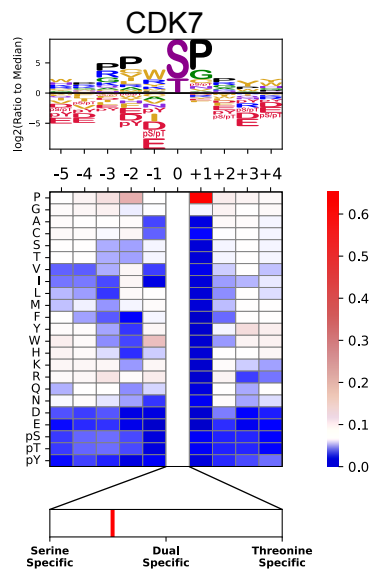


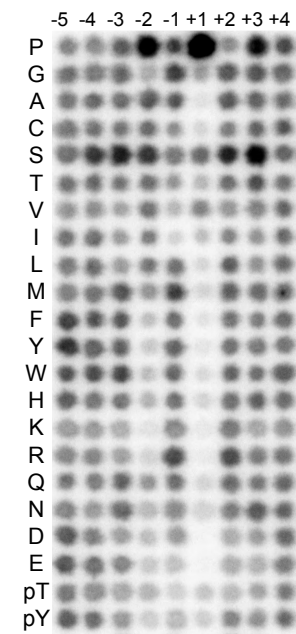
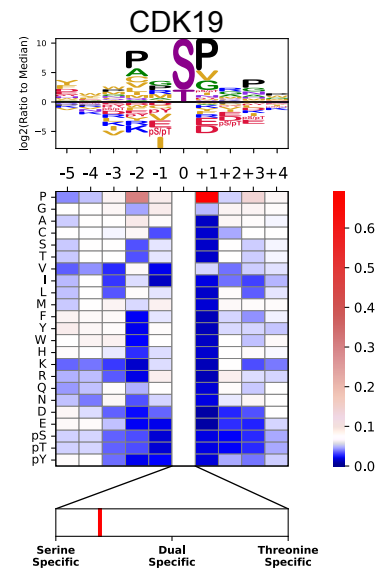
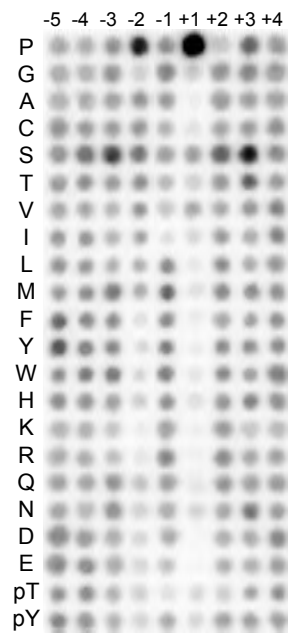
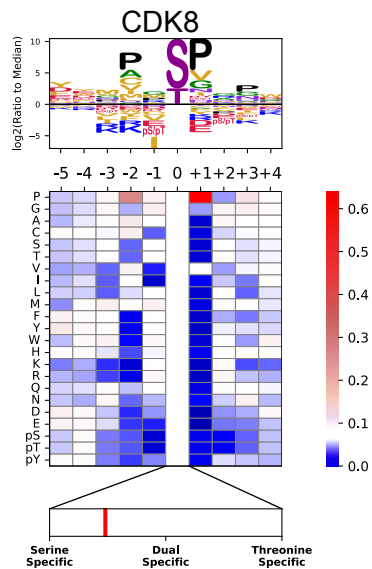
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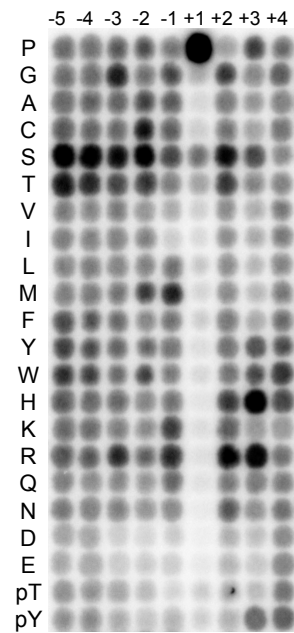
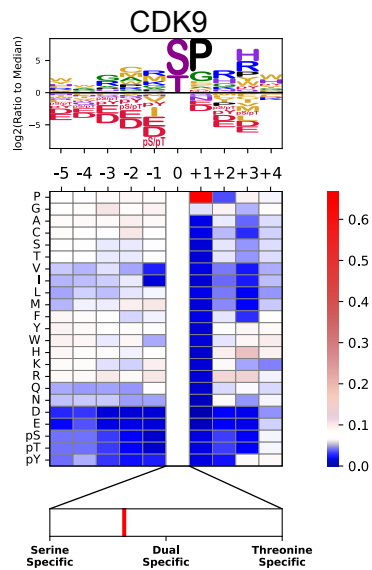


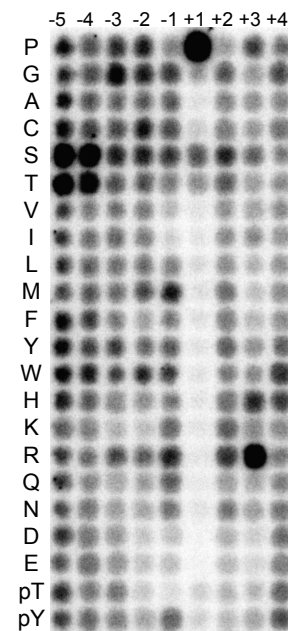
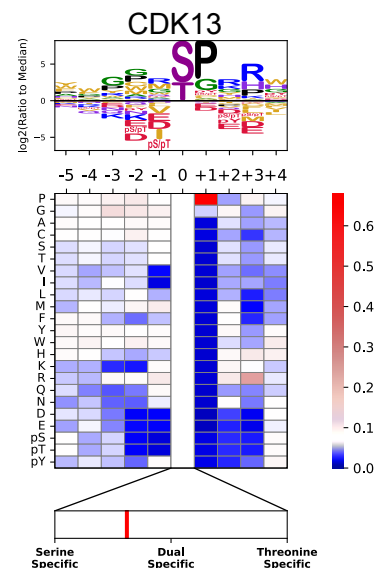
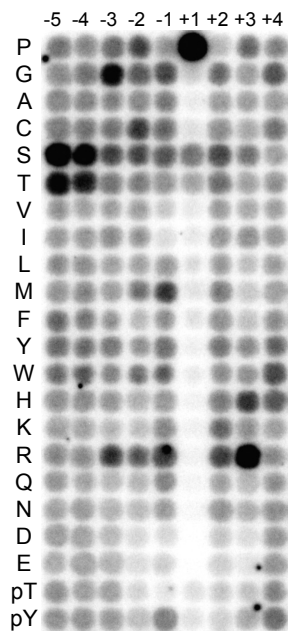
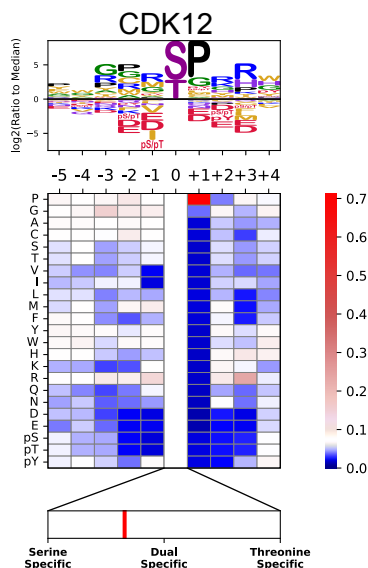


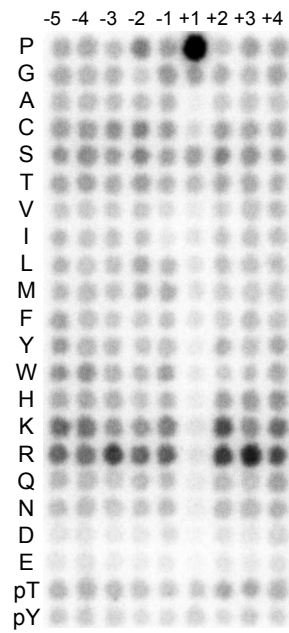
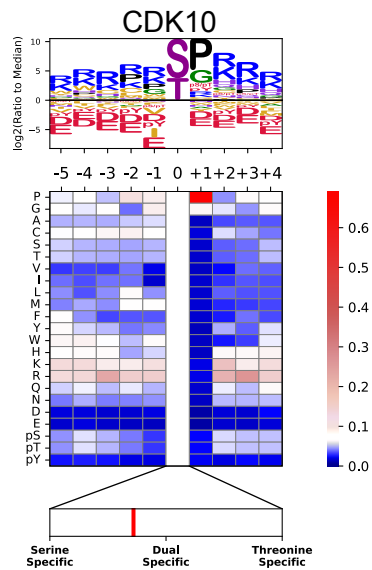


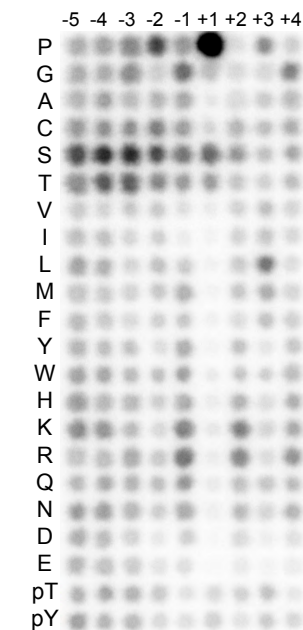
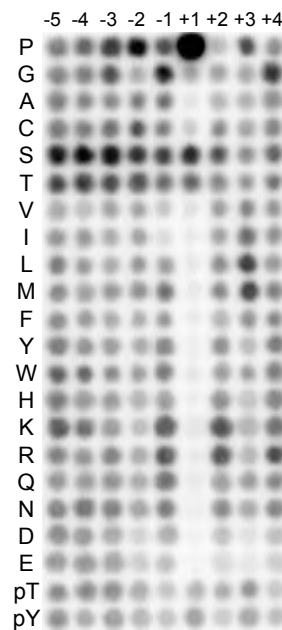
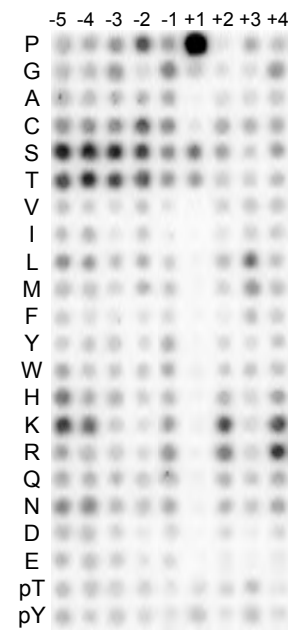
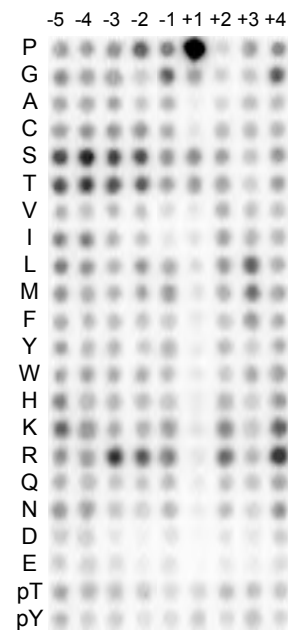
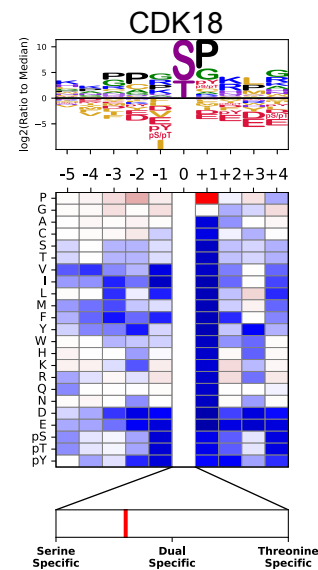
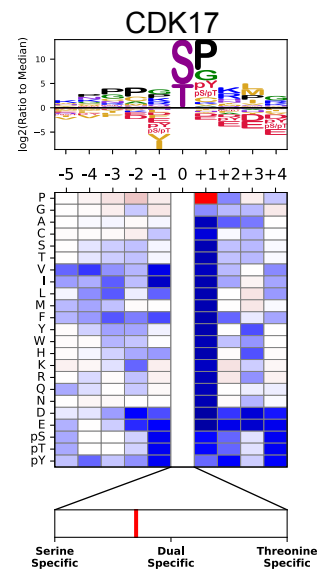
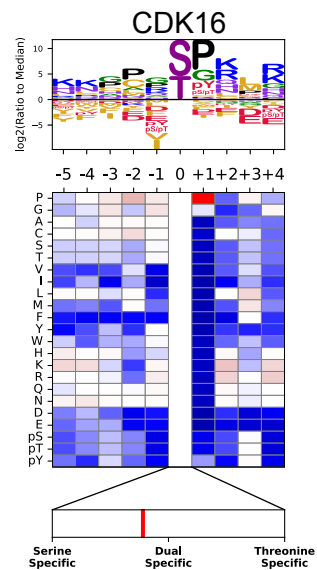
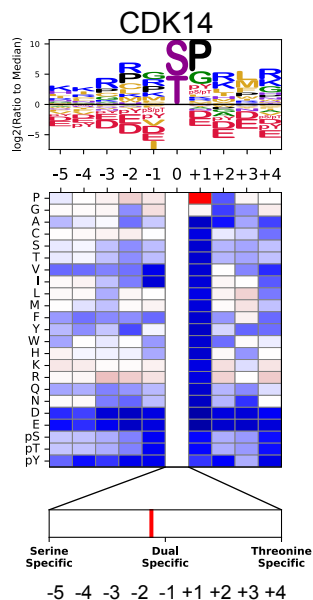


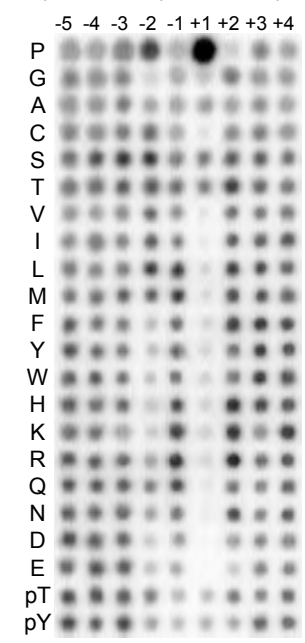
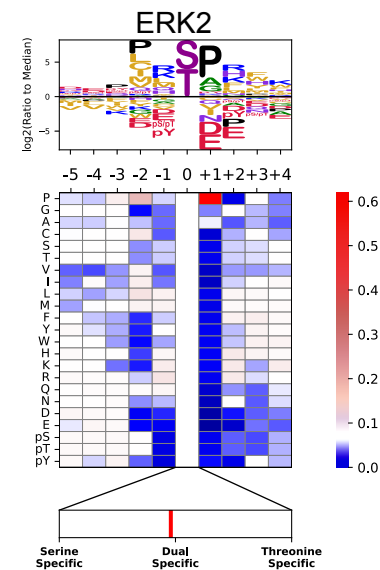
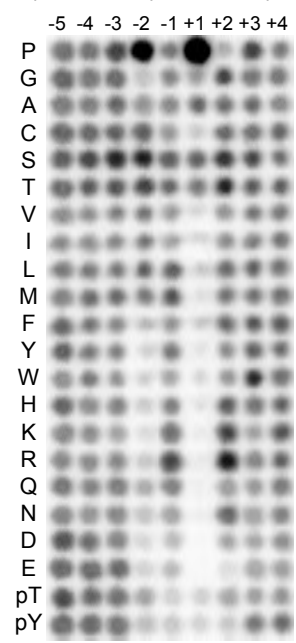
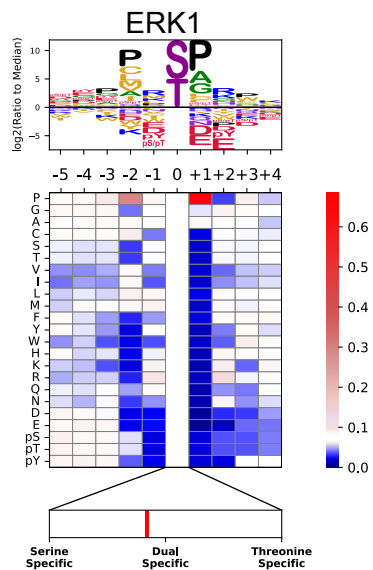


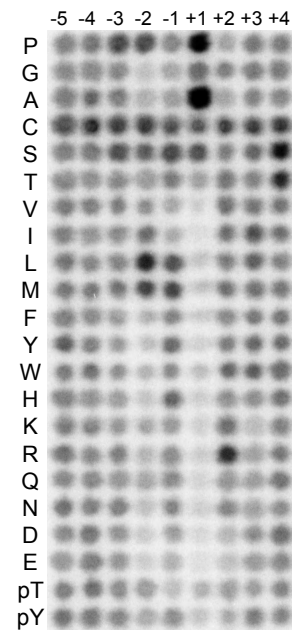
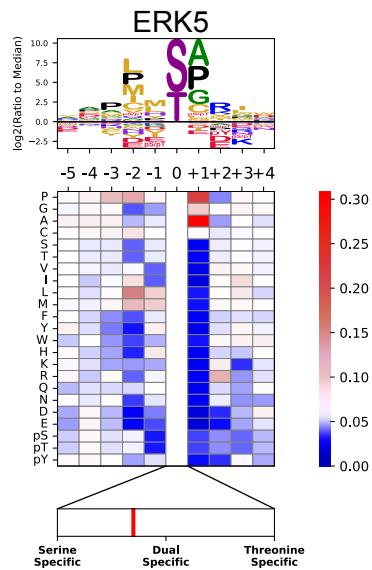


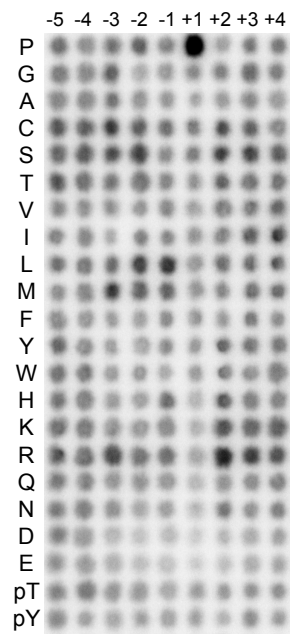
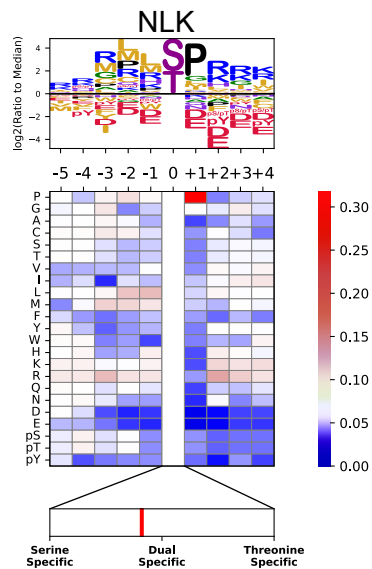


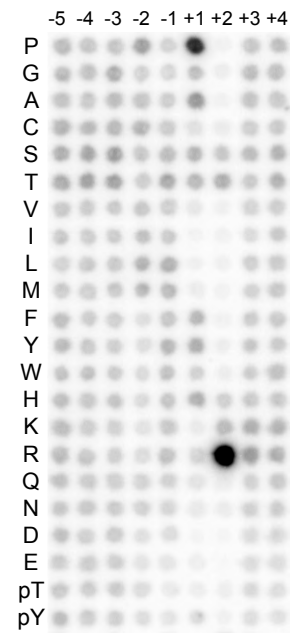
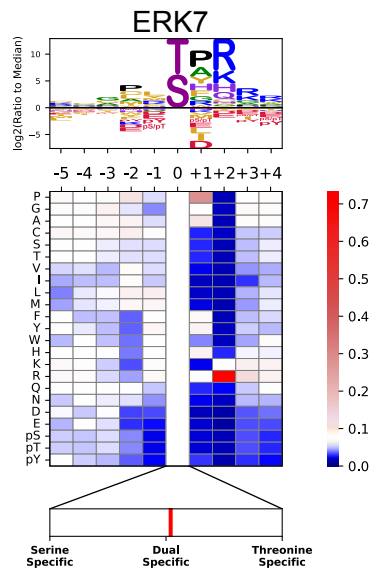


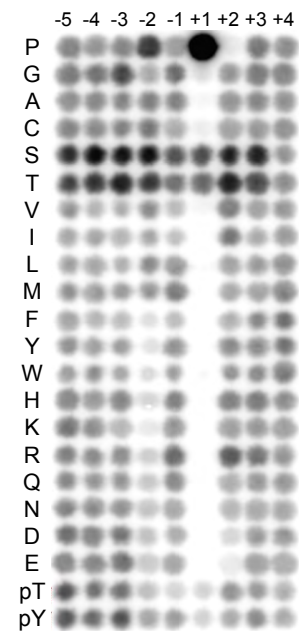
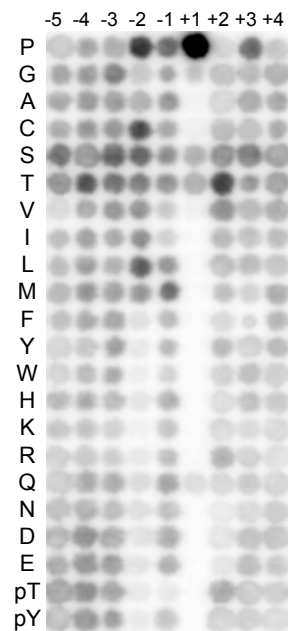
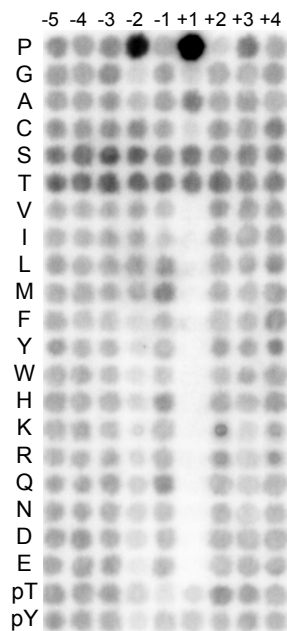
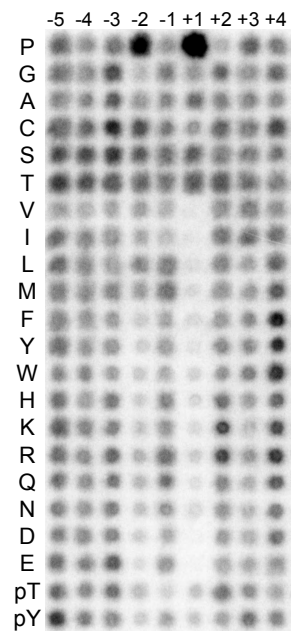
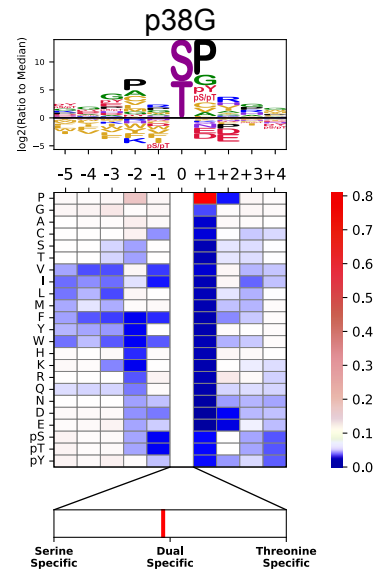
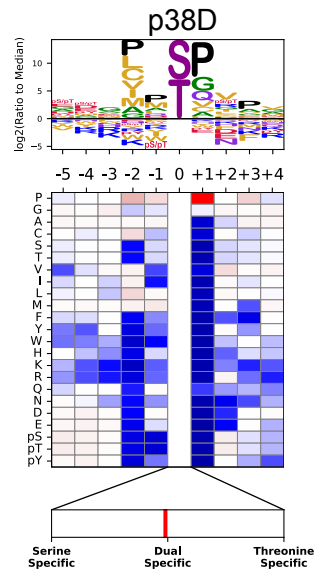
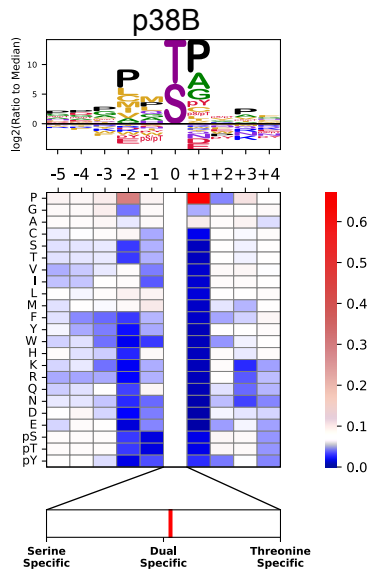
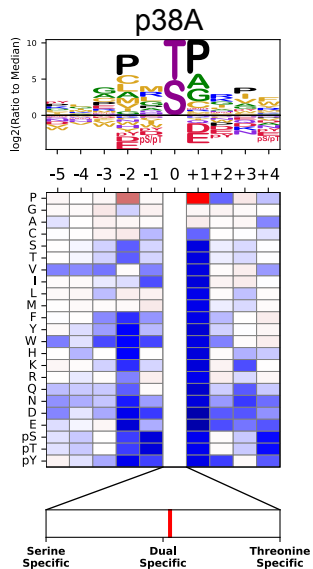


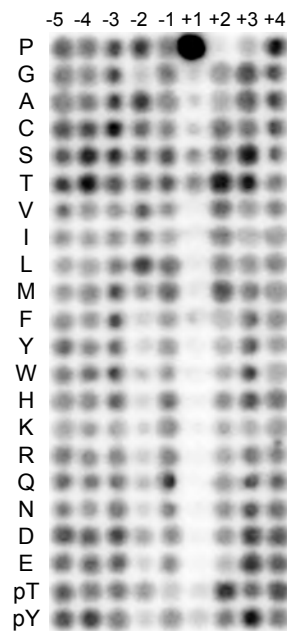
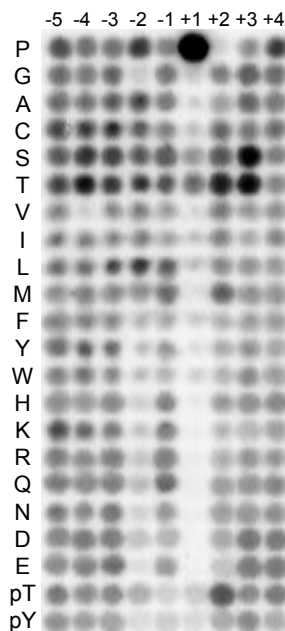
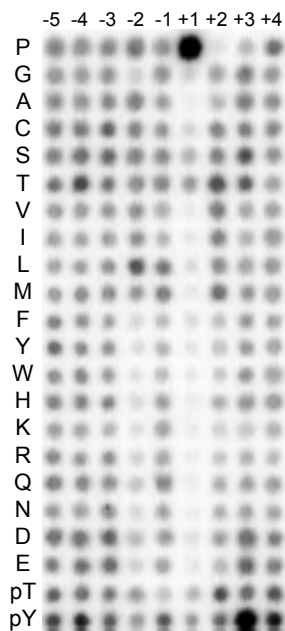
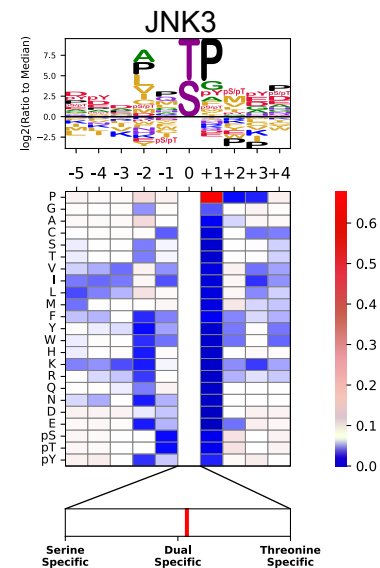
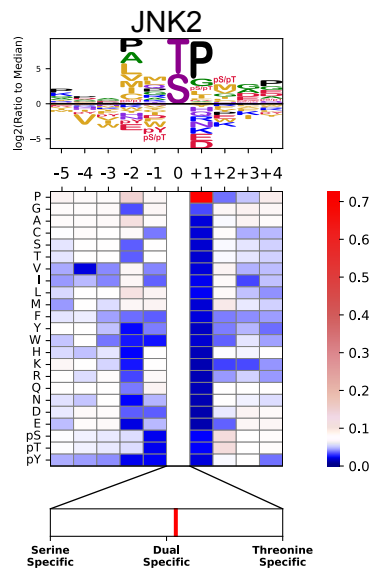
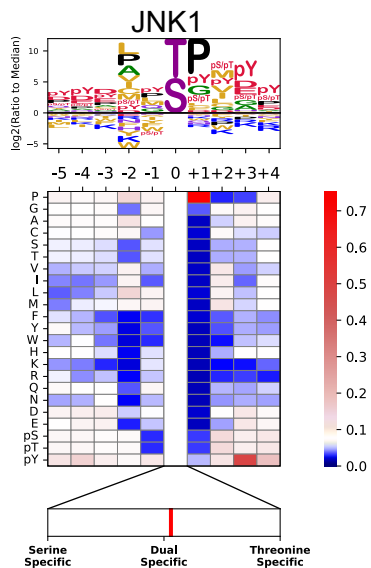


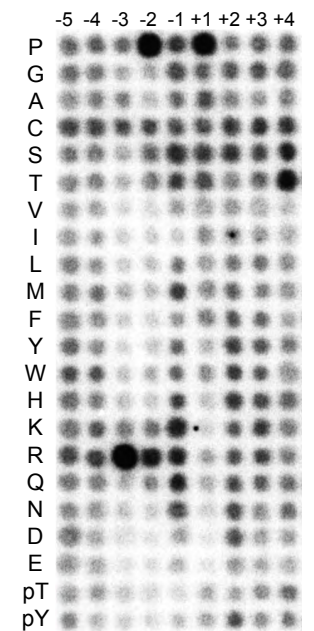
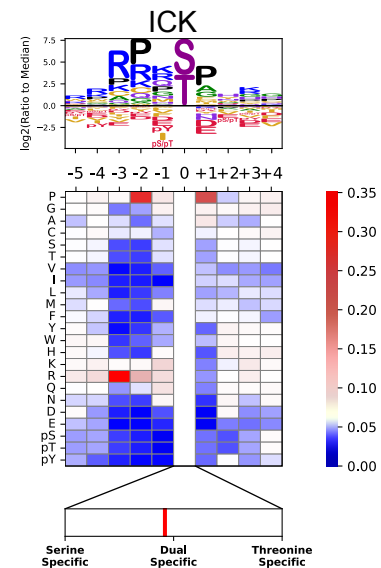
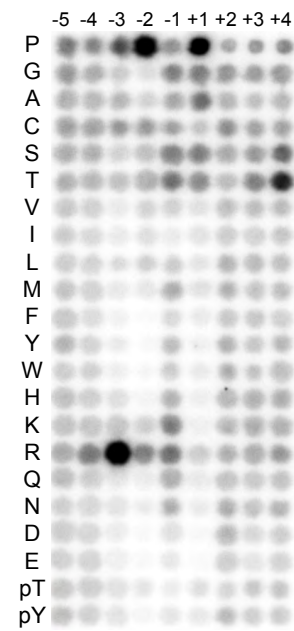
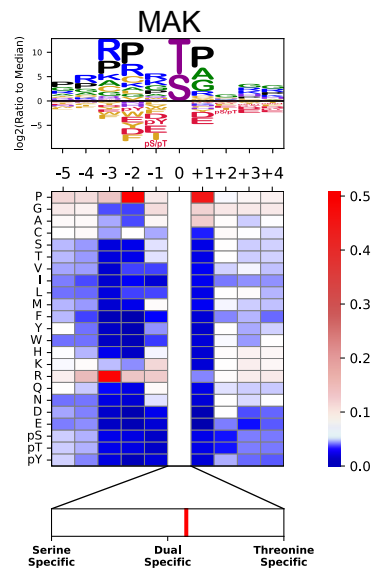
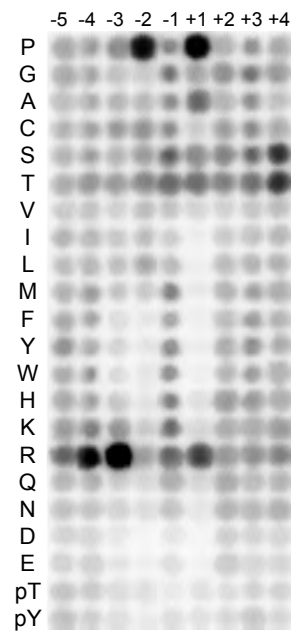
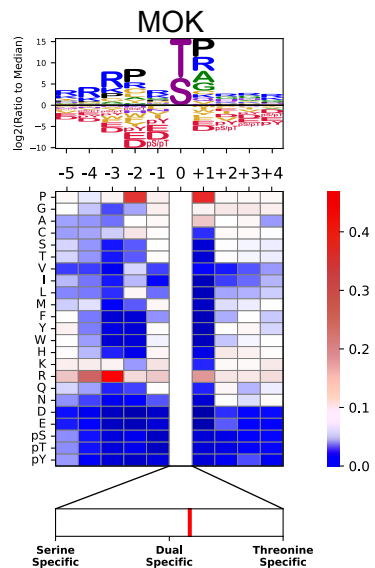


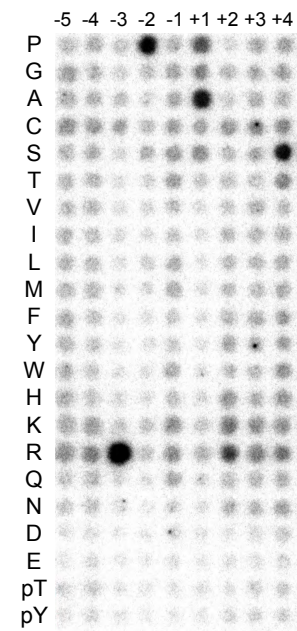
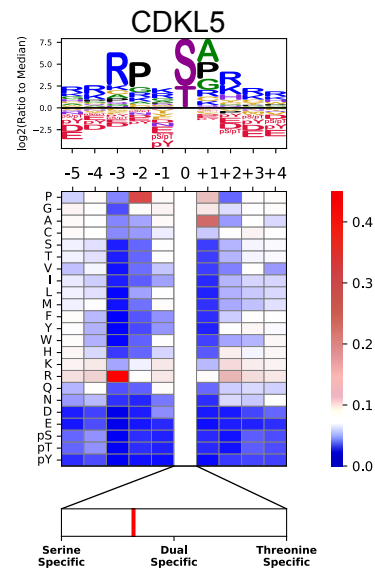
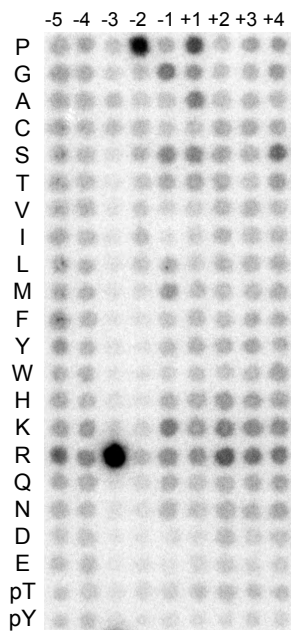
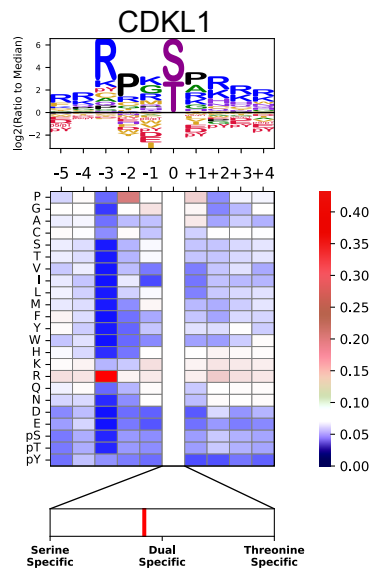


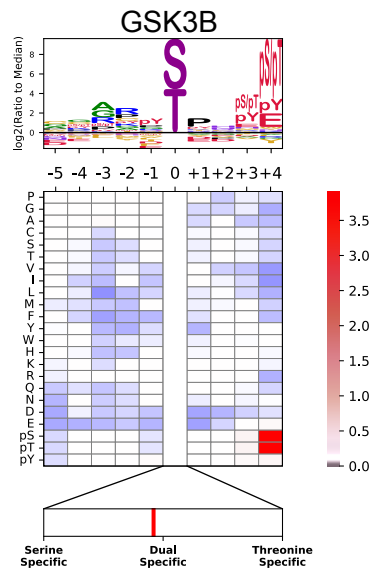
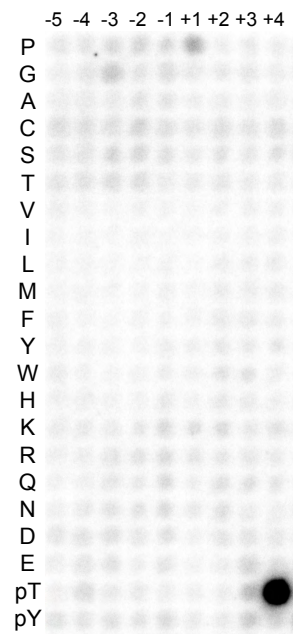
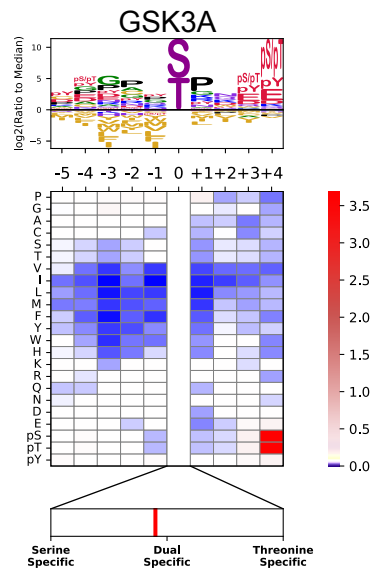


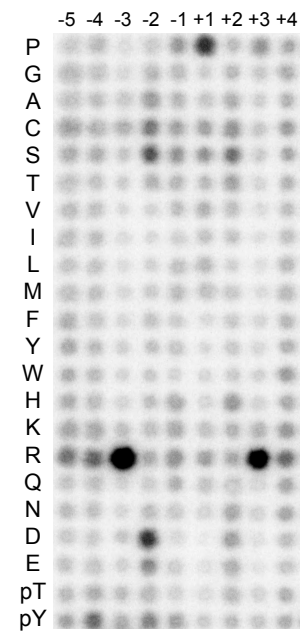
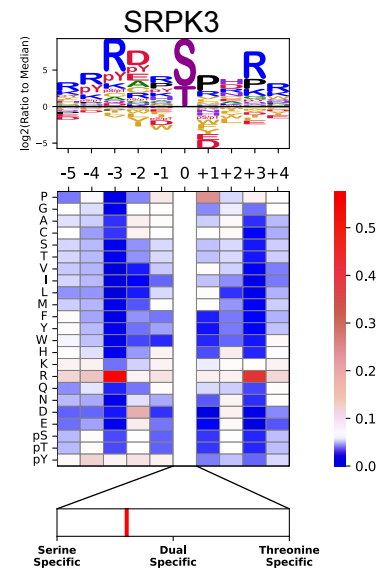
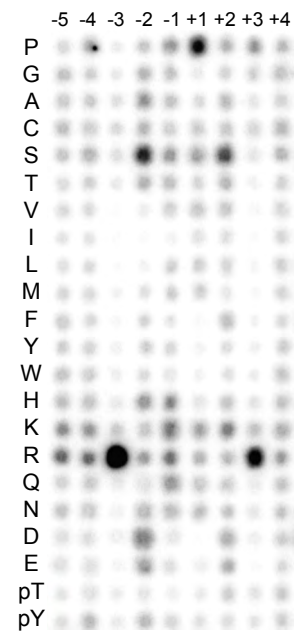
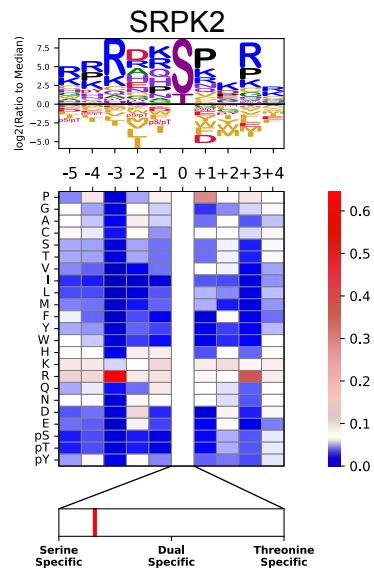
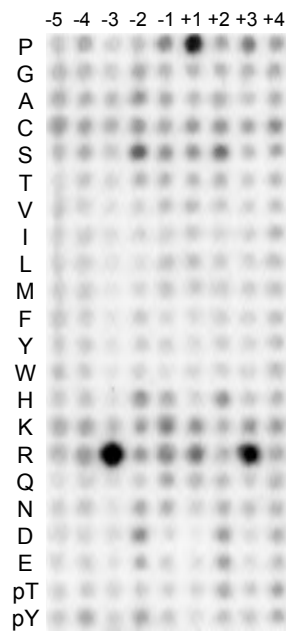
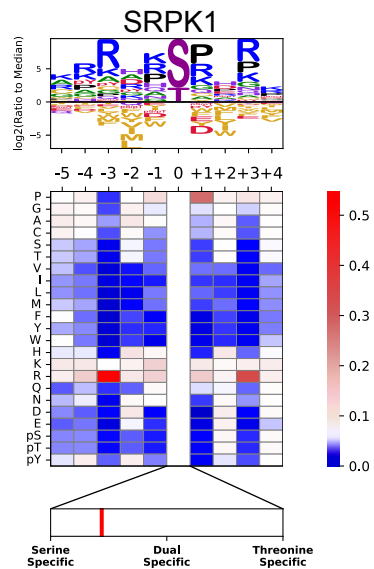


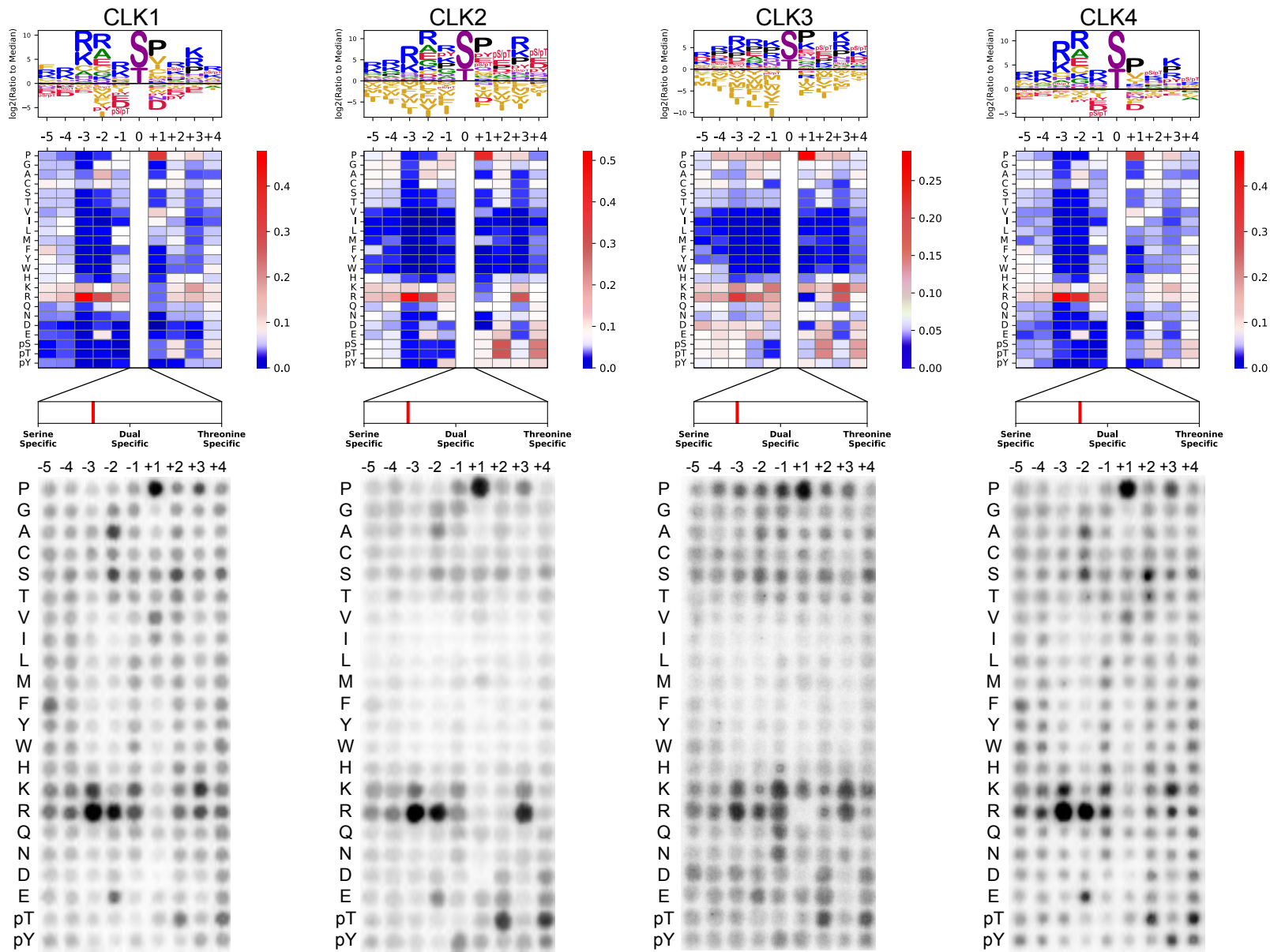


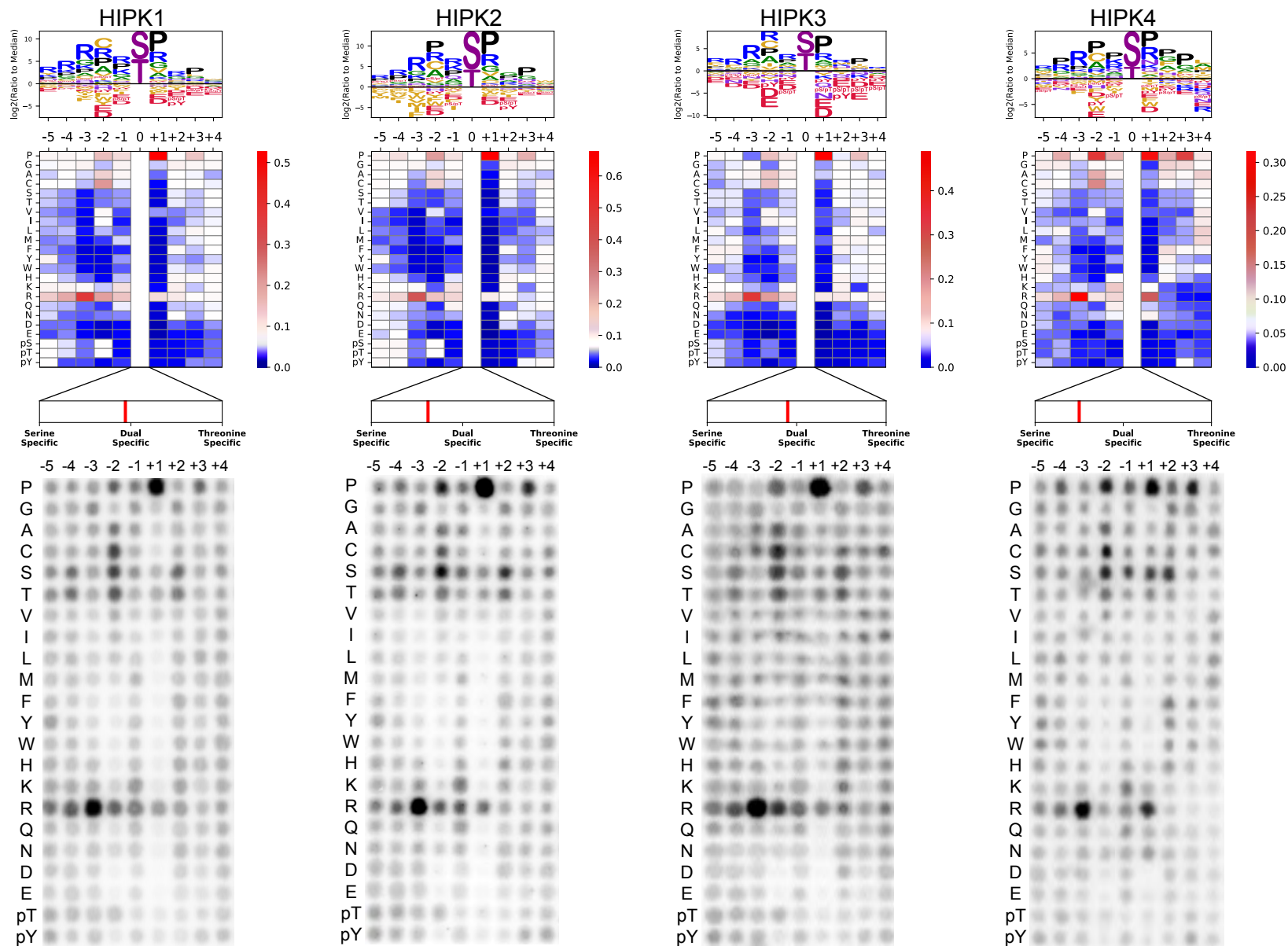


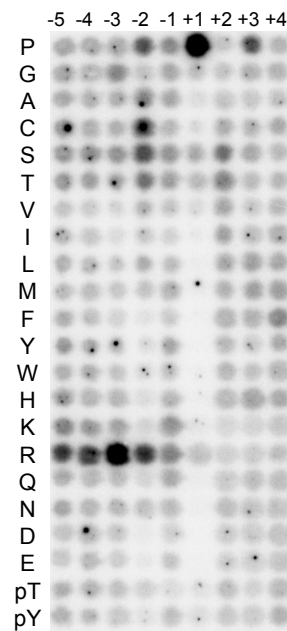
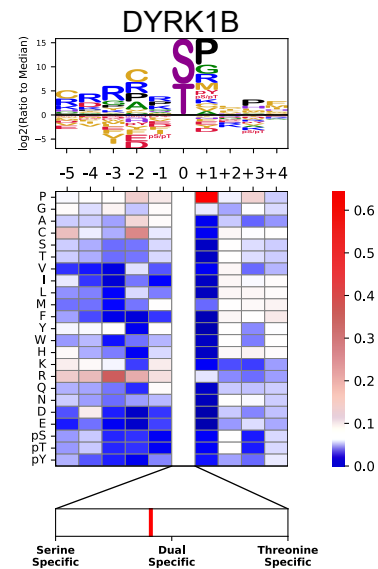
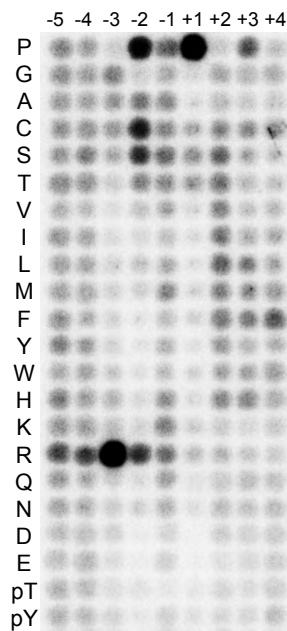
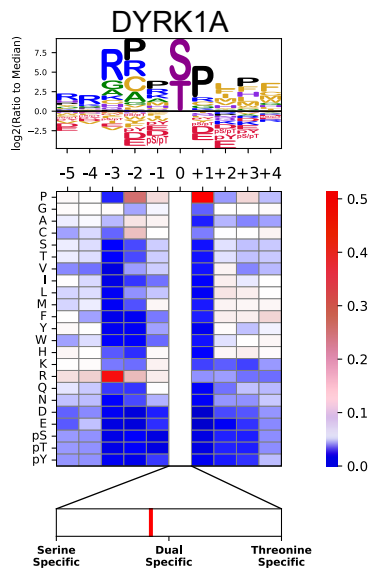


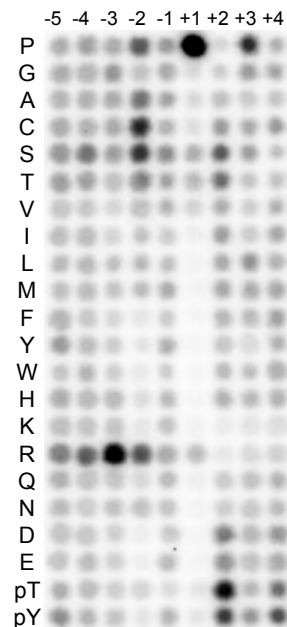
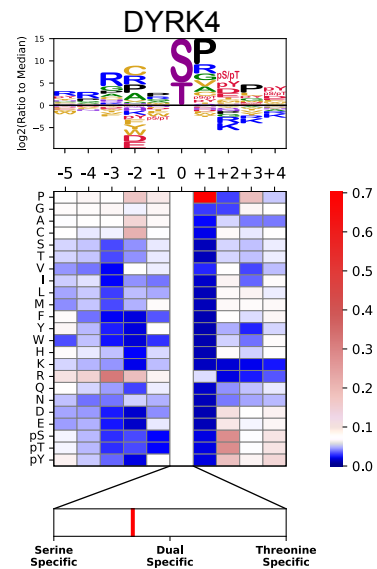
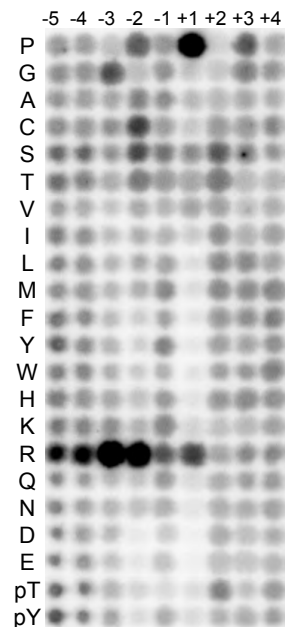
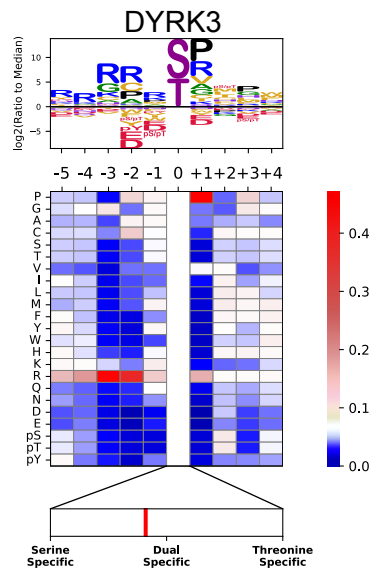
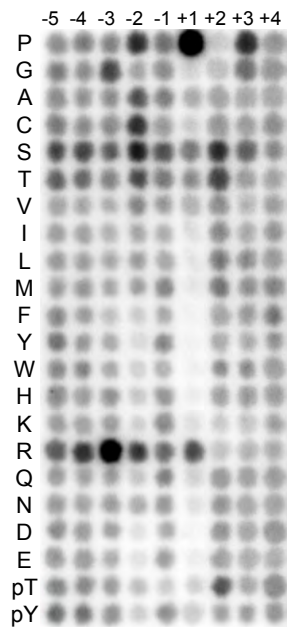
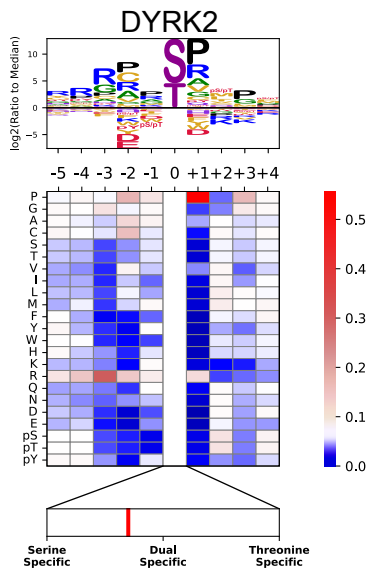


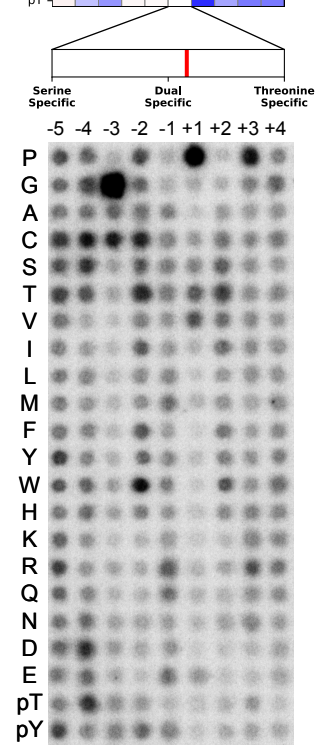
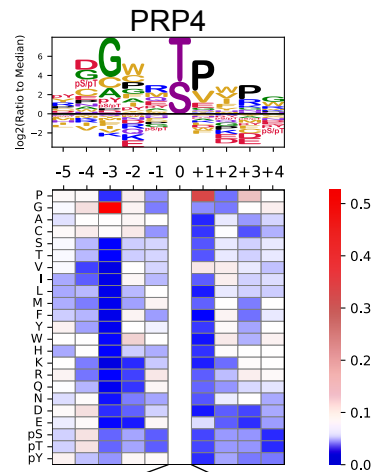




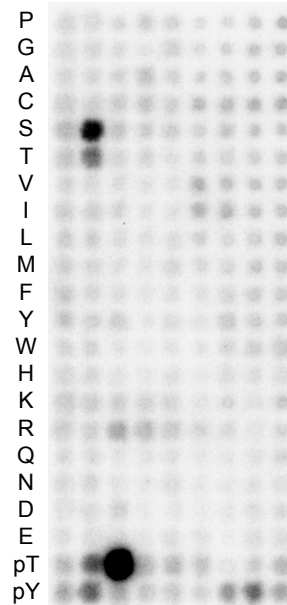
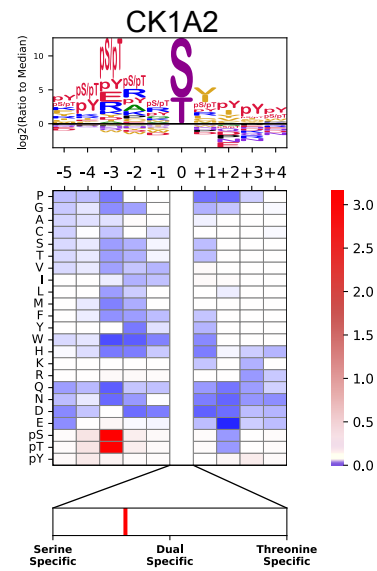
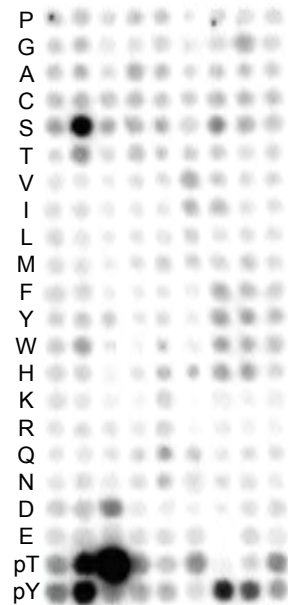
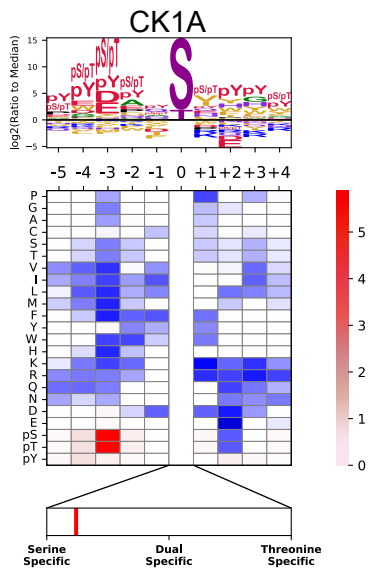


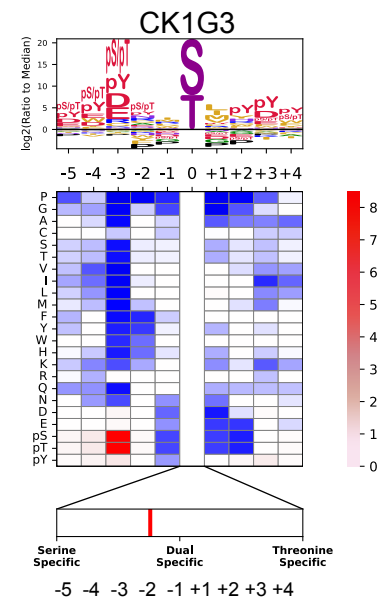
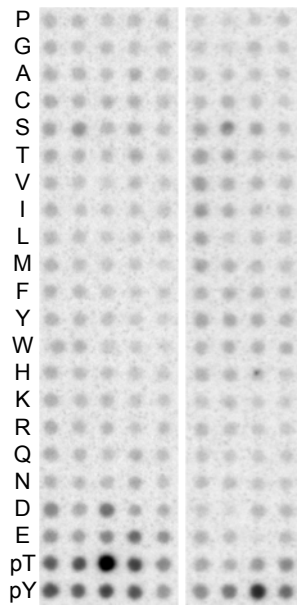
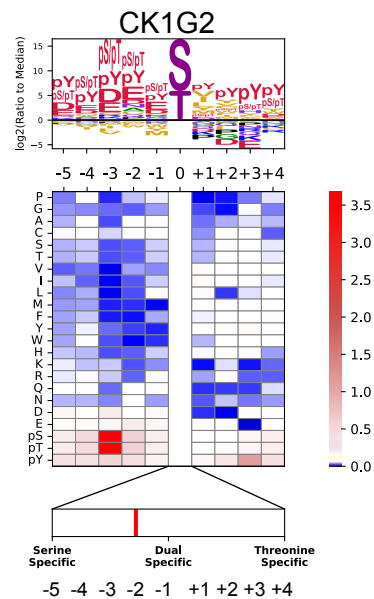
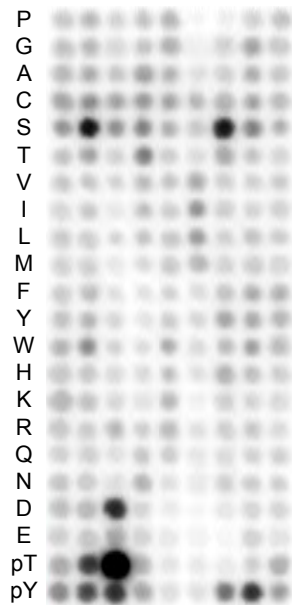
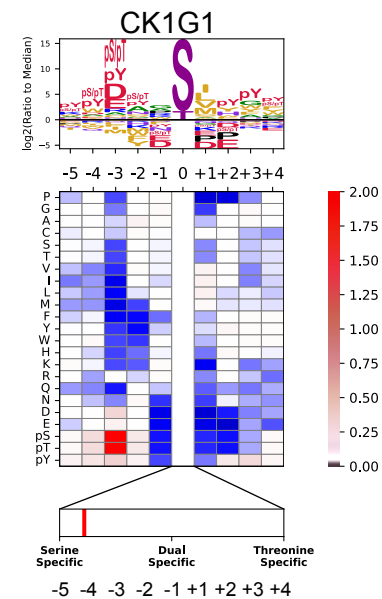


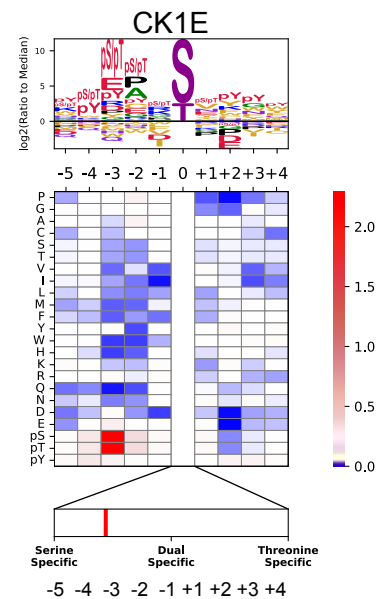
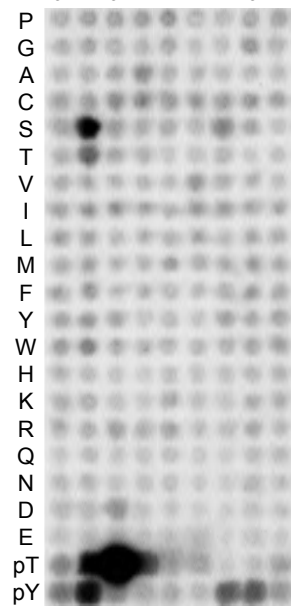
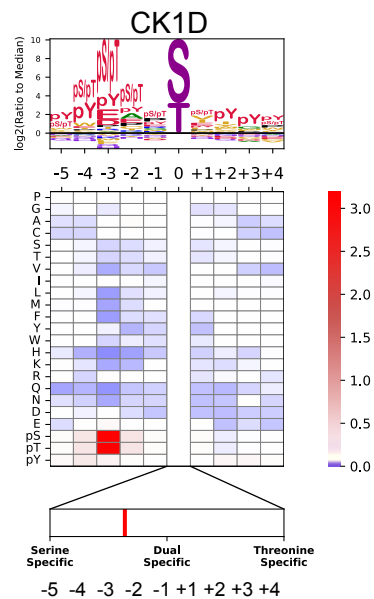


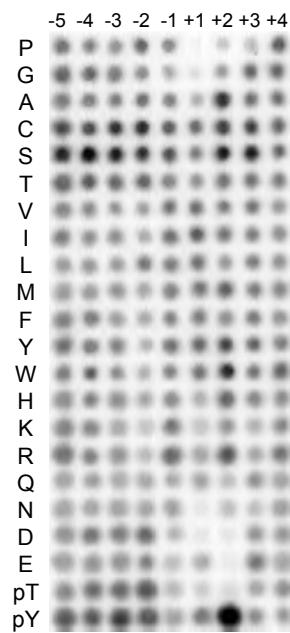
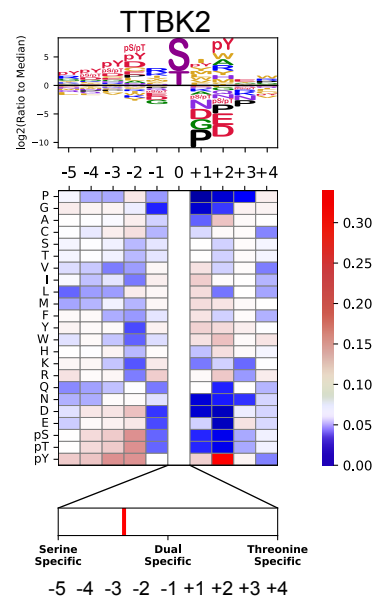
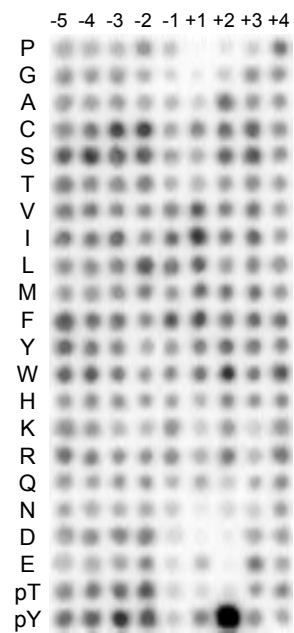
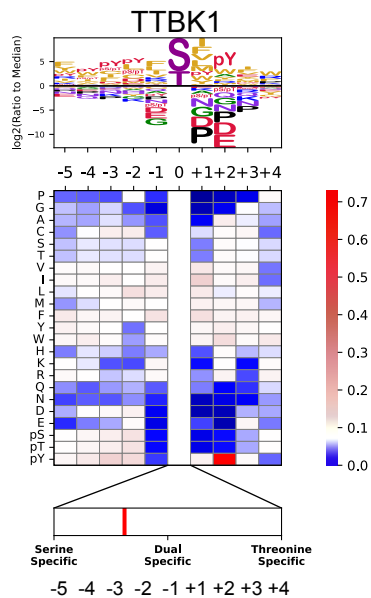


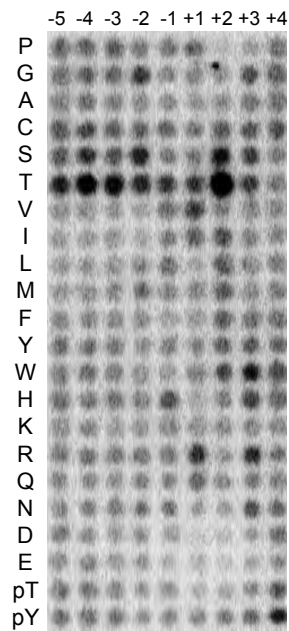
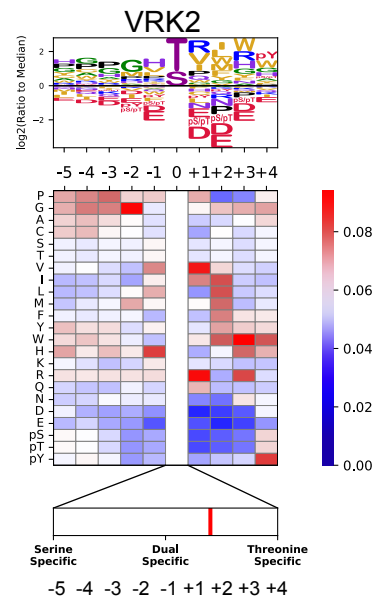
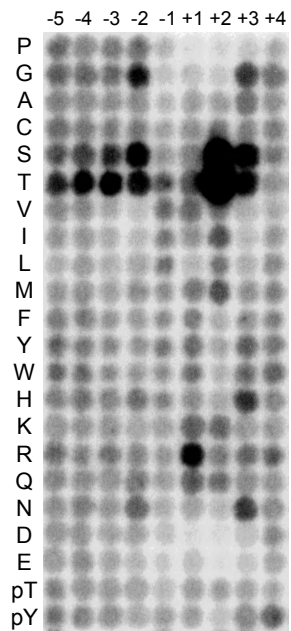
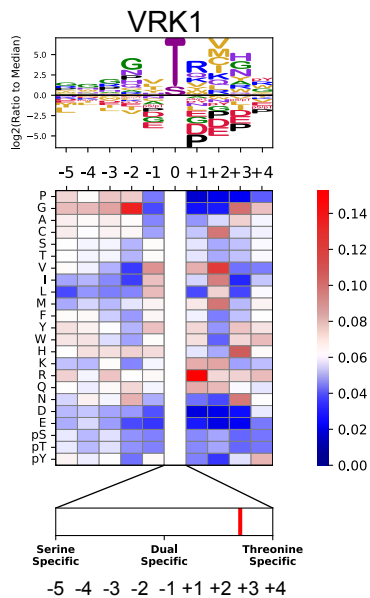
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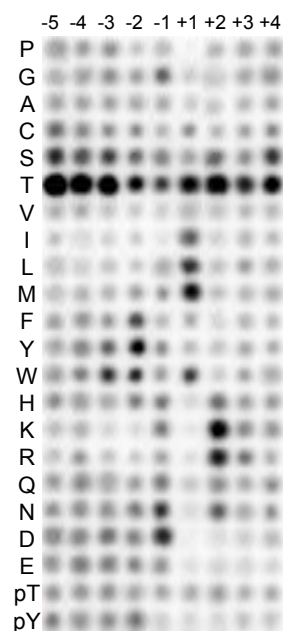
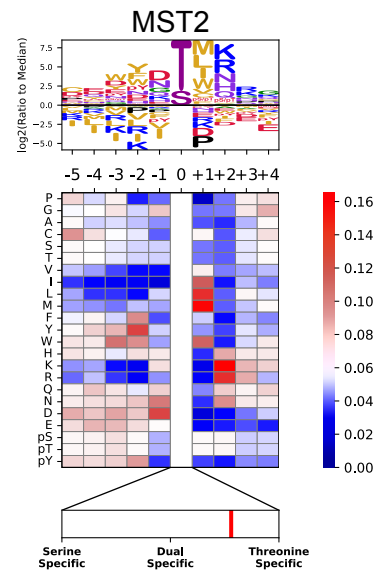
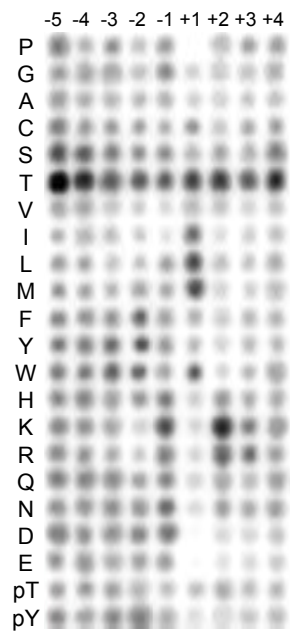
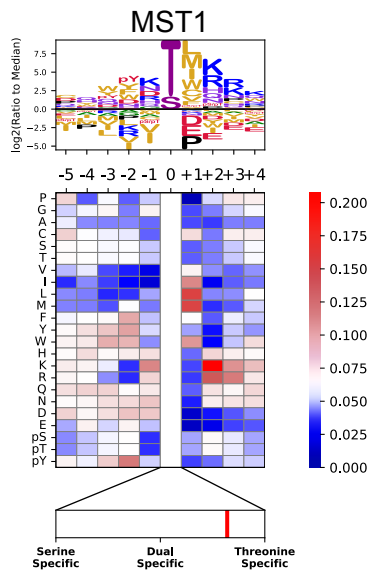


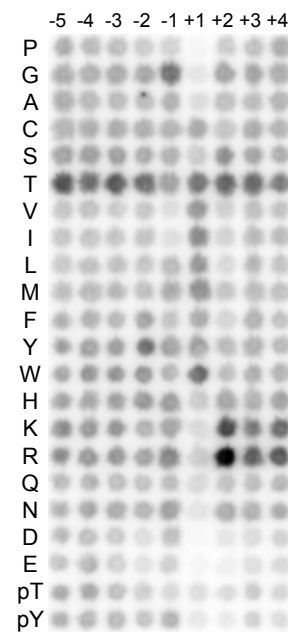
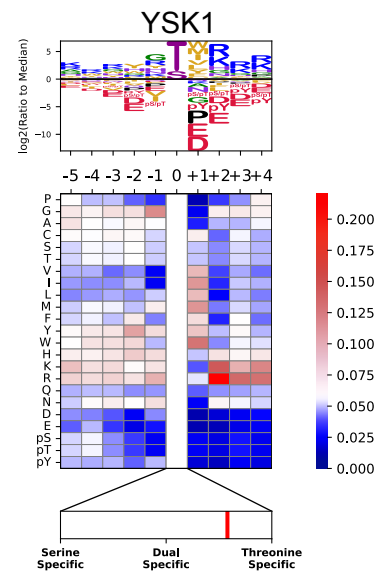
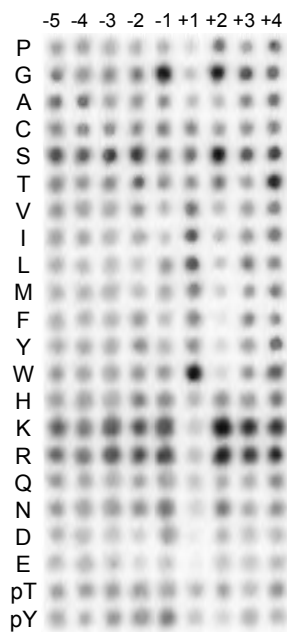
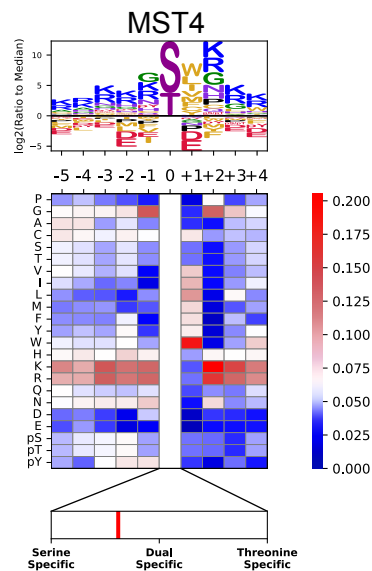
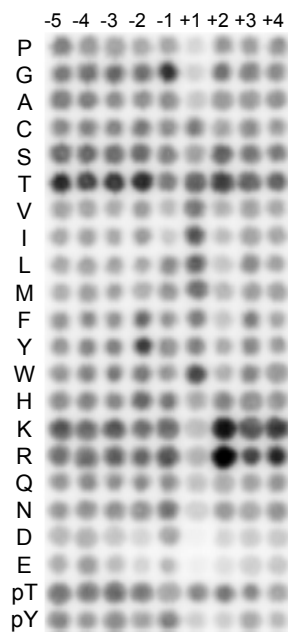
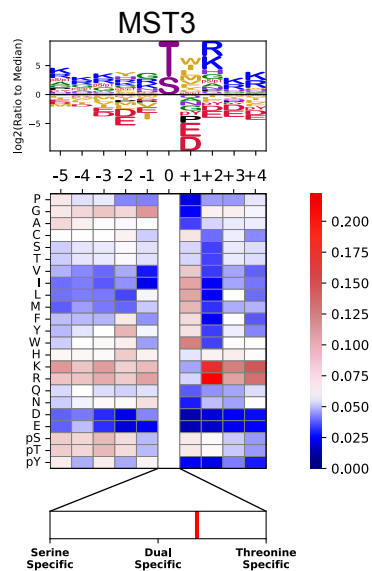


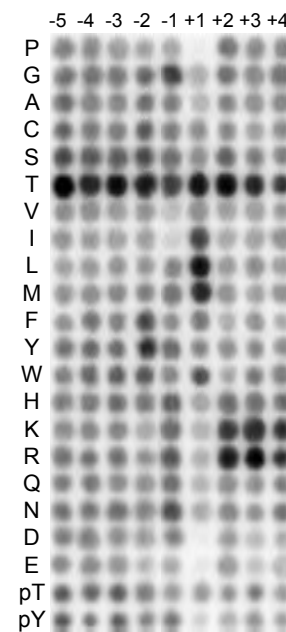
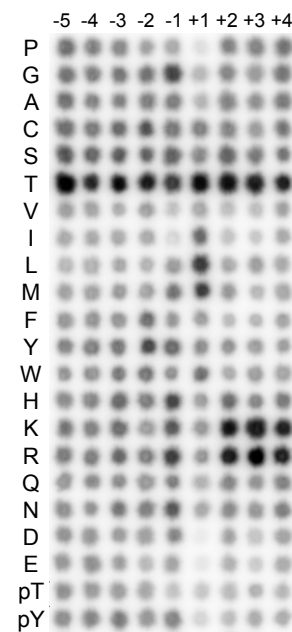
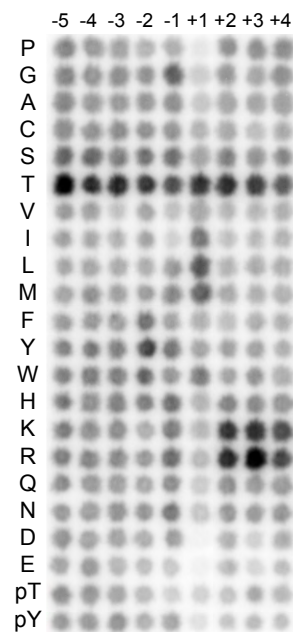
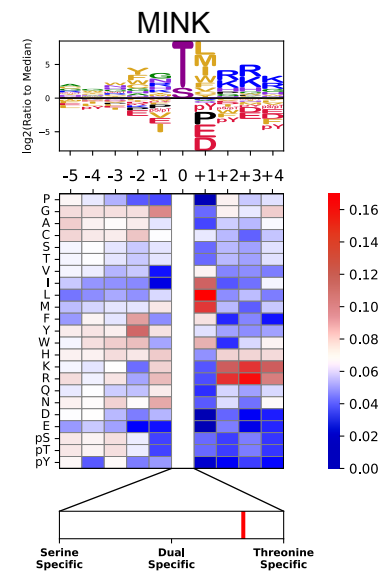
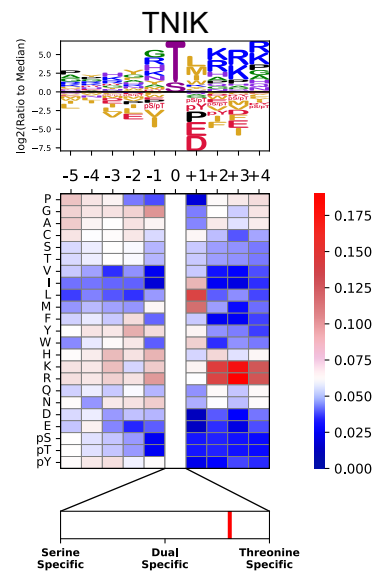
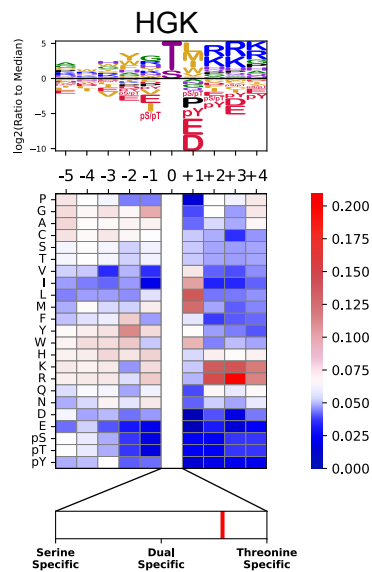


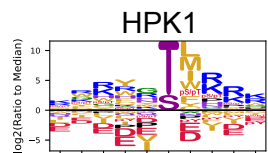


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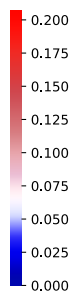
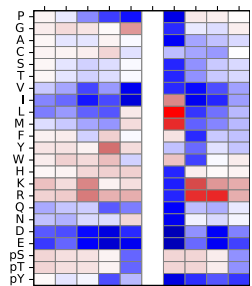






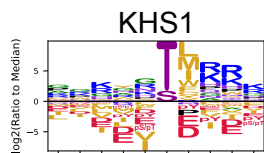
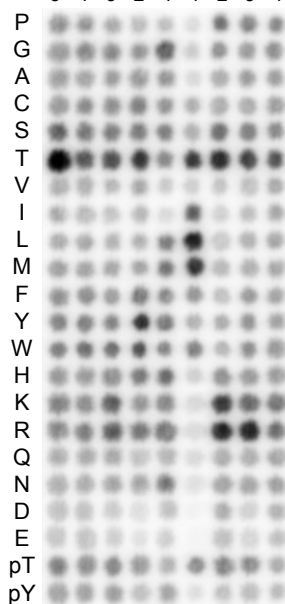


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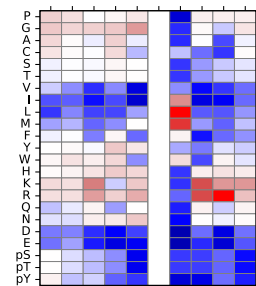


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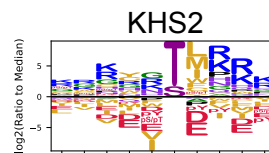
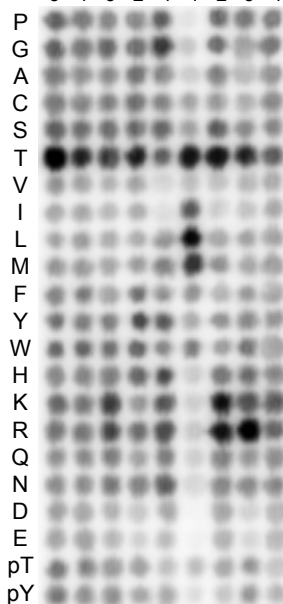


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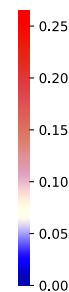
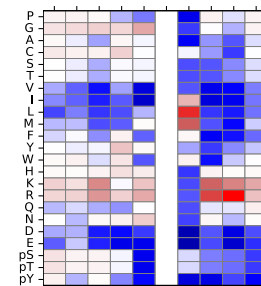


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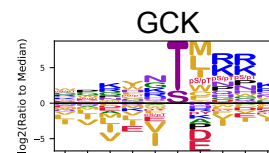
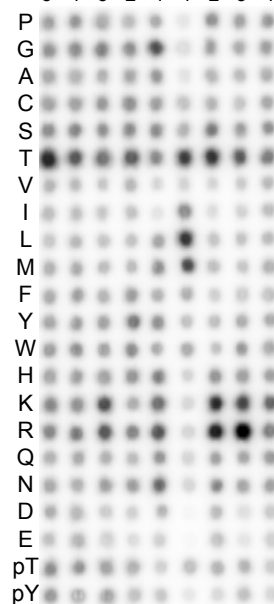


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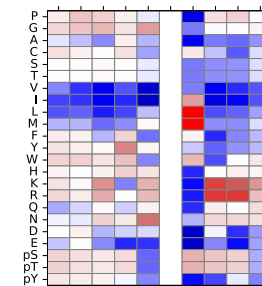


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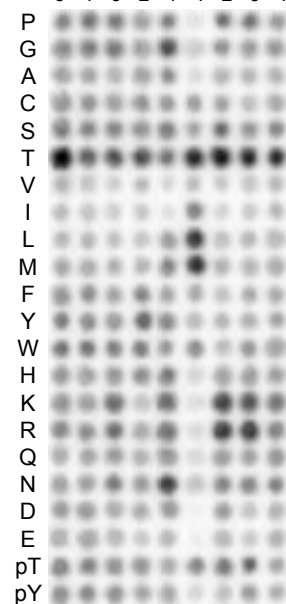


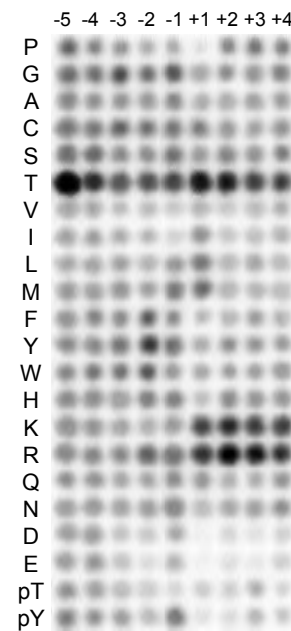
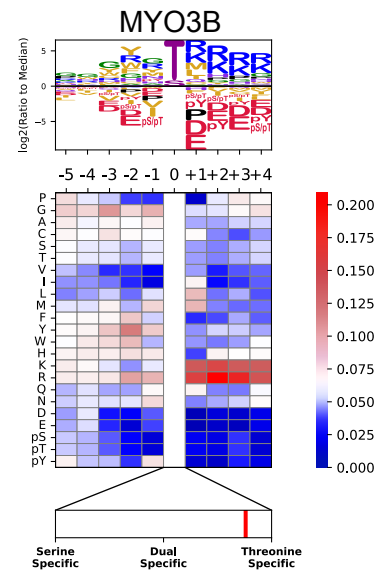
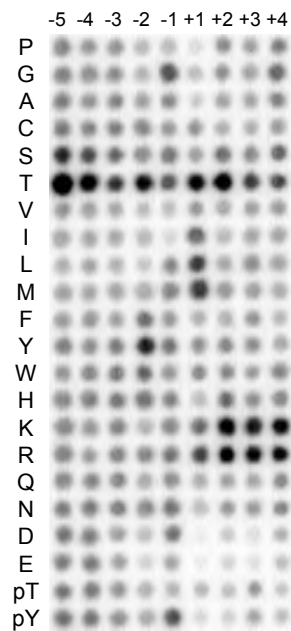
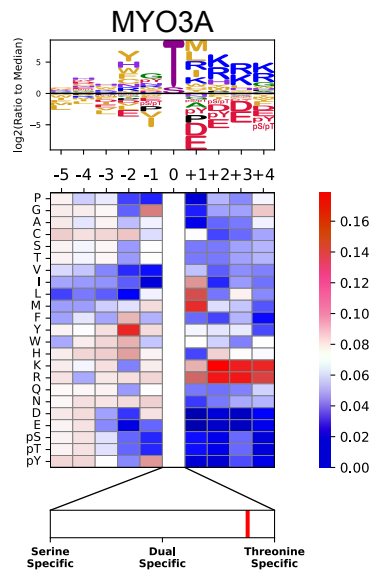
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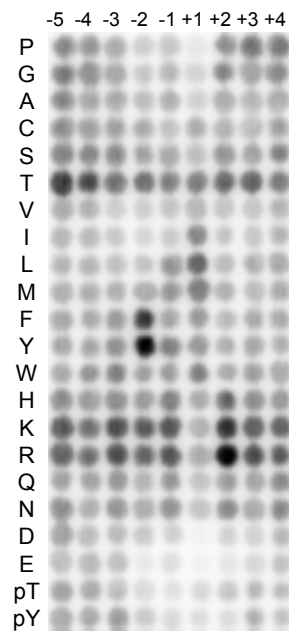
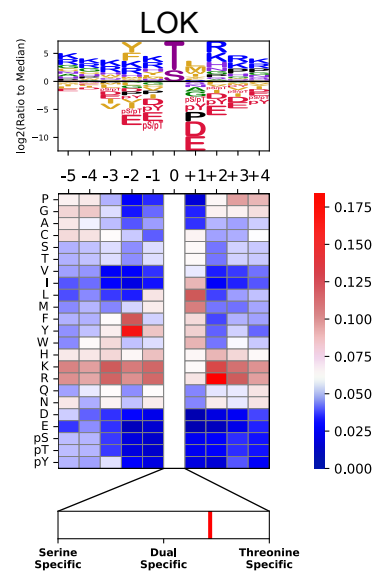
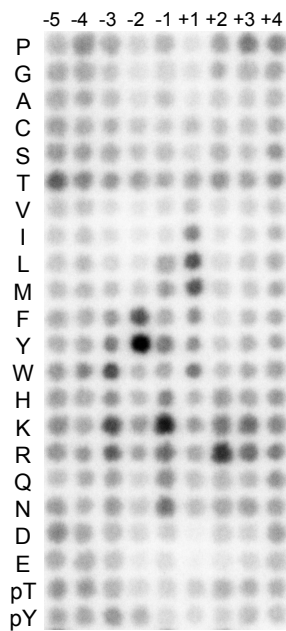
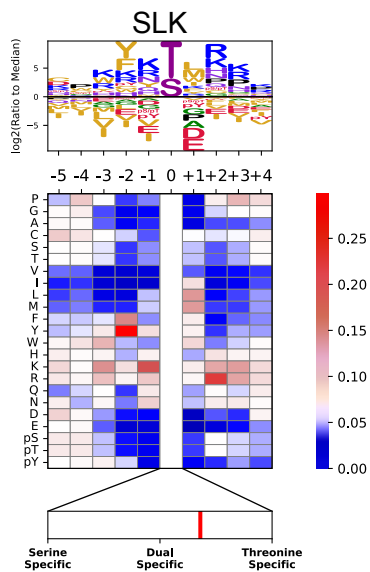


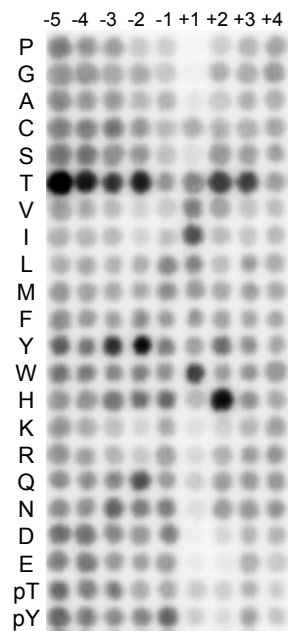
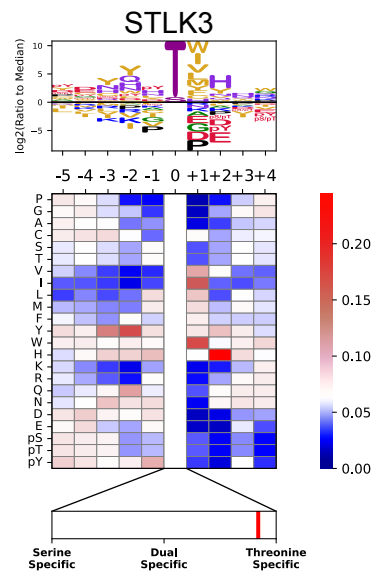
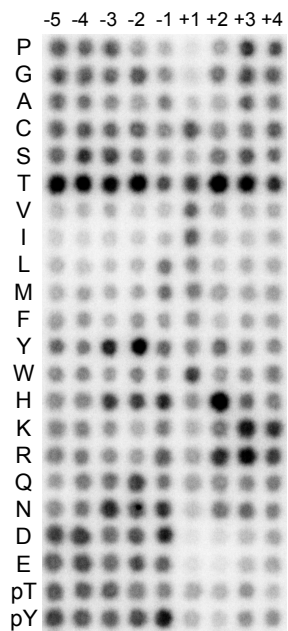
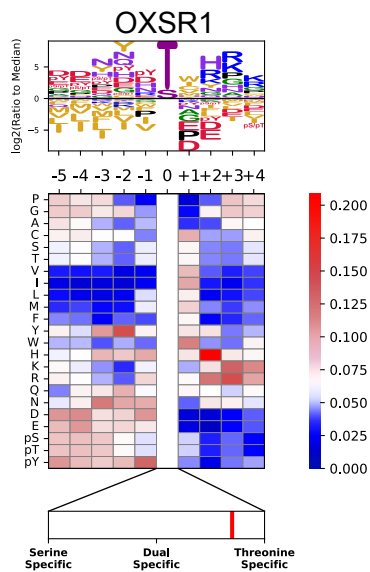
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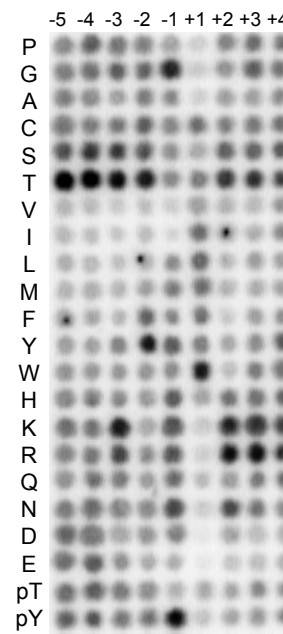
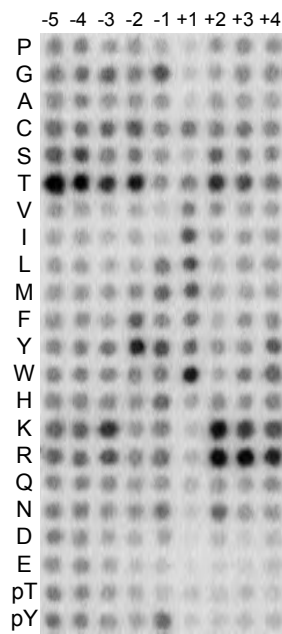
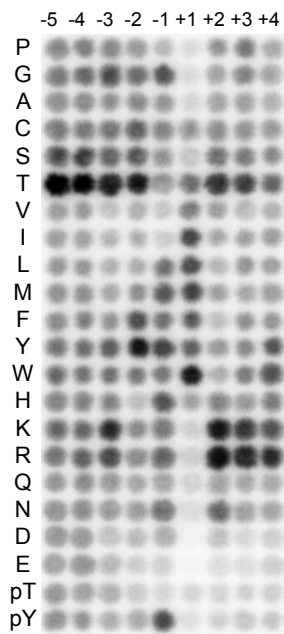
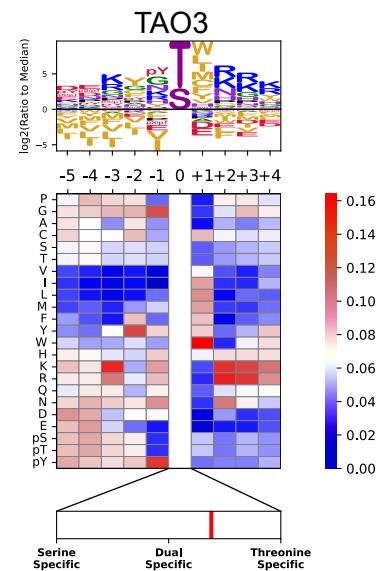
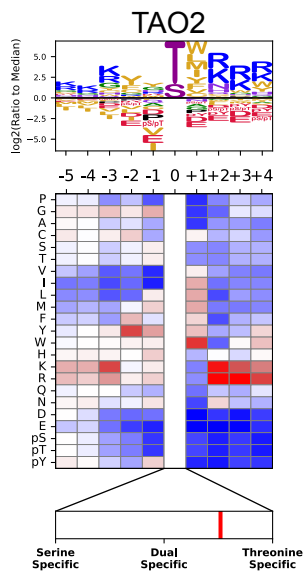
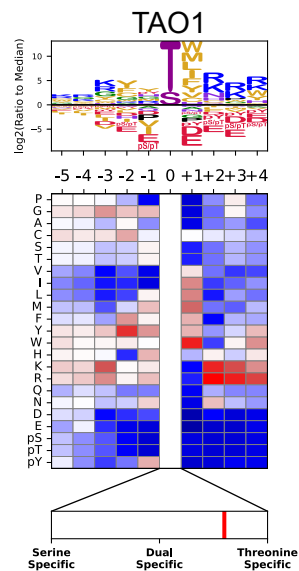
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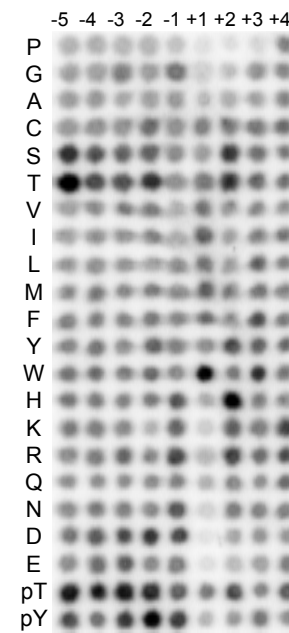
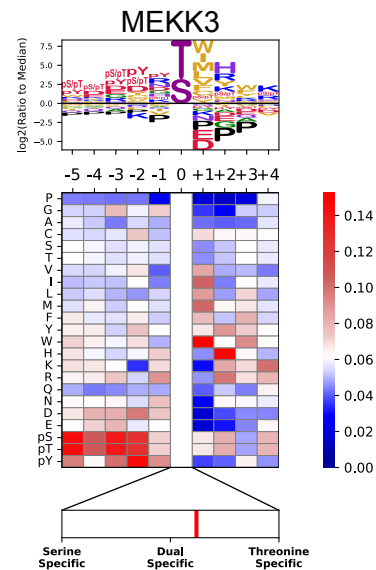
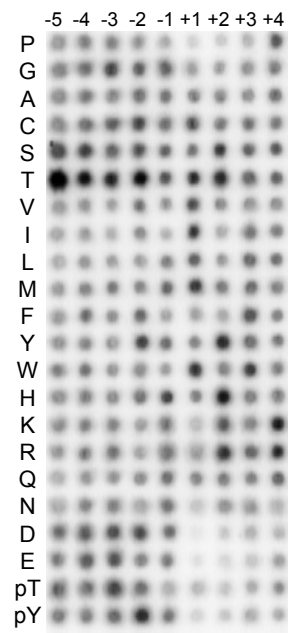
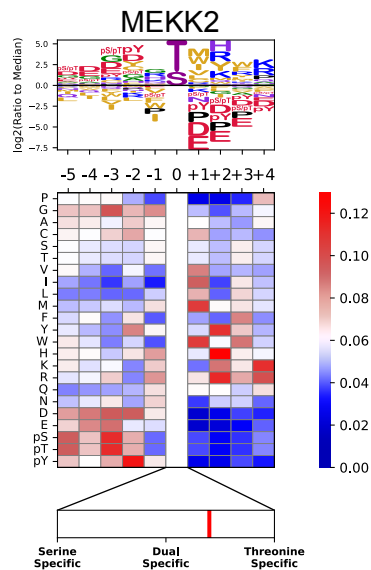
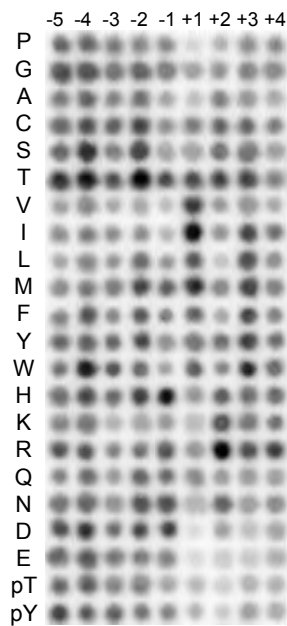
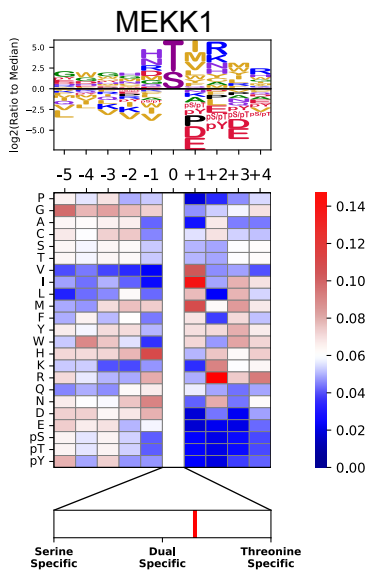


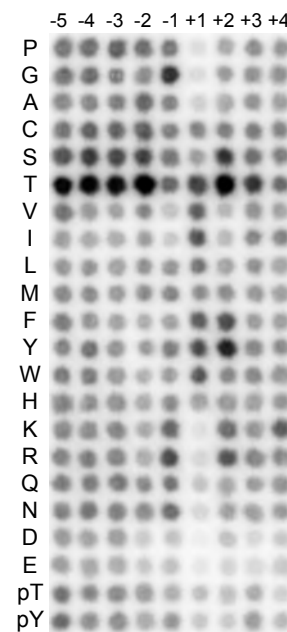
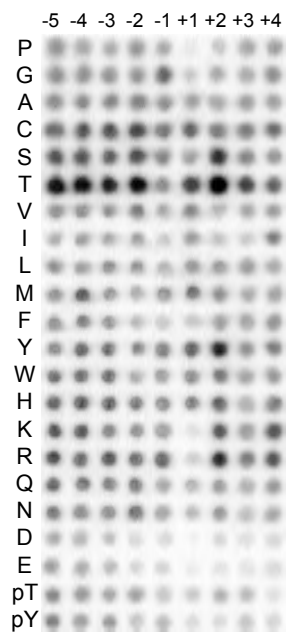
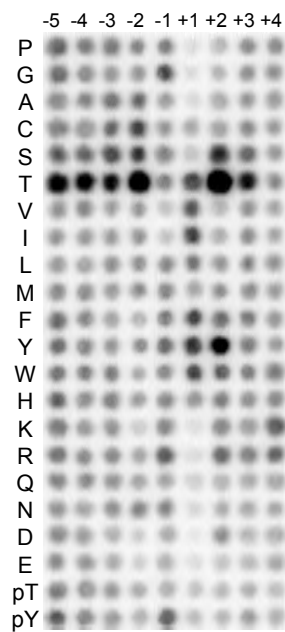
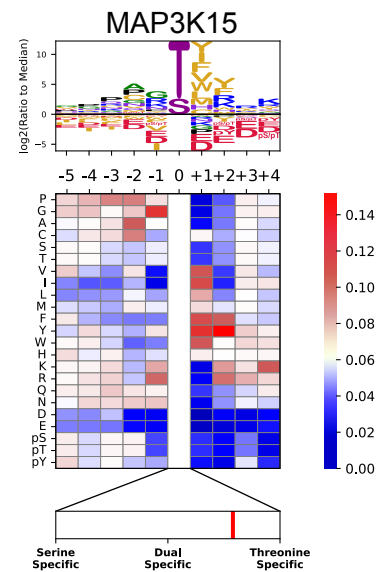
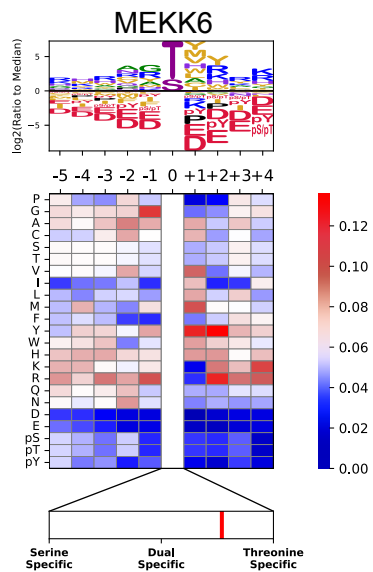
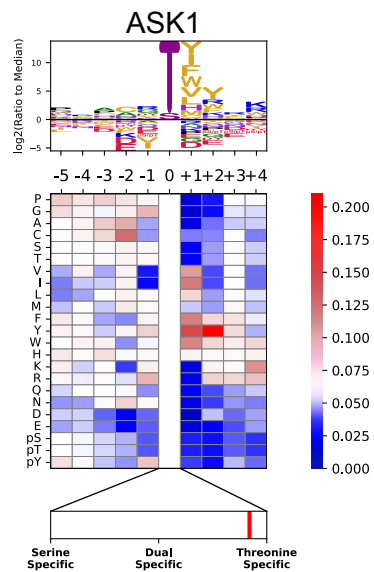




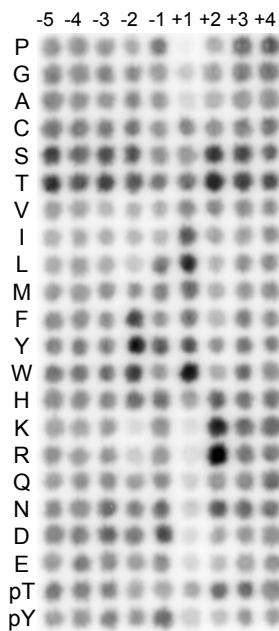
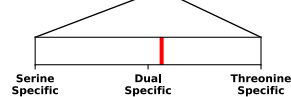
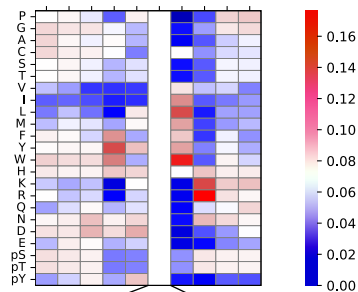
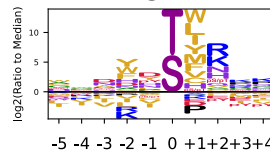


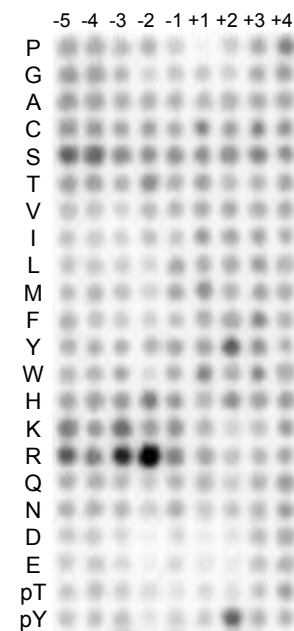
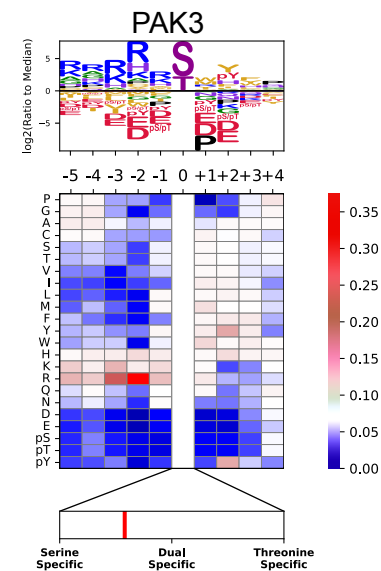
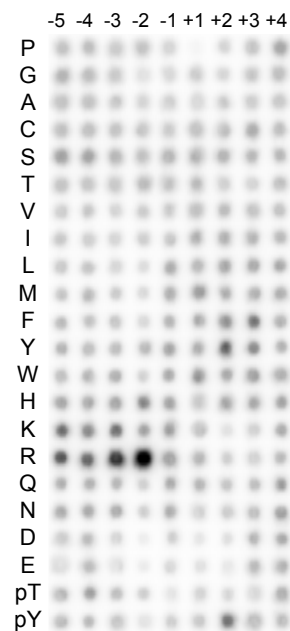
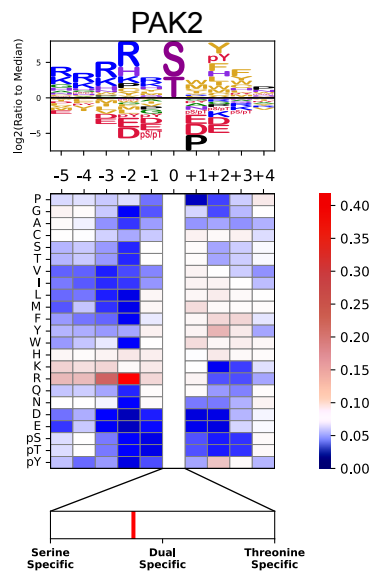
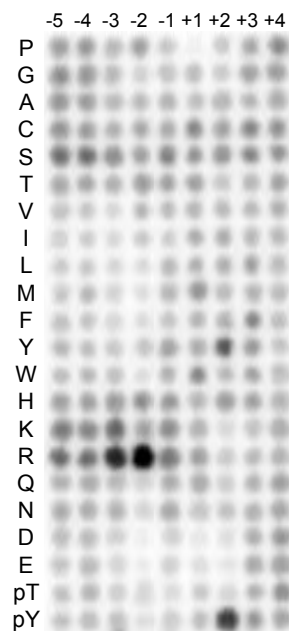
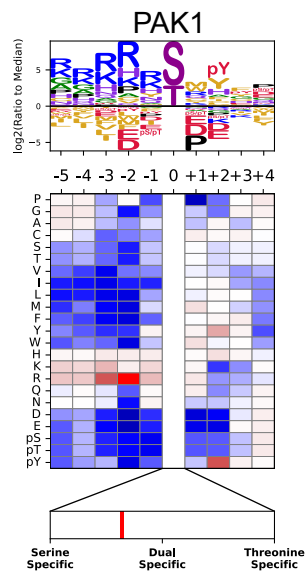


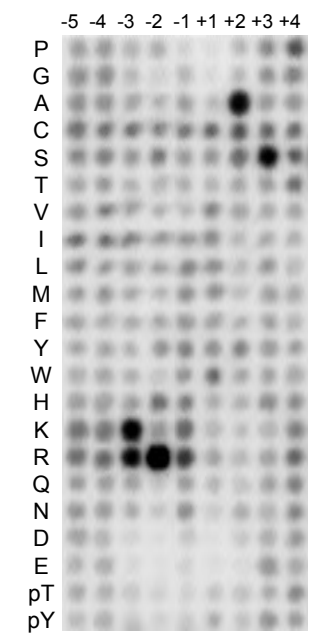
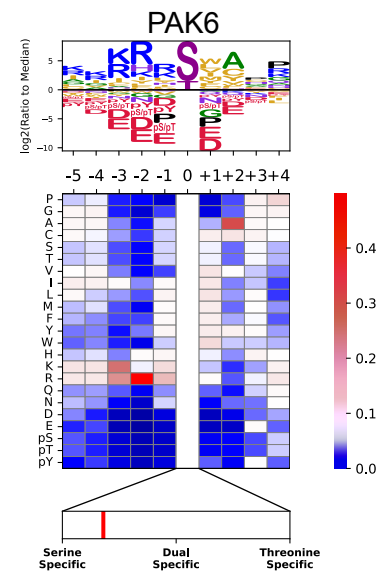
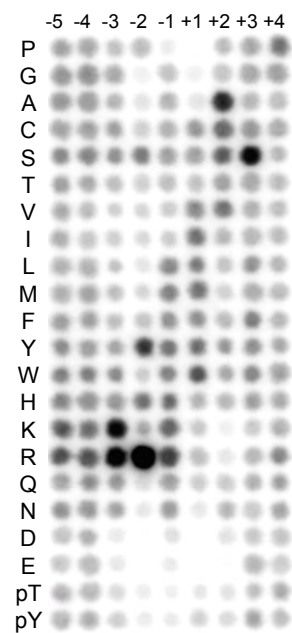
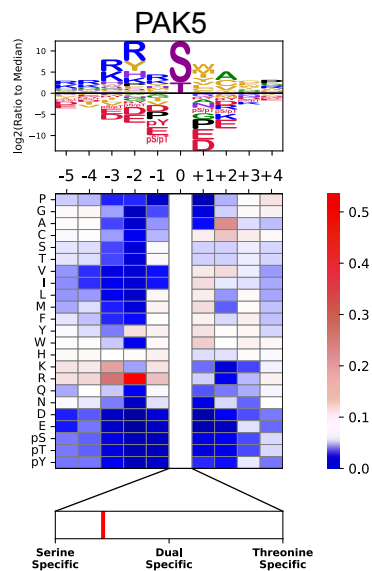
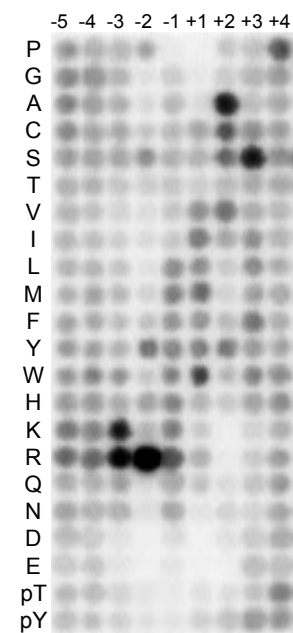
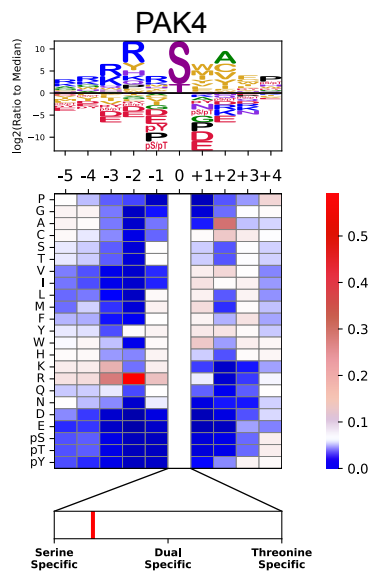


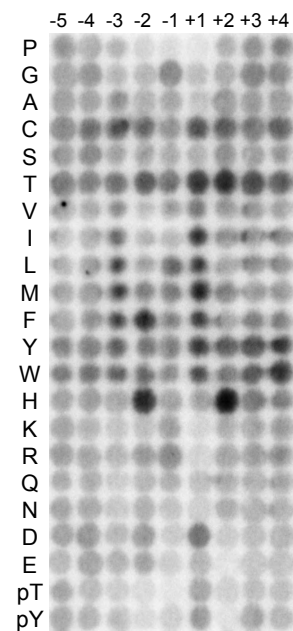
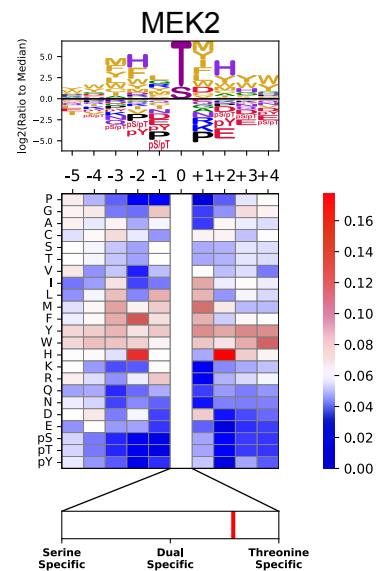
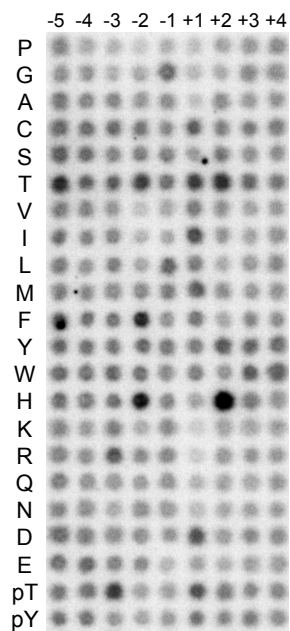
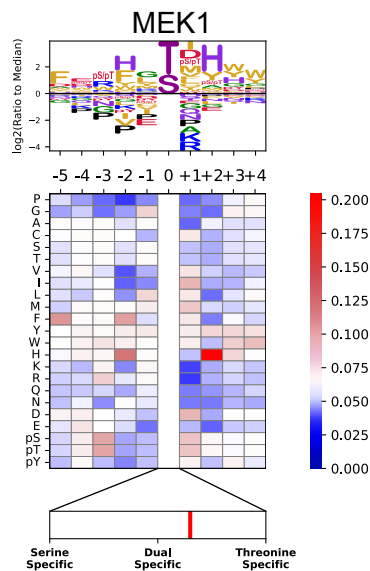


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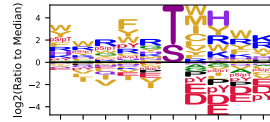




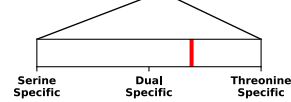
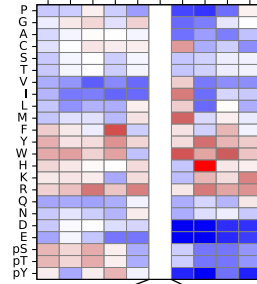




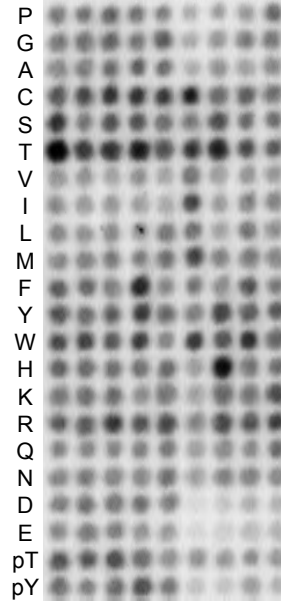
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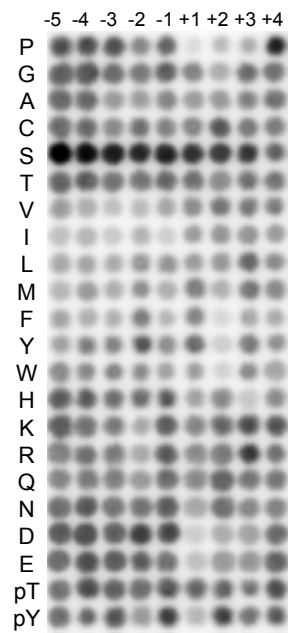
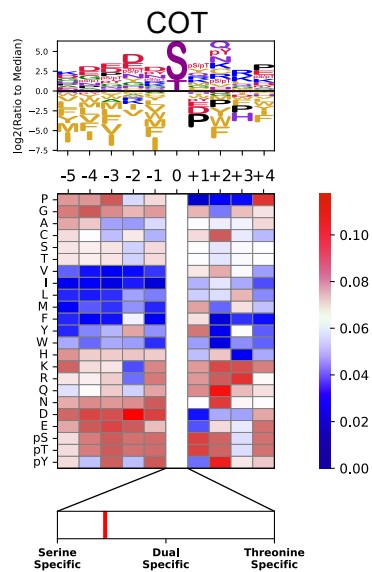


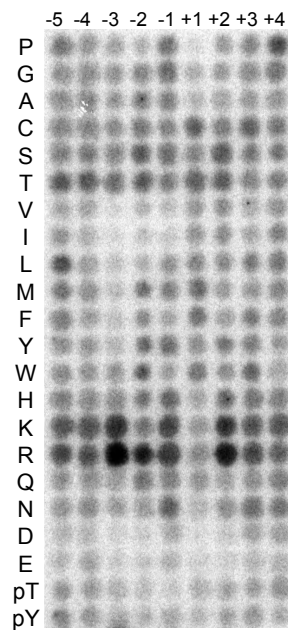
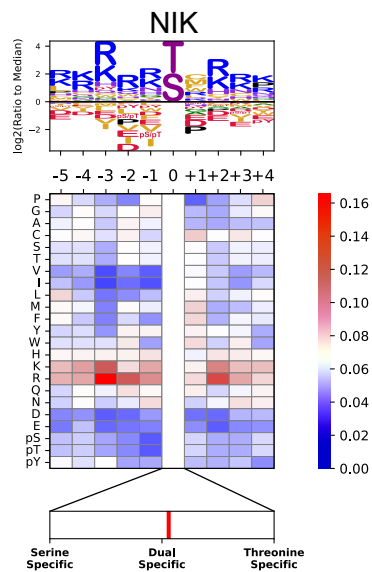
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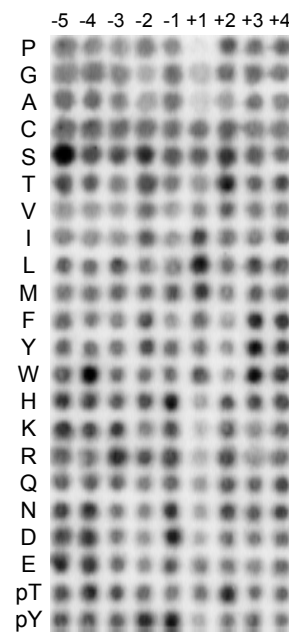
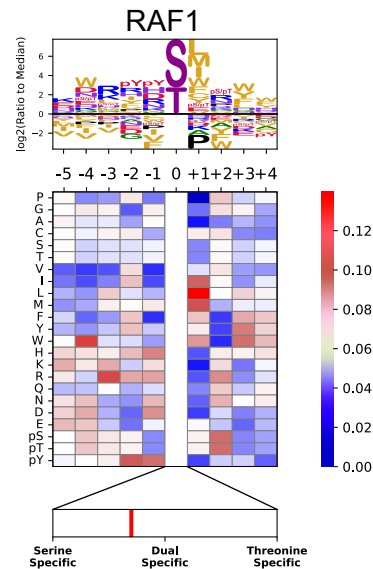
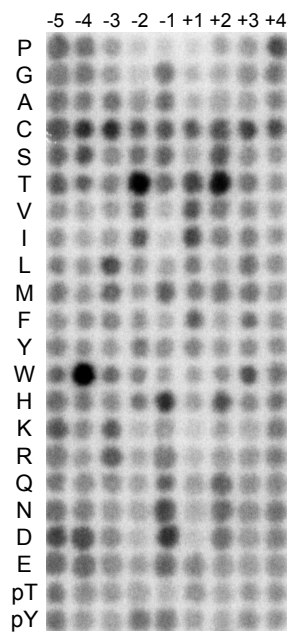
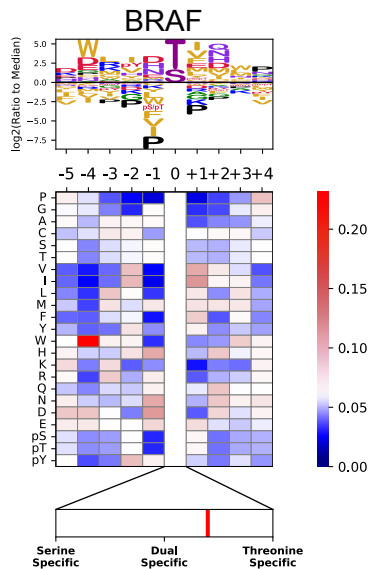
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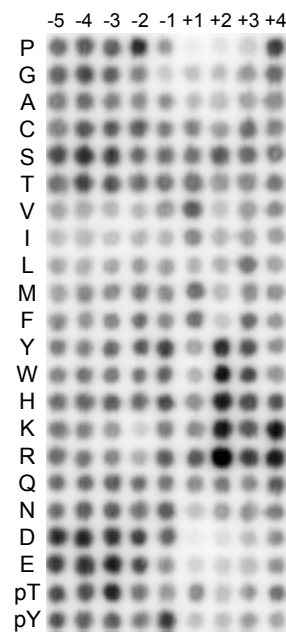
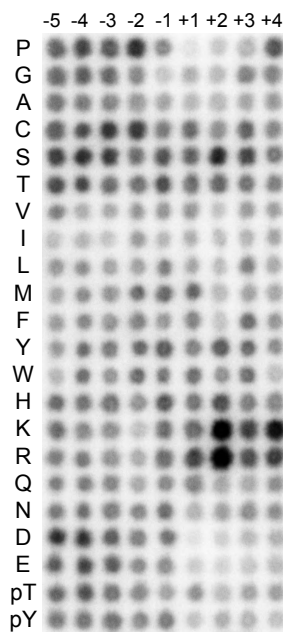
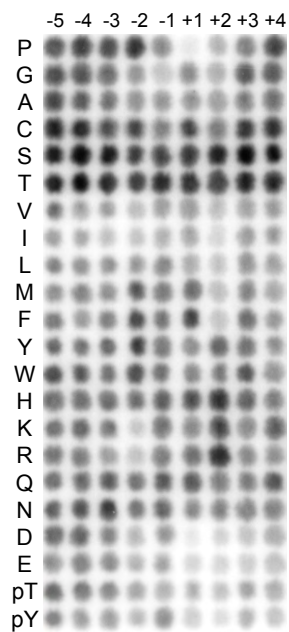
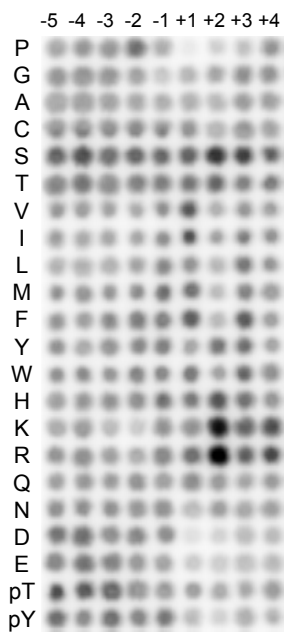
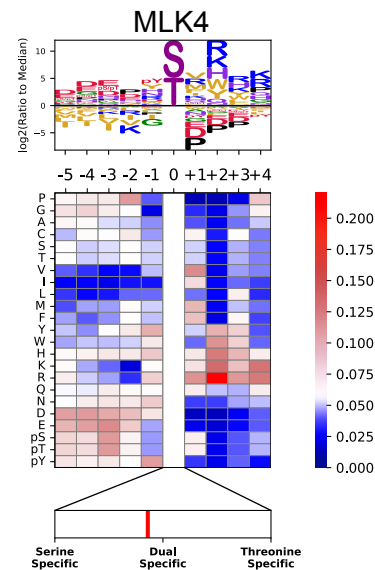
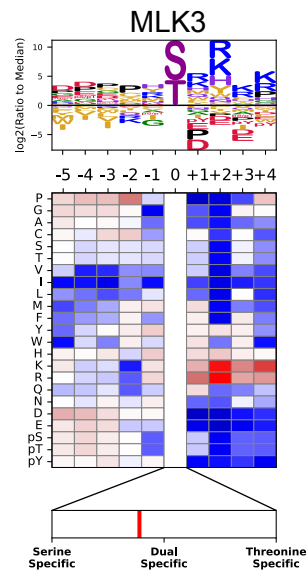
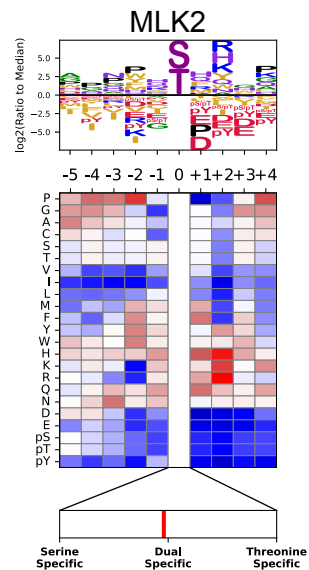
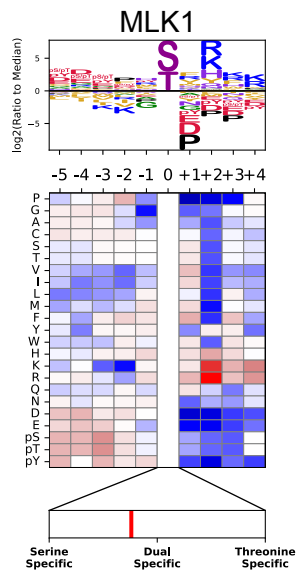


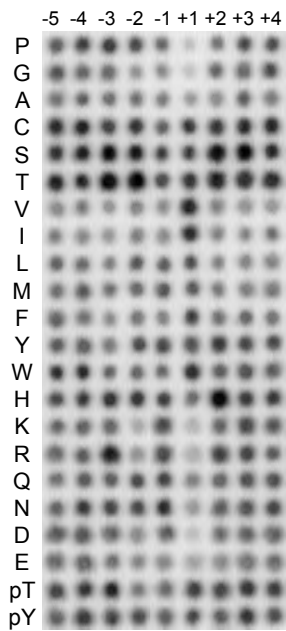
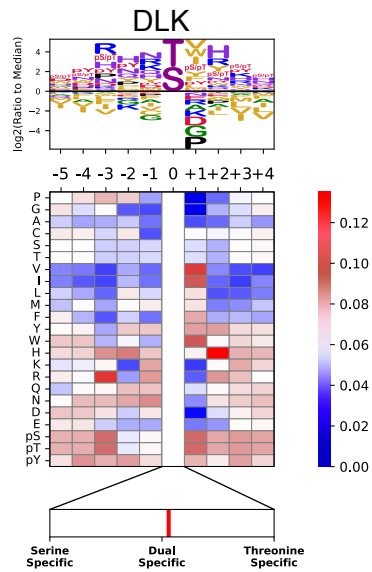


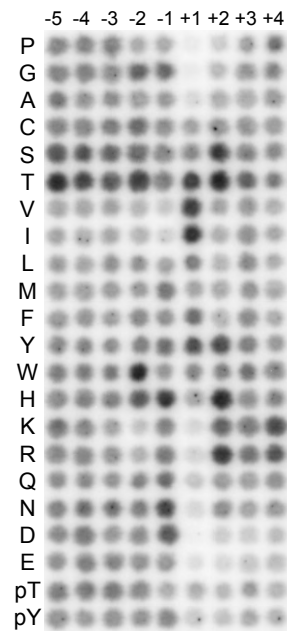
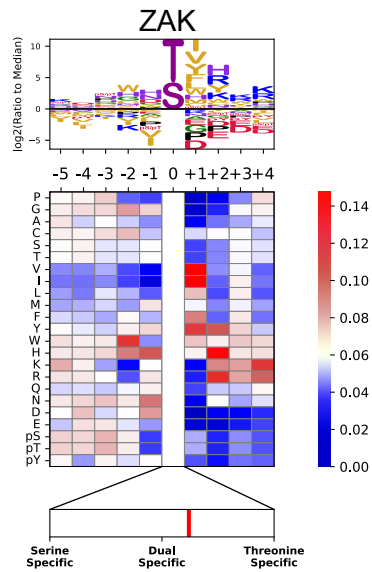


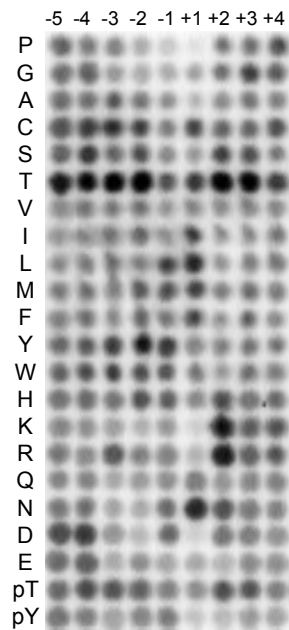
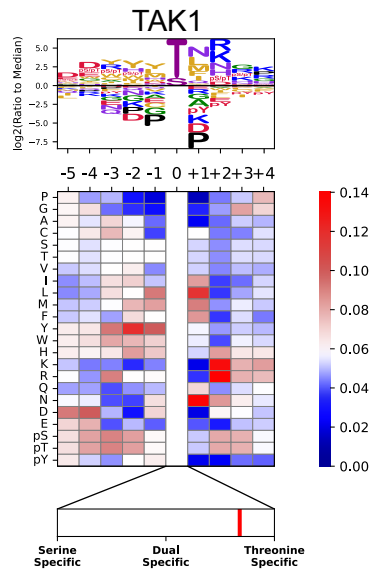
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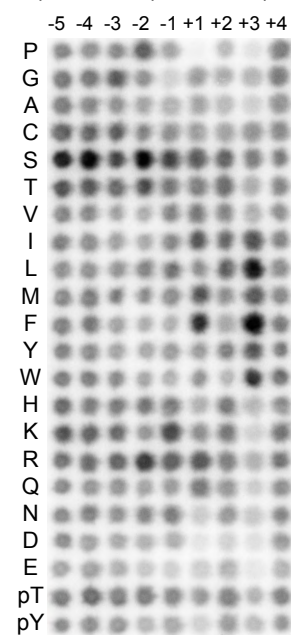
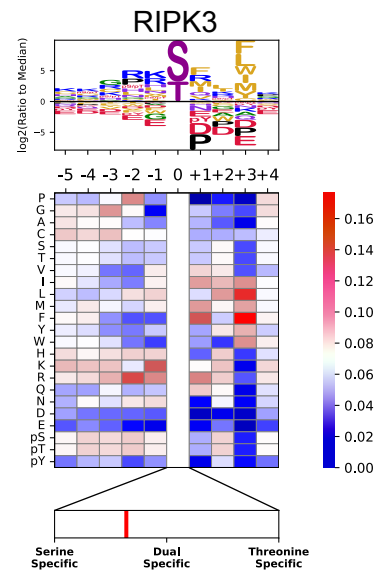
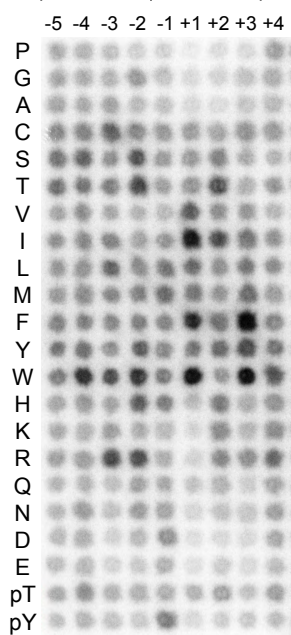
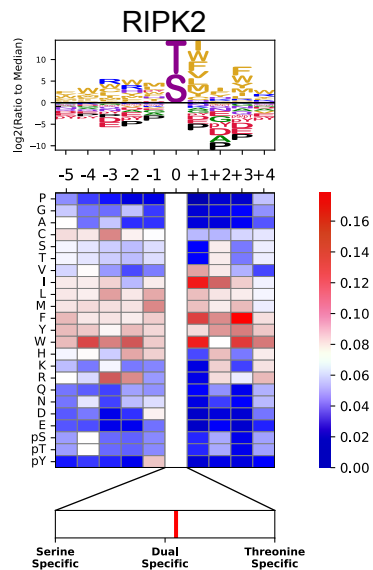
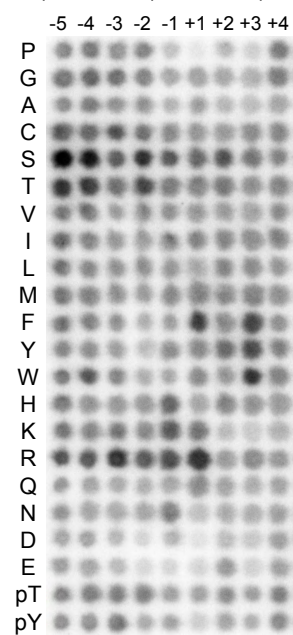
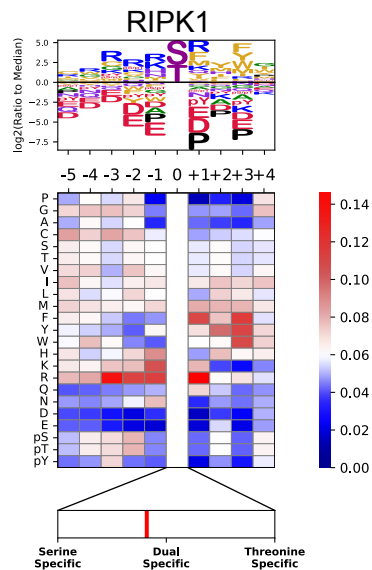




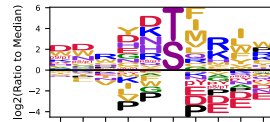




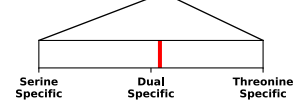
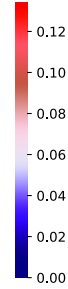
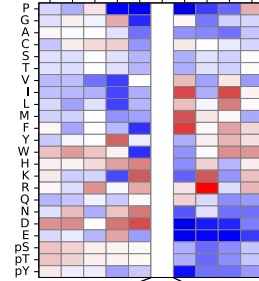




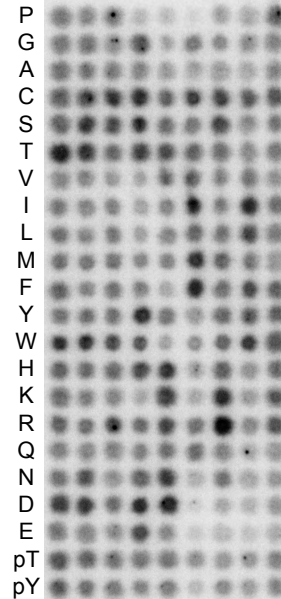
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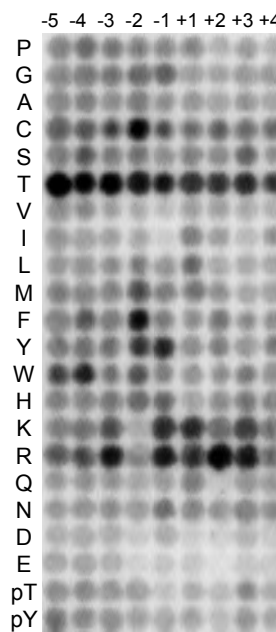
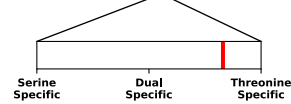
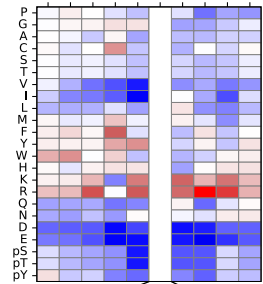
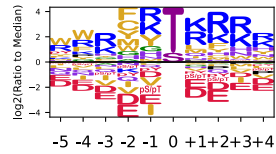
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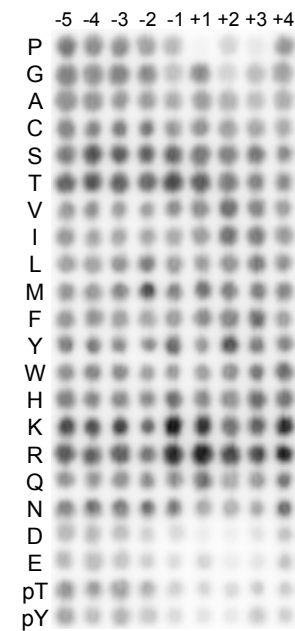
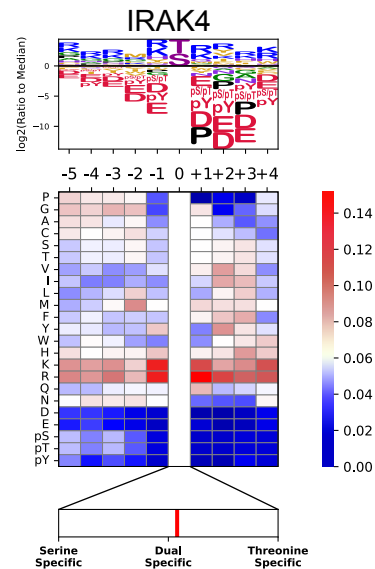
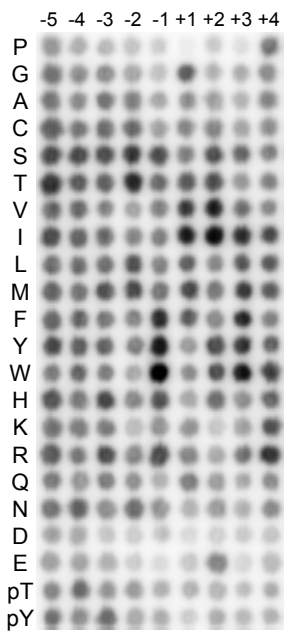
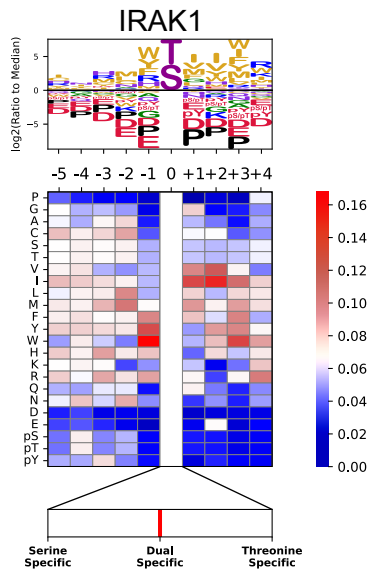


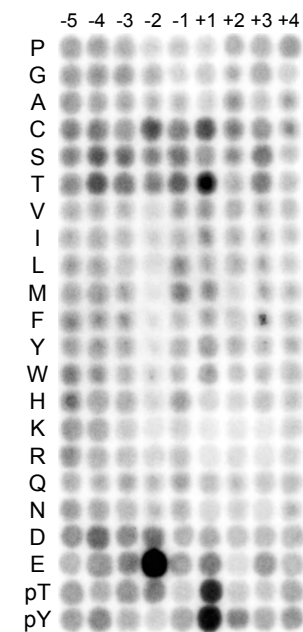
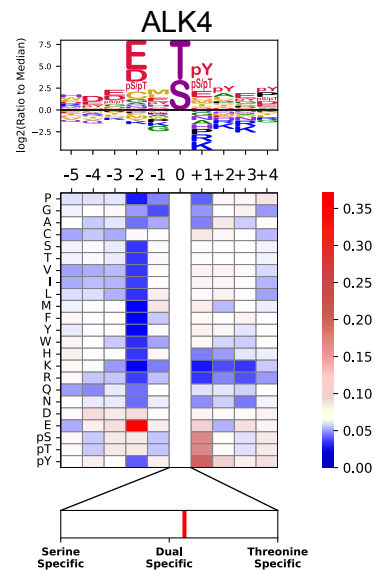
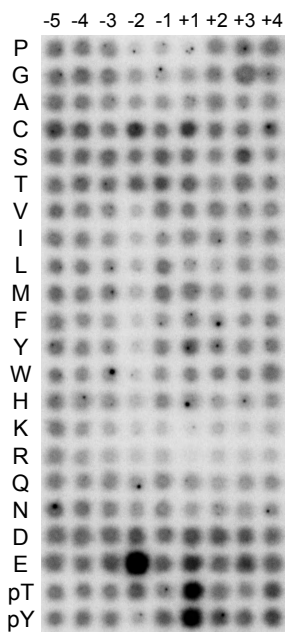
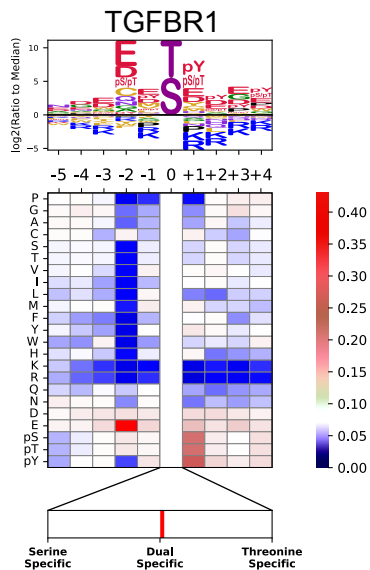
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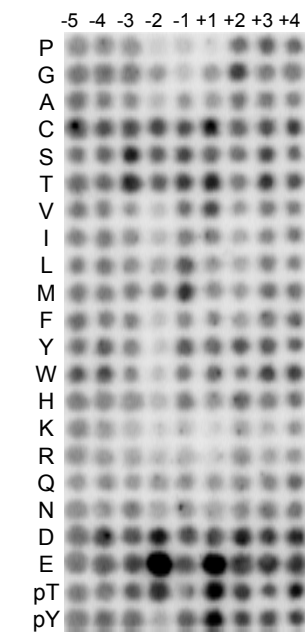
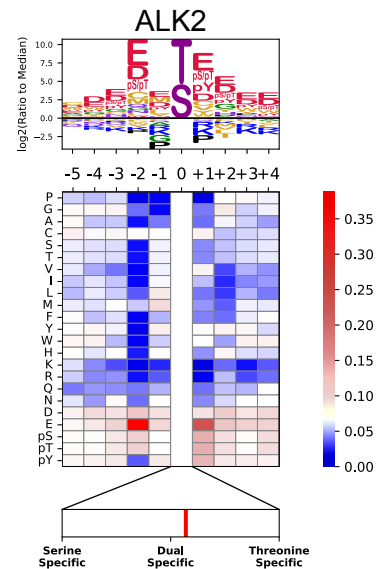
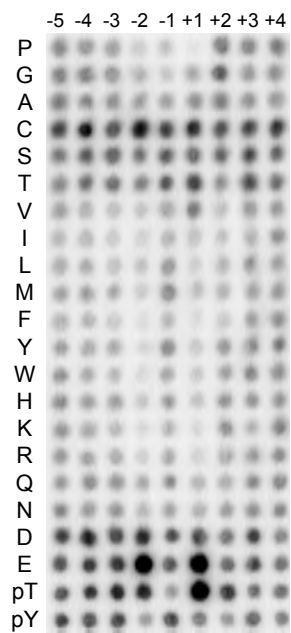
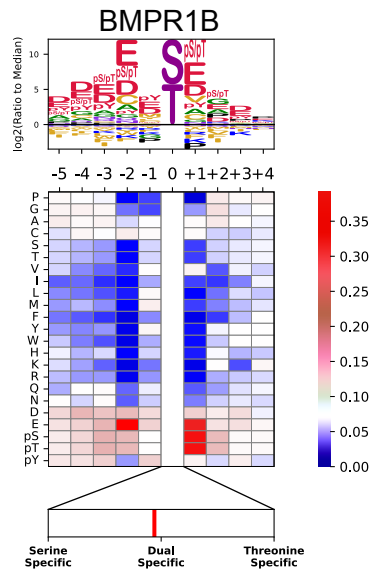
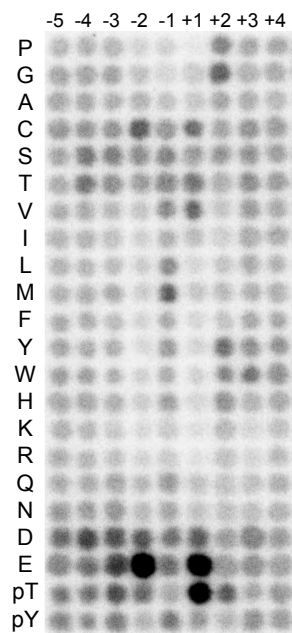
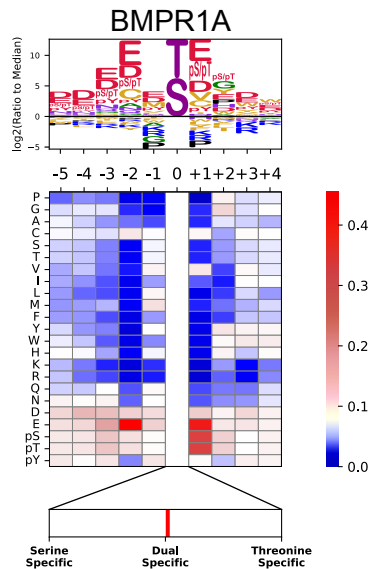


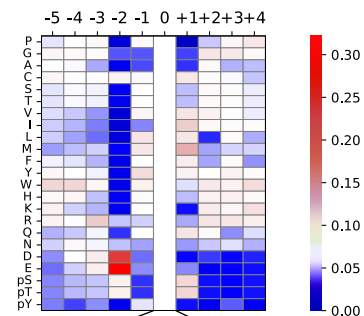
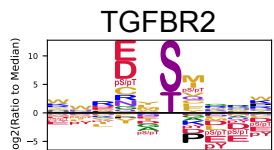
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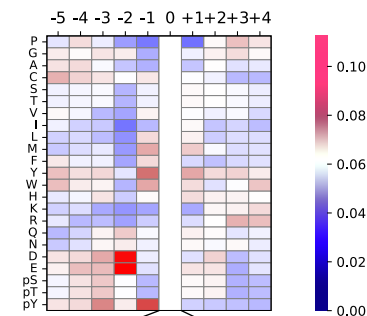
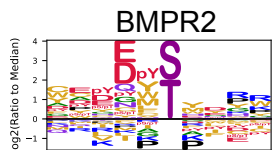
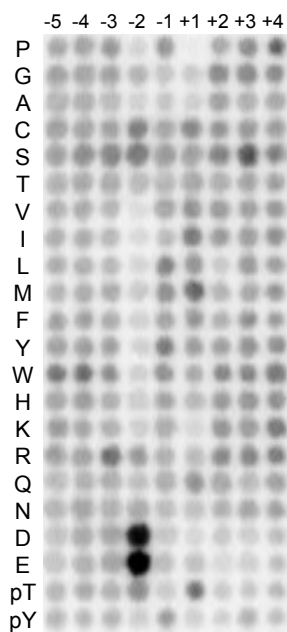




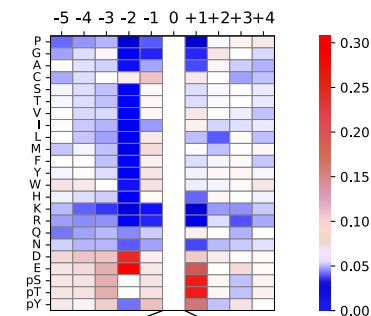
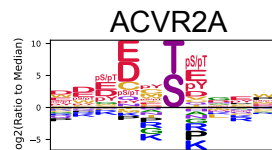
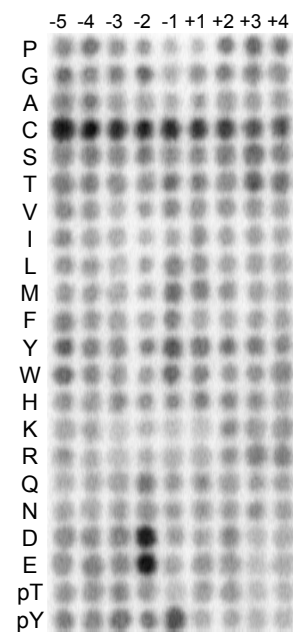




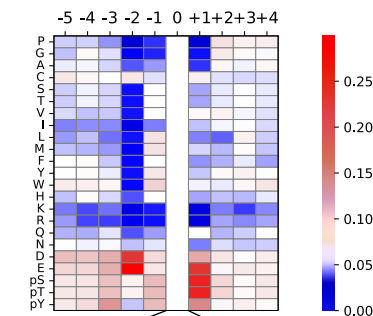
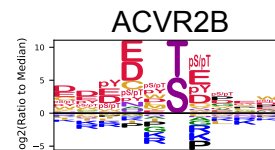
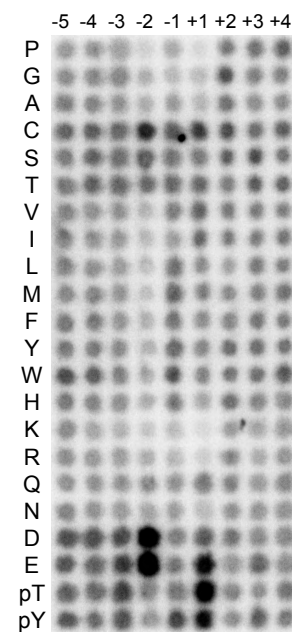
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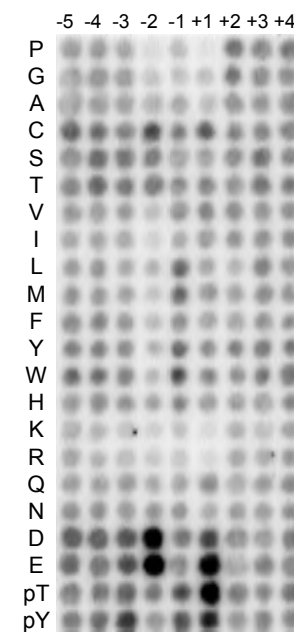
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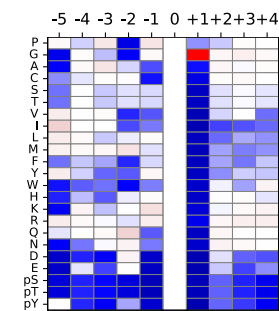
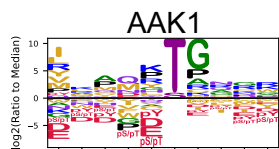
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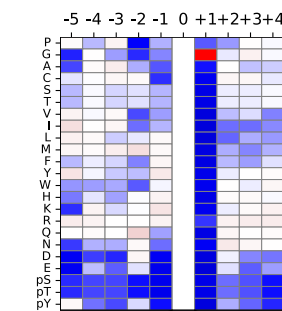
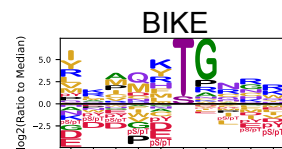
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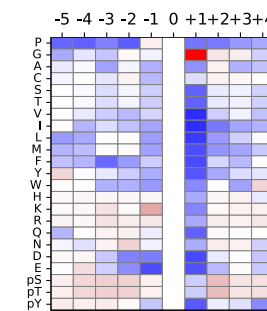
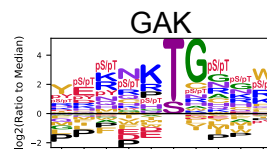
OTHER



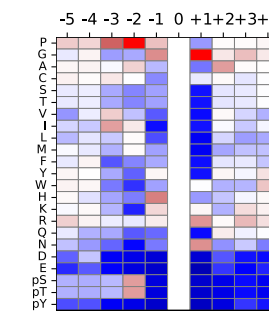
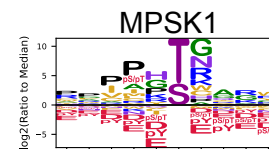
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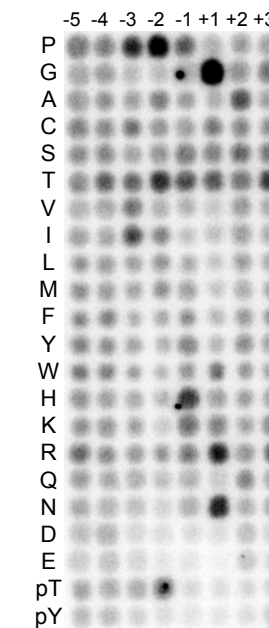
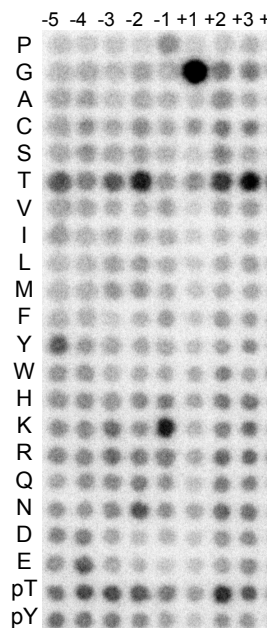
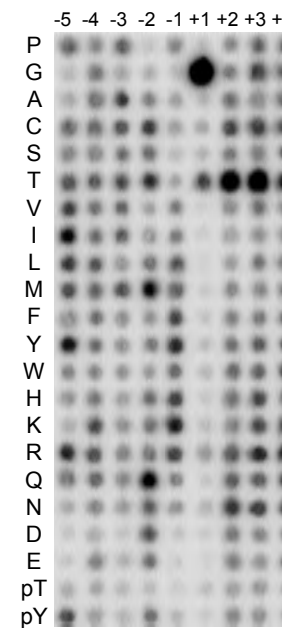
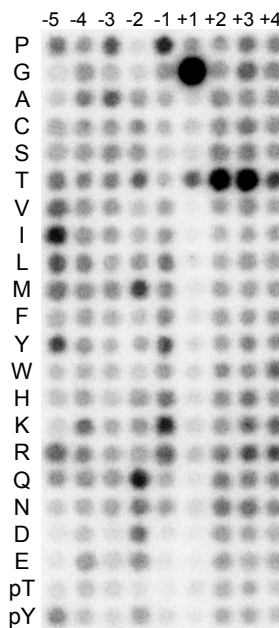
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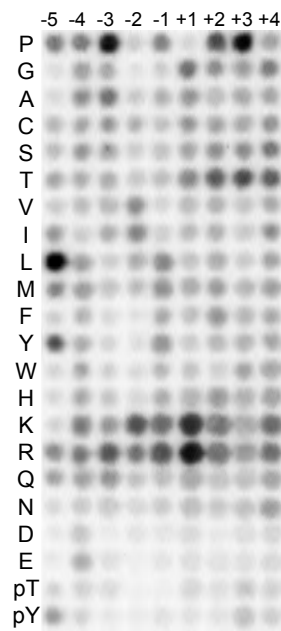
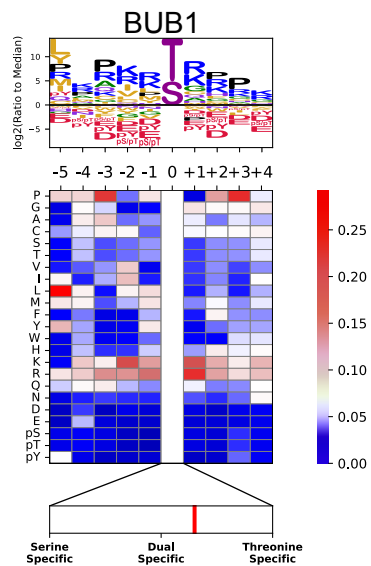


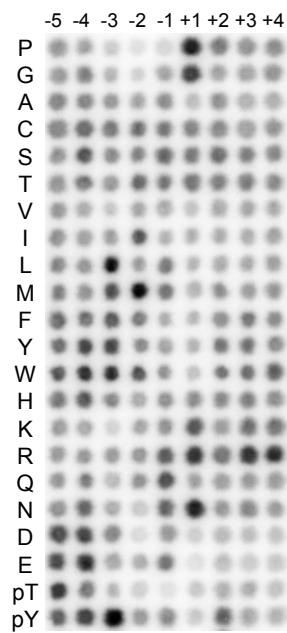
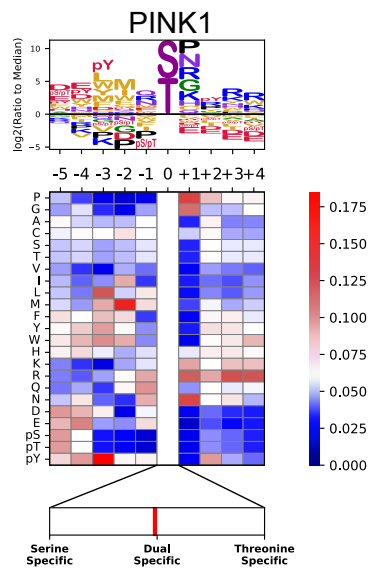
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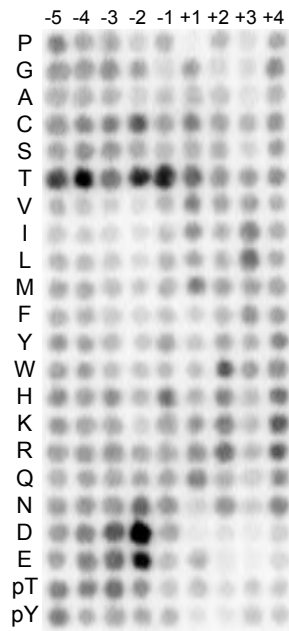
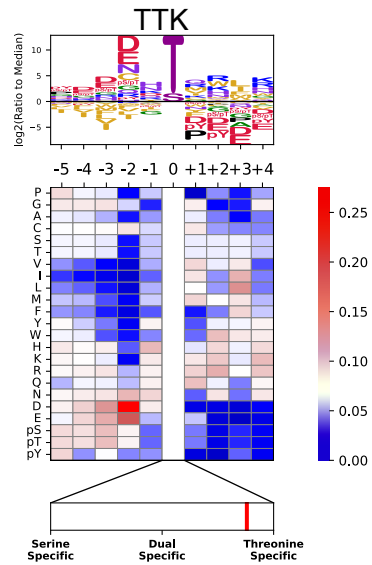


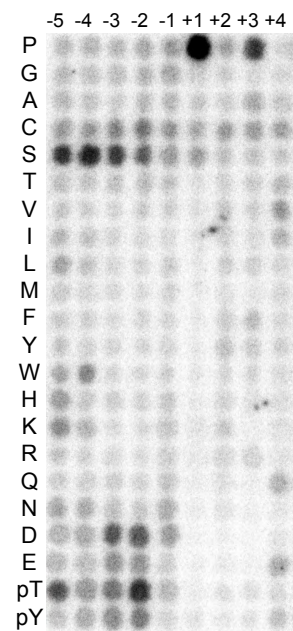
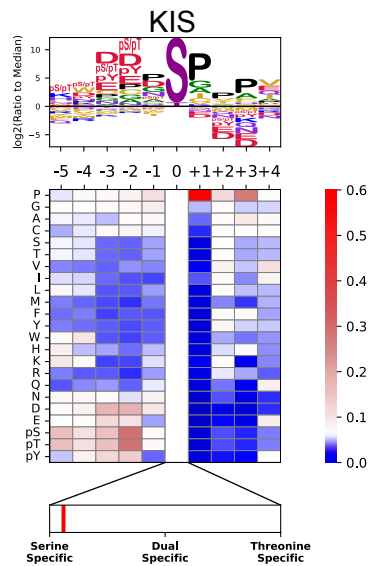
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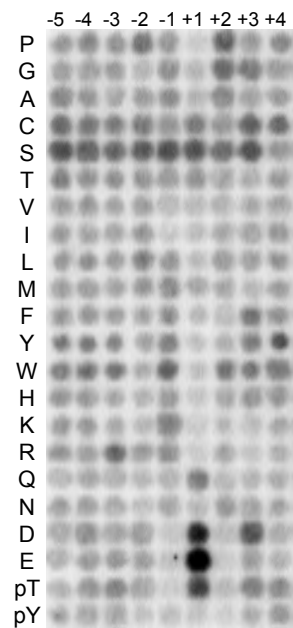
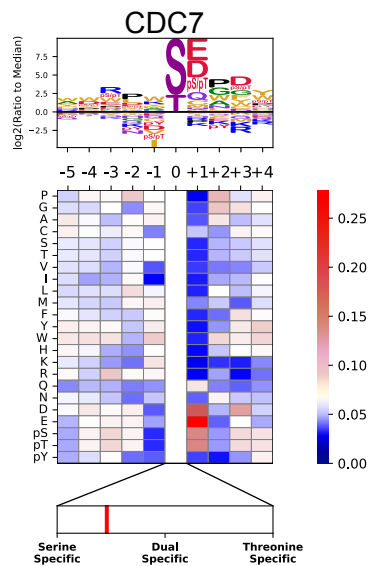


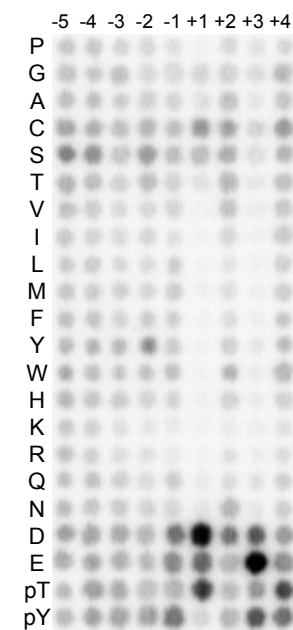
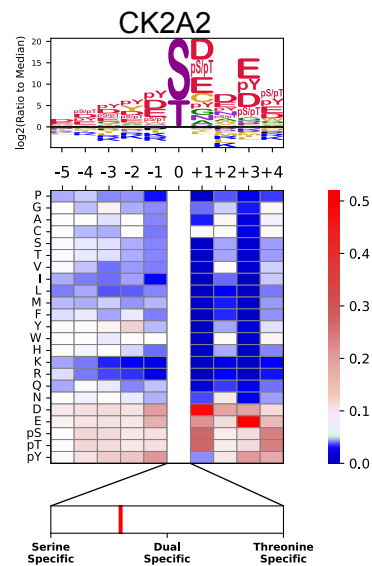
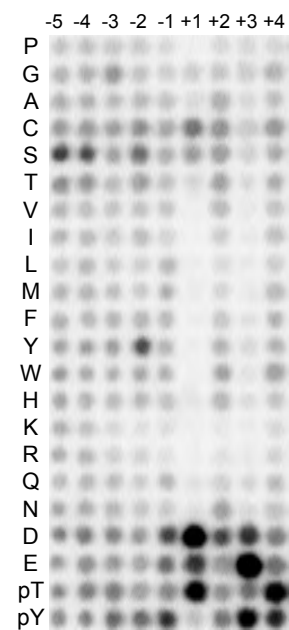
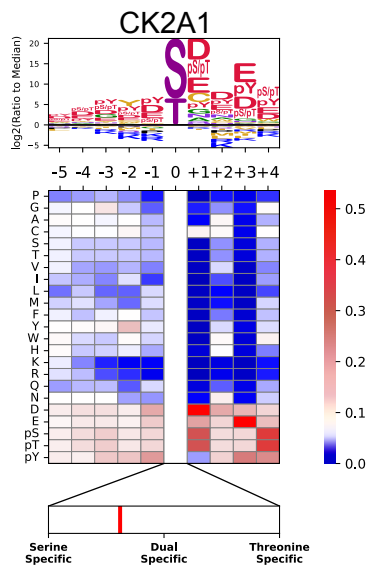


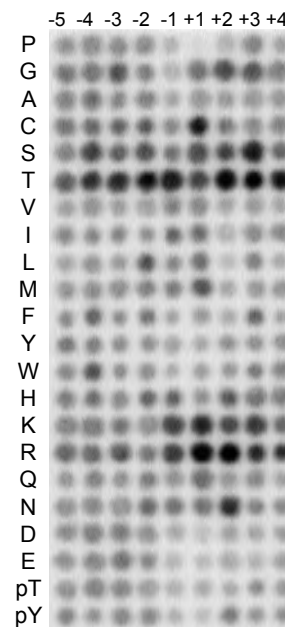
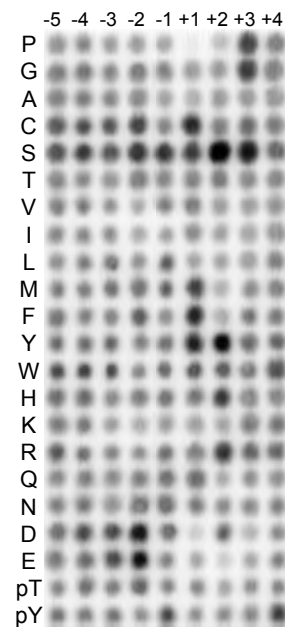
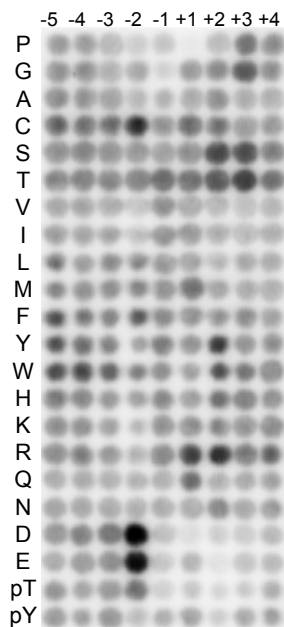
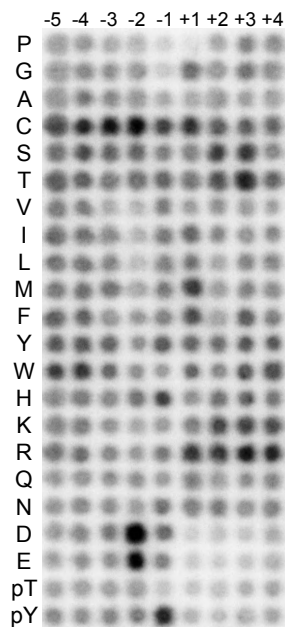
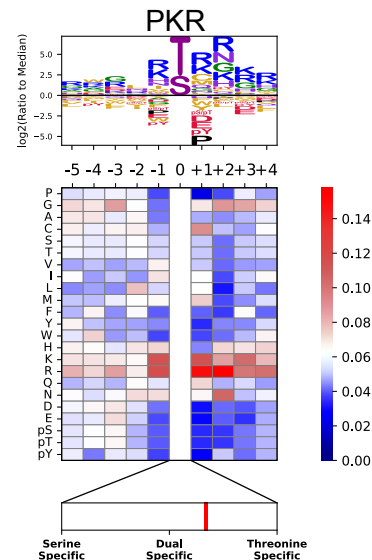
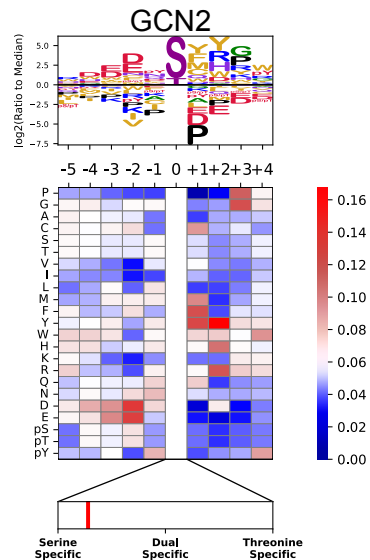
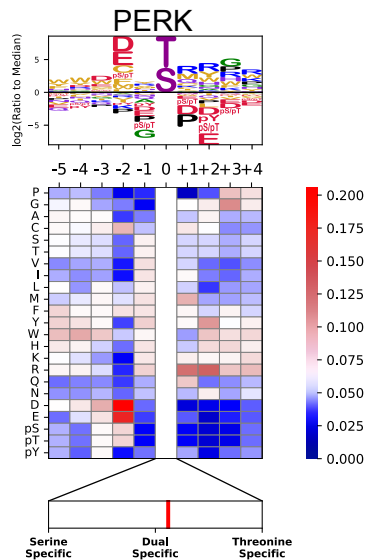
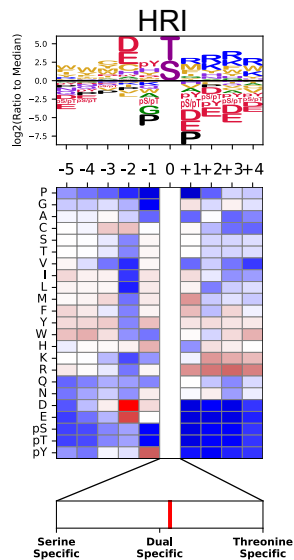


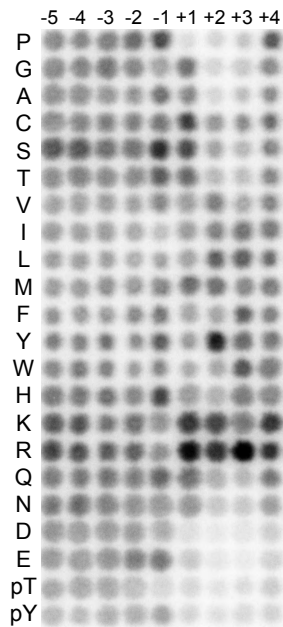
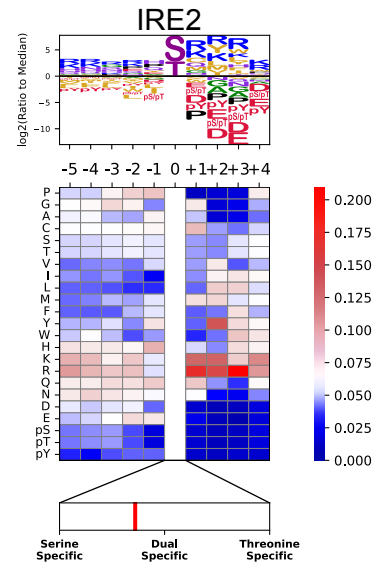
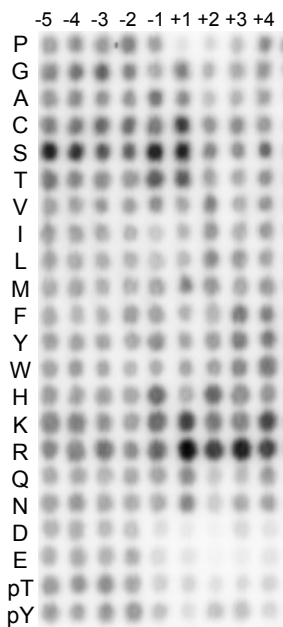
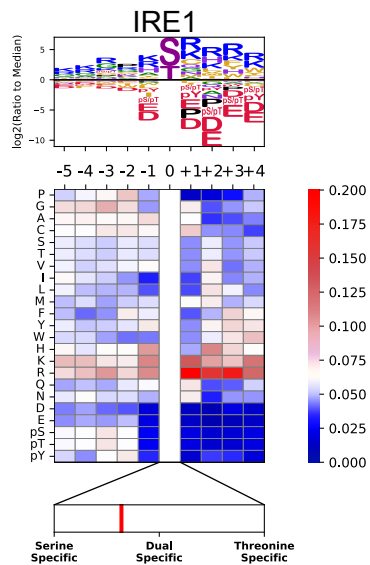


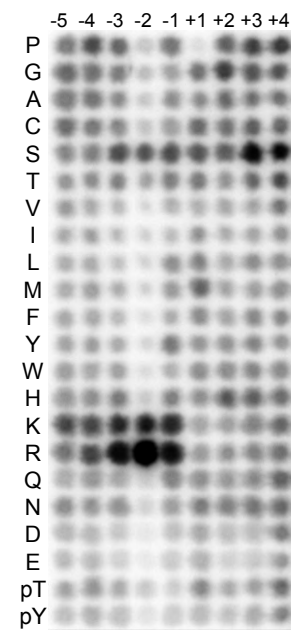
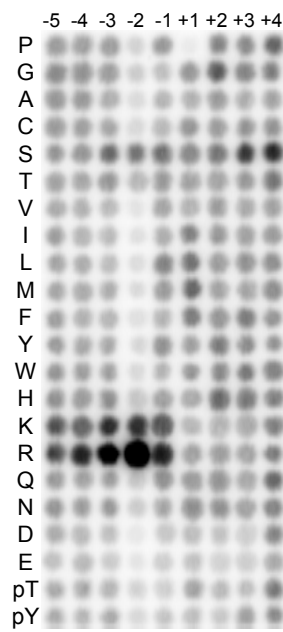
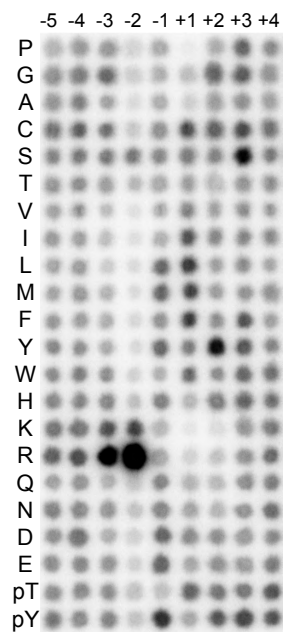
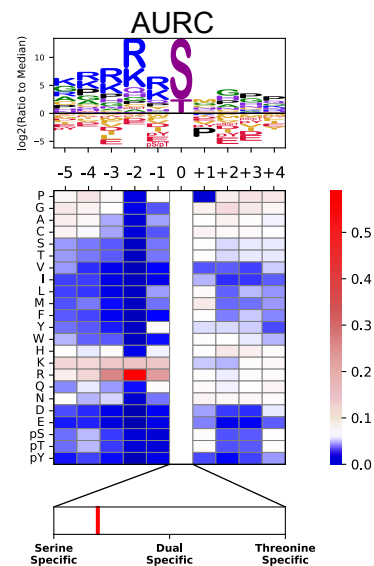
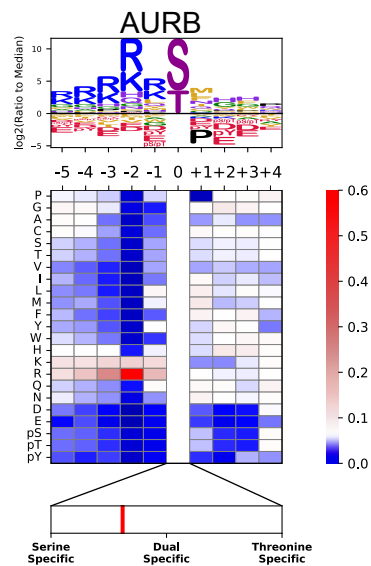
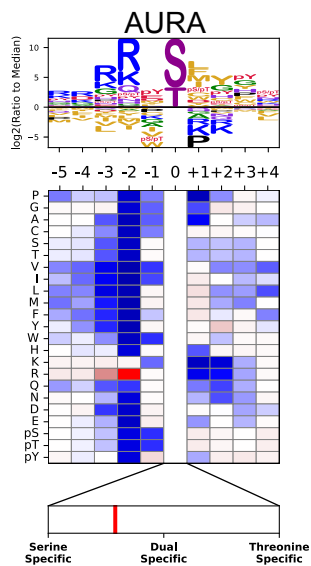


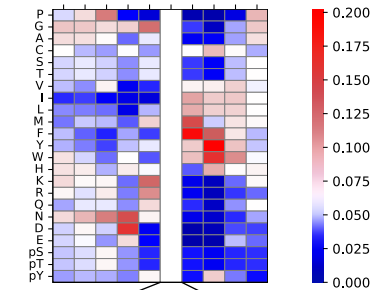
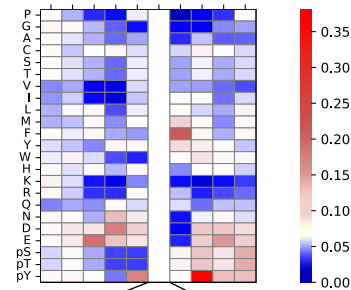
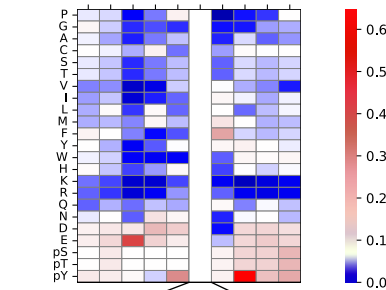
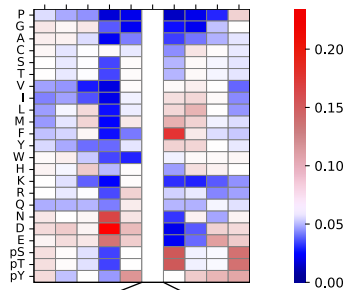
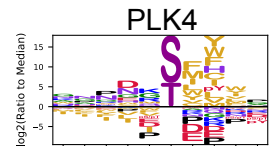
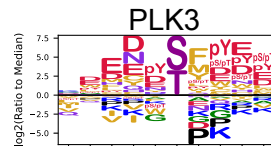
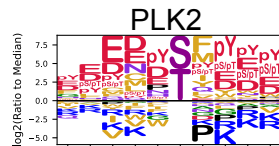
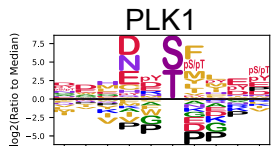










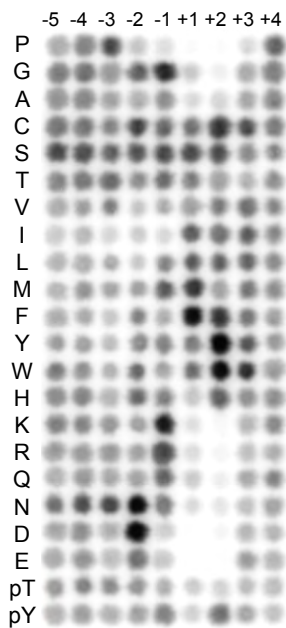
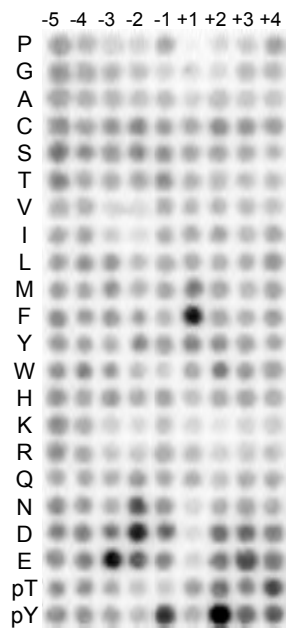
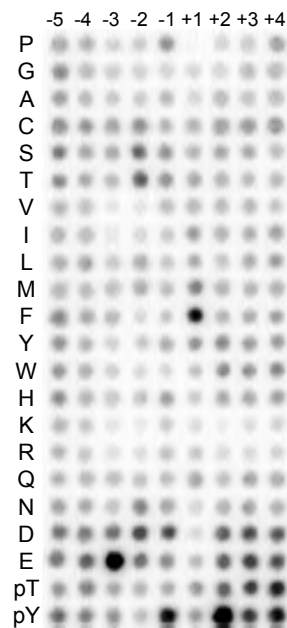
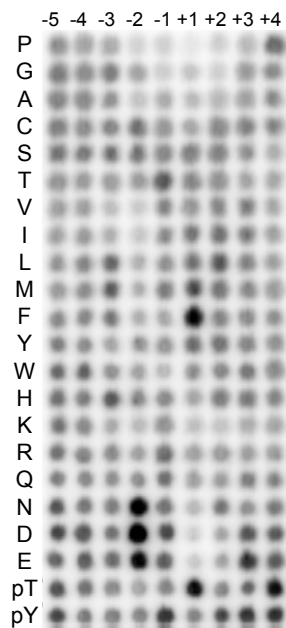


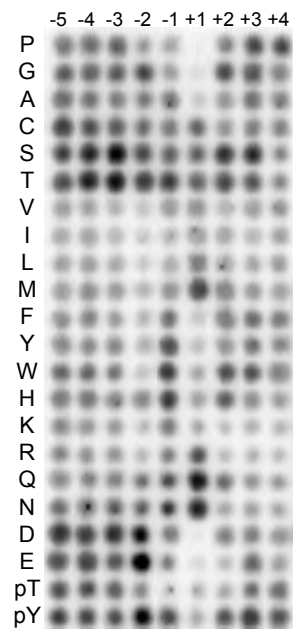
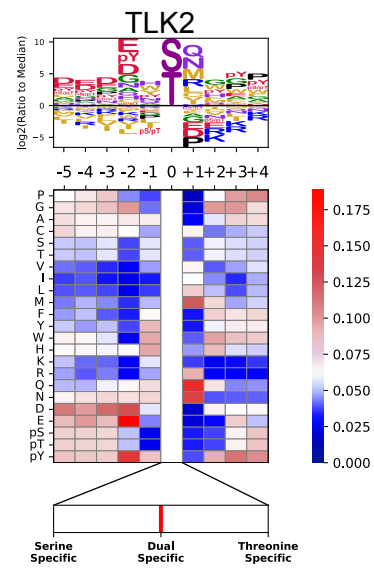
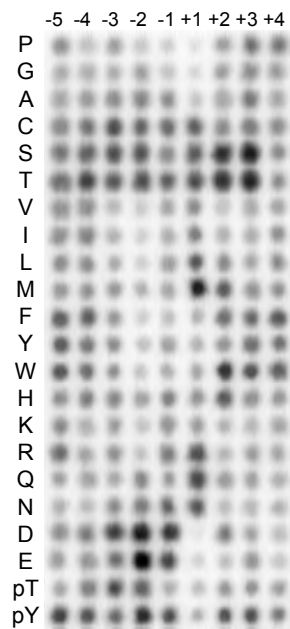
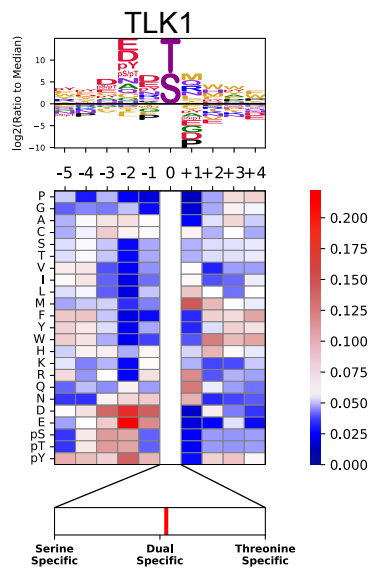
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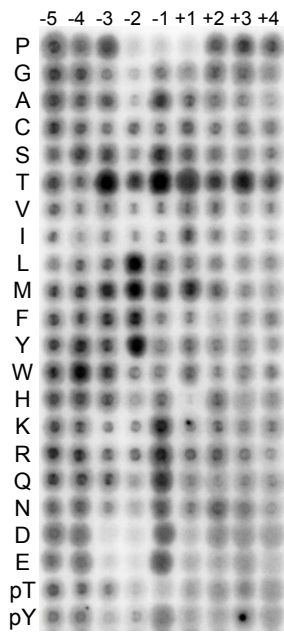
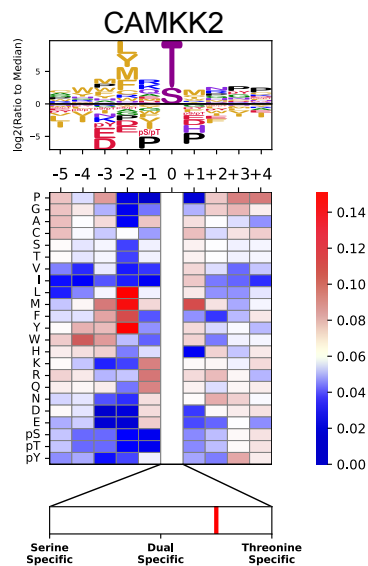
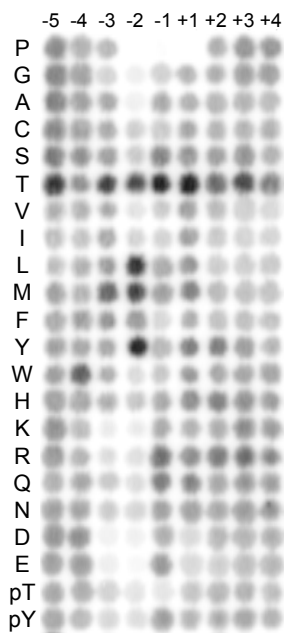
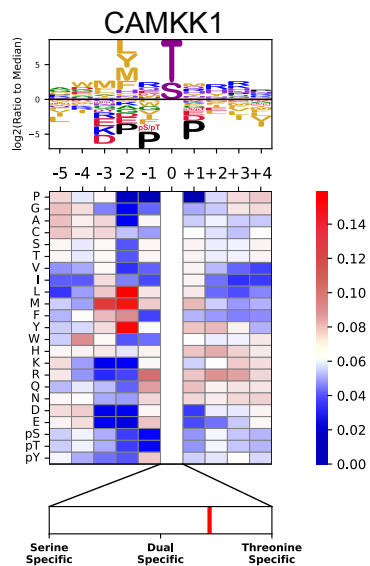
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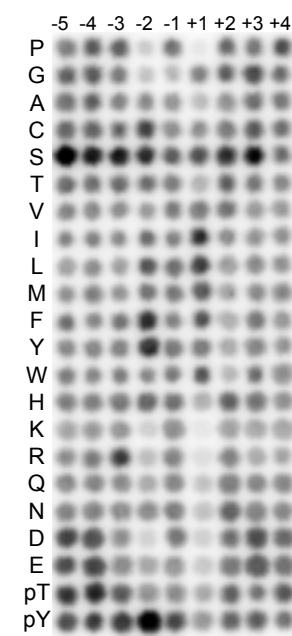
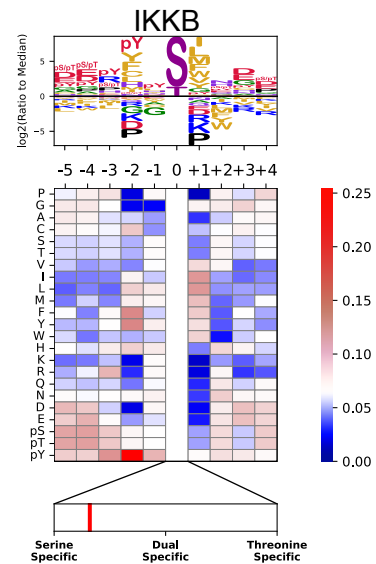
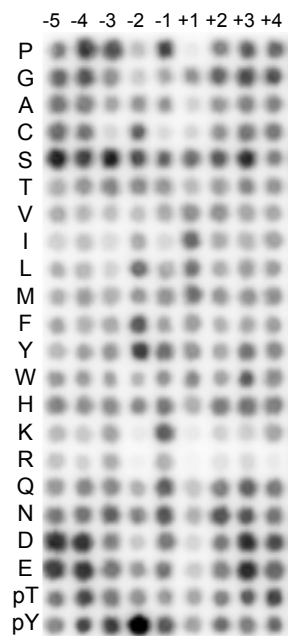
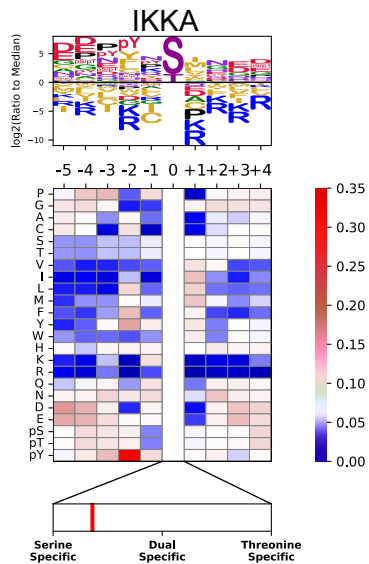
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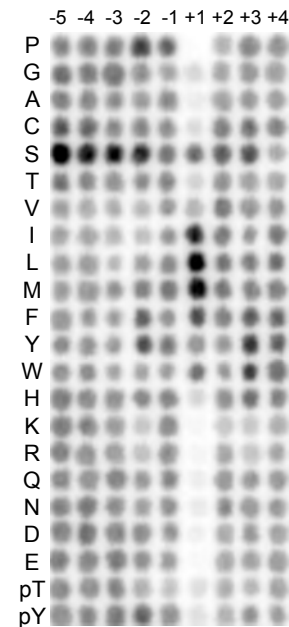
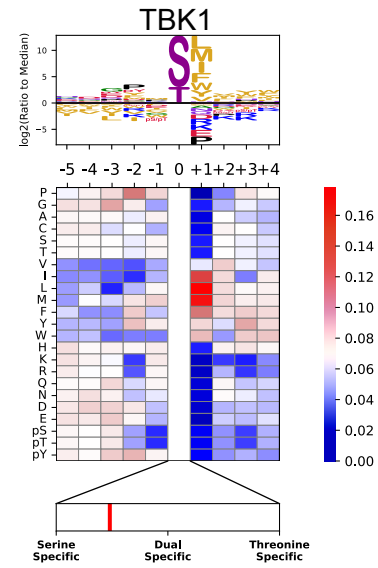
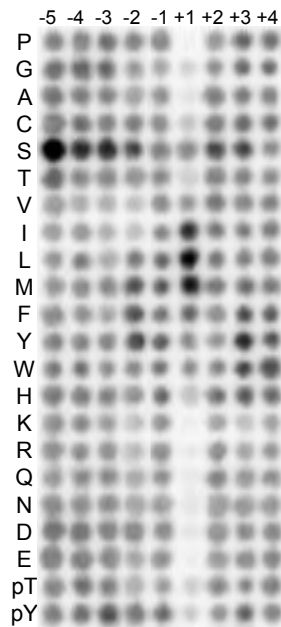
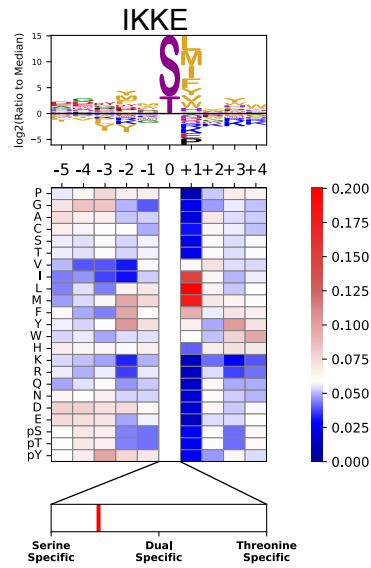
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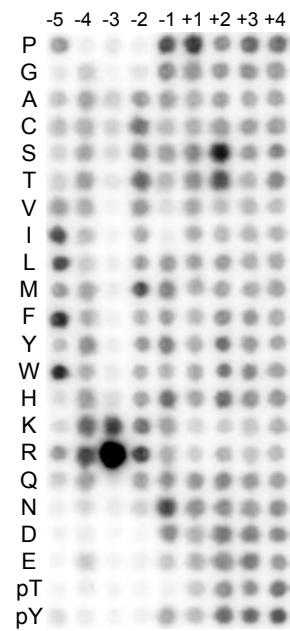
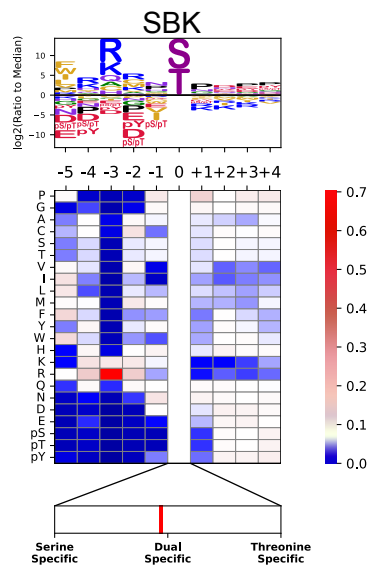


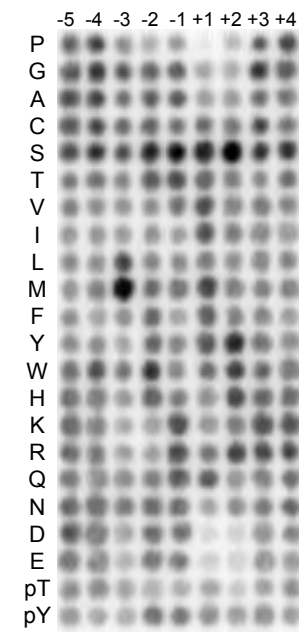
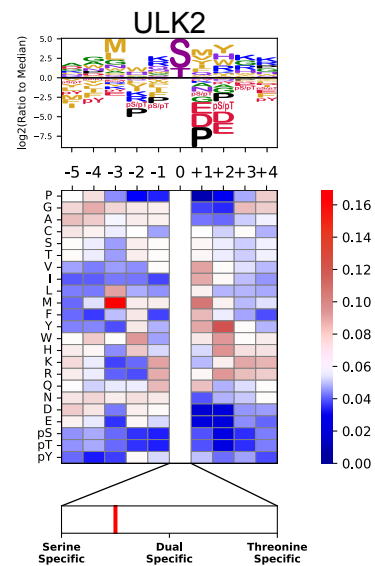
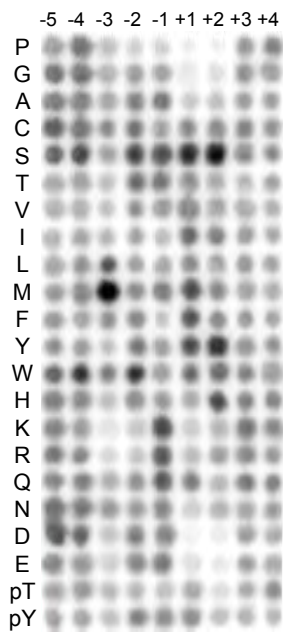
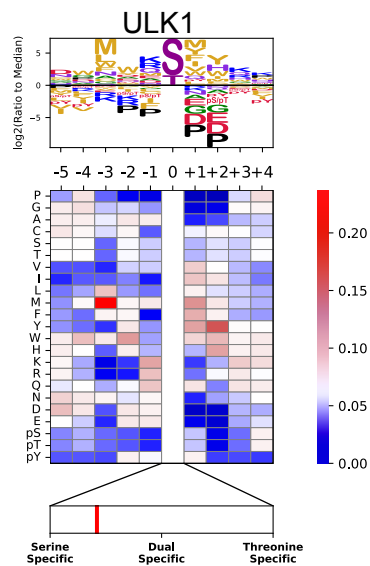


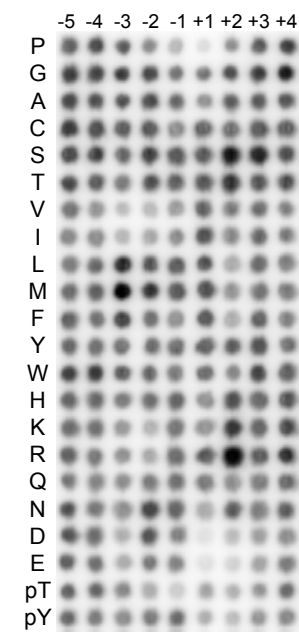
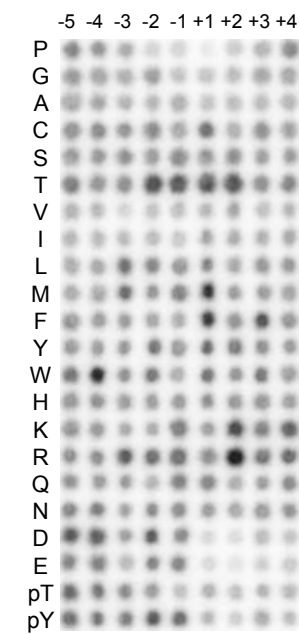
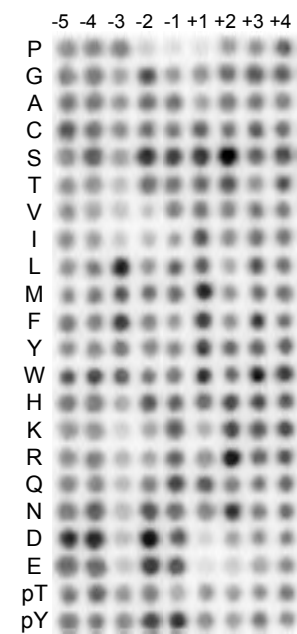
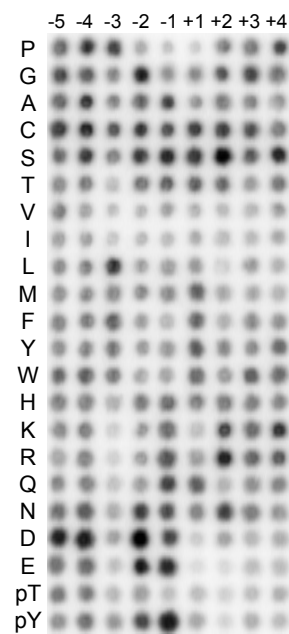
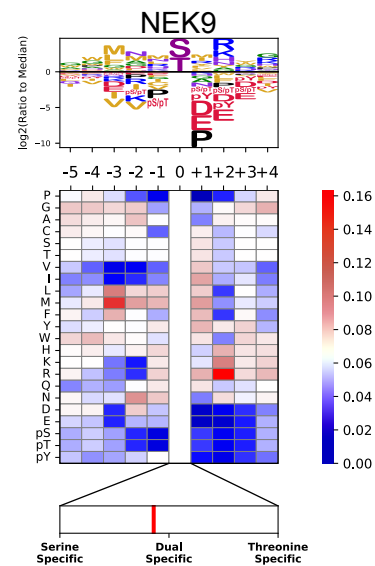
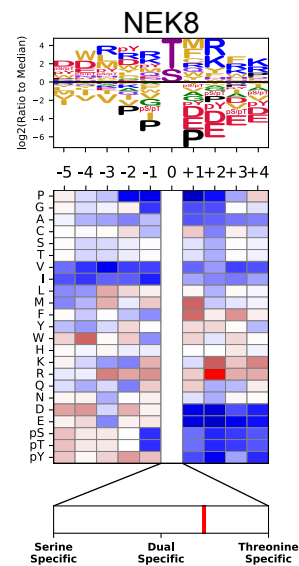
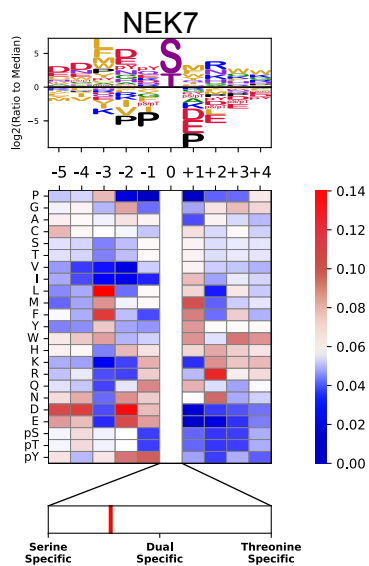
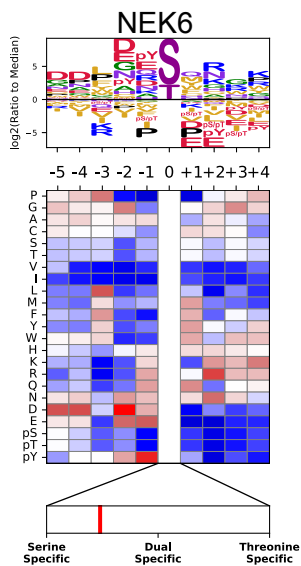


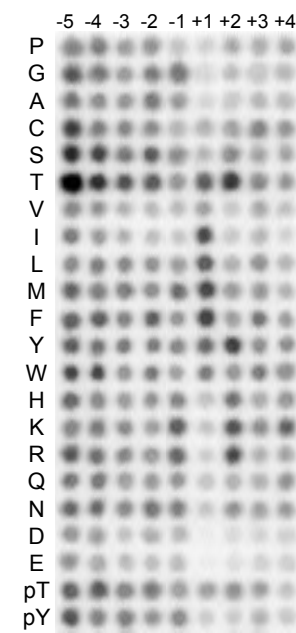
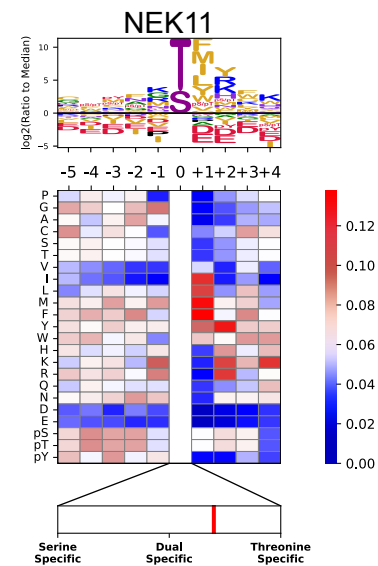
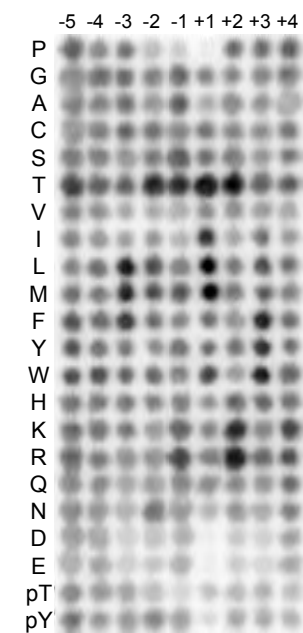
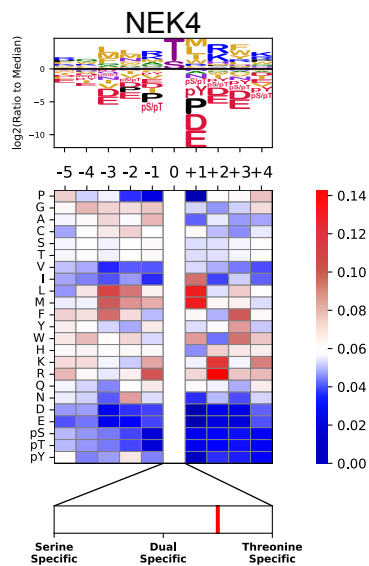
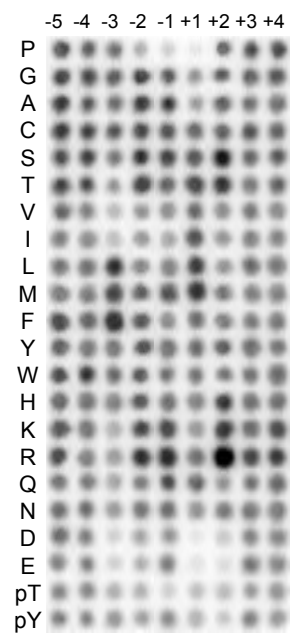
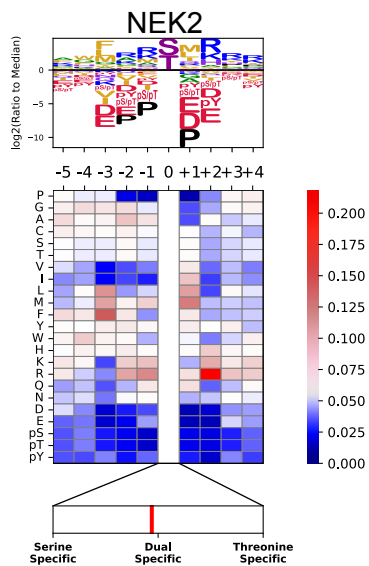


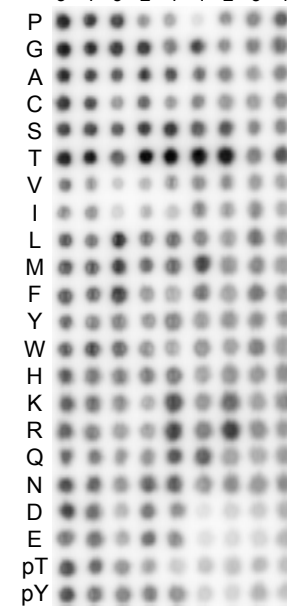
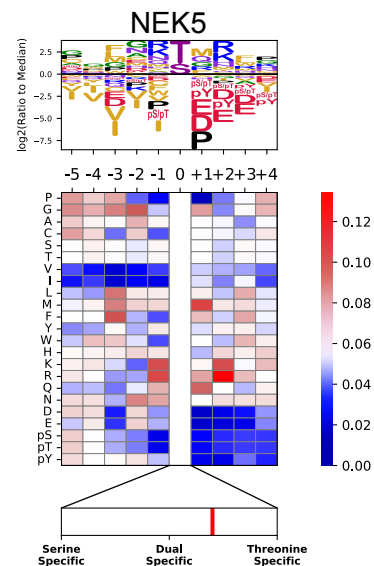
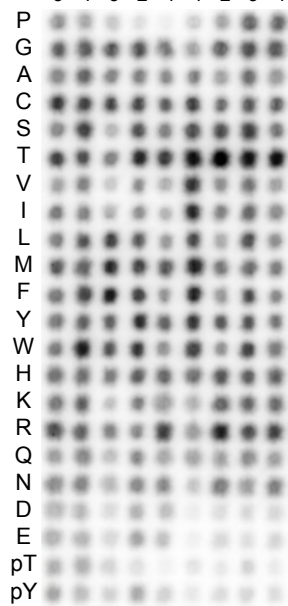
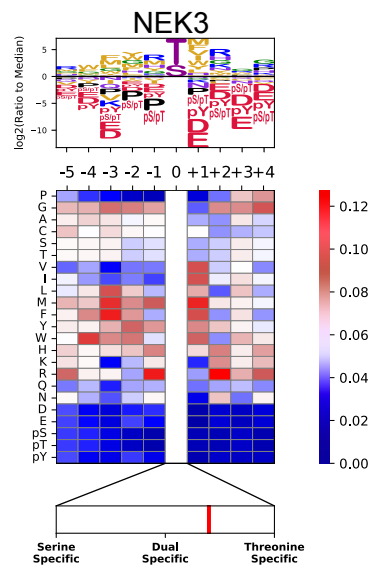
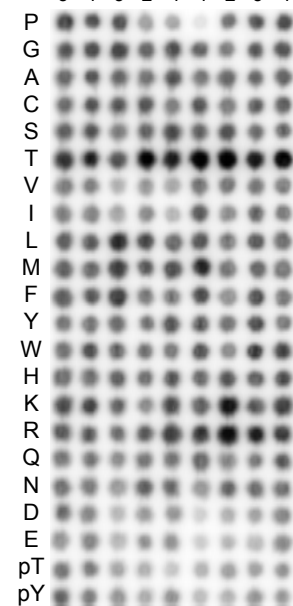
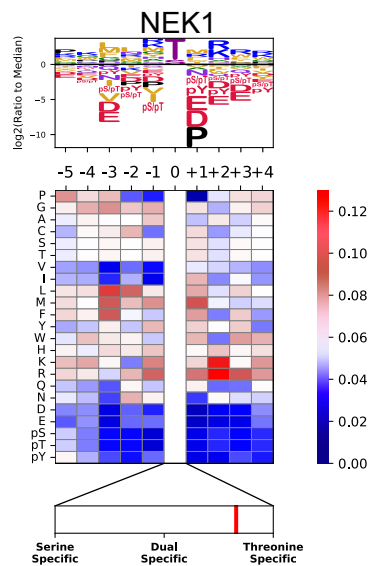


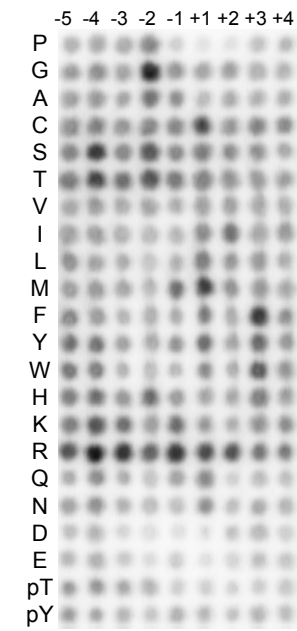
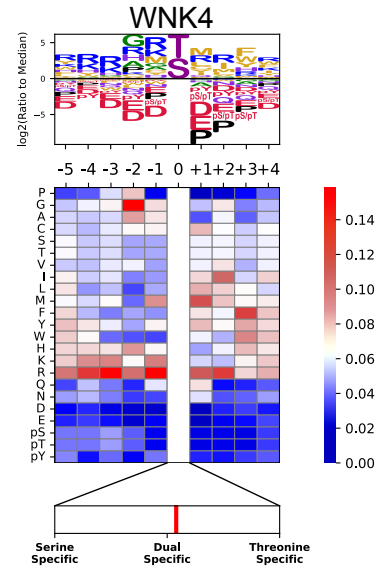
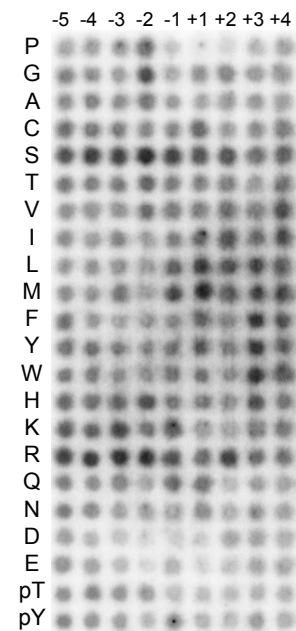
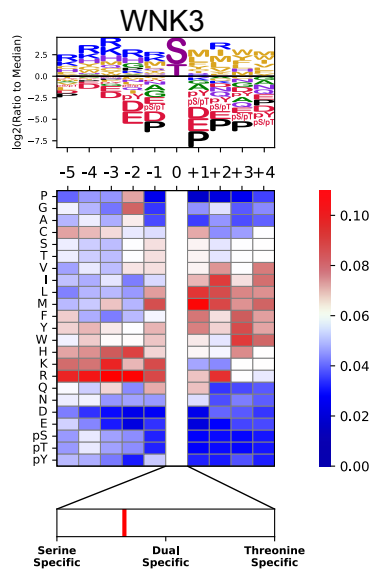
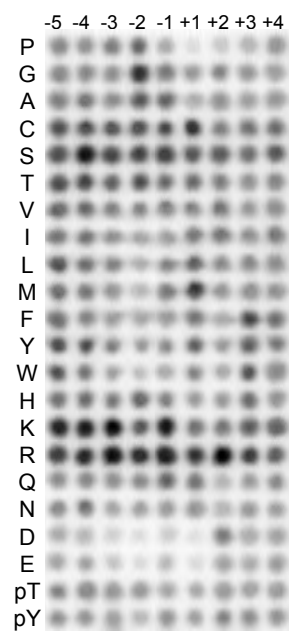
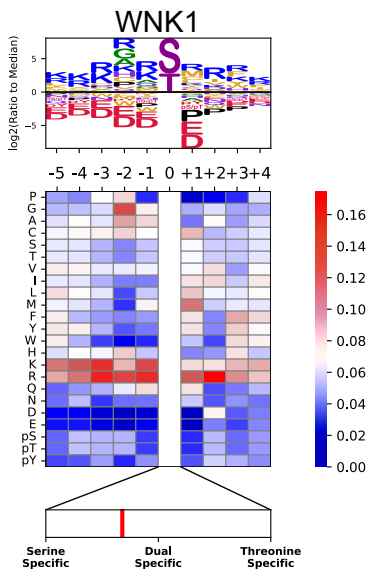


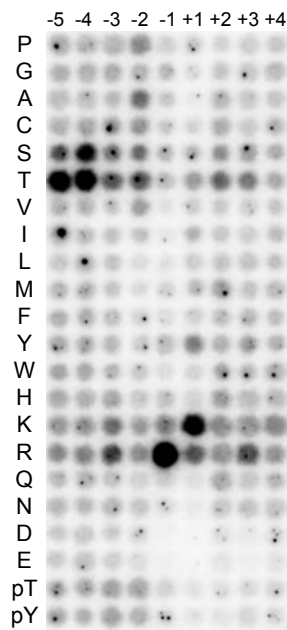
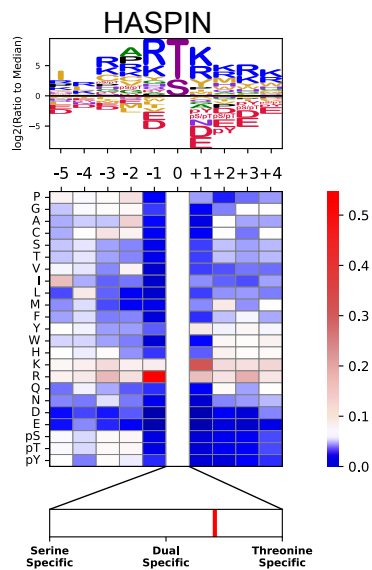


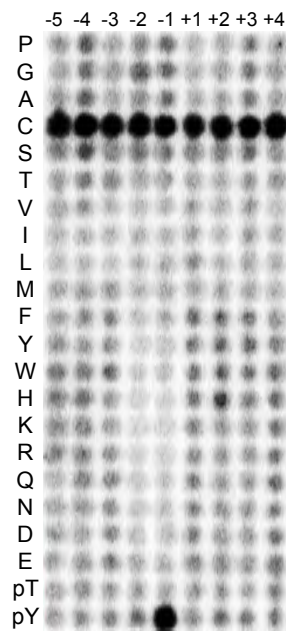
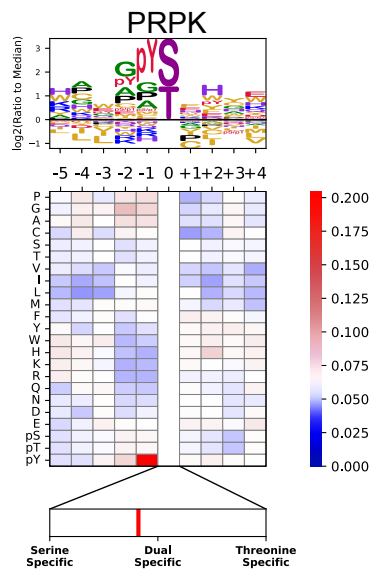




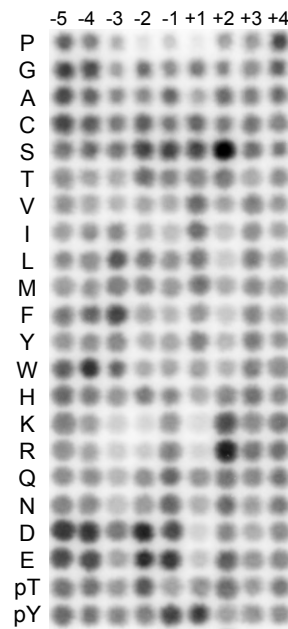
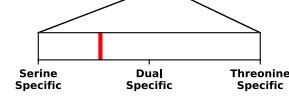
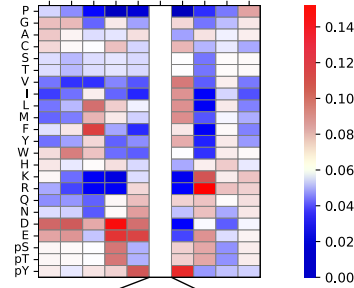
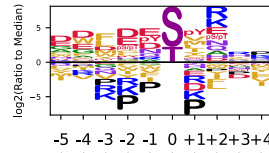


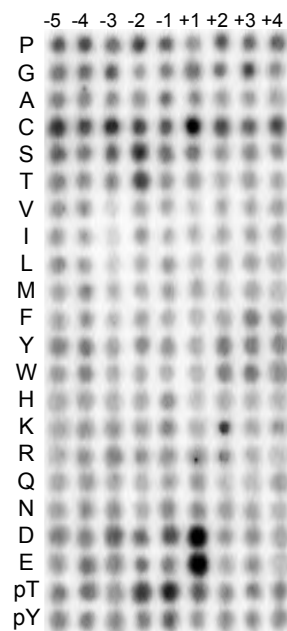
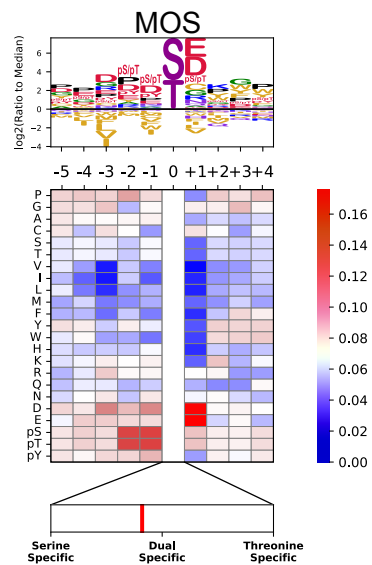


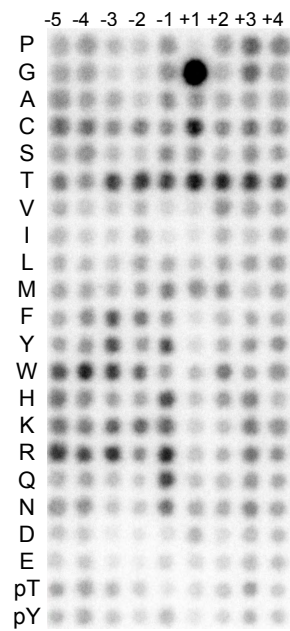
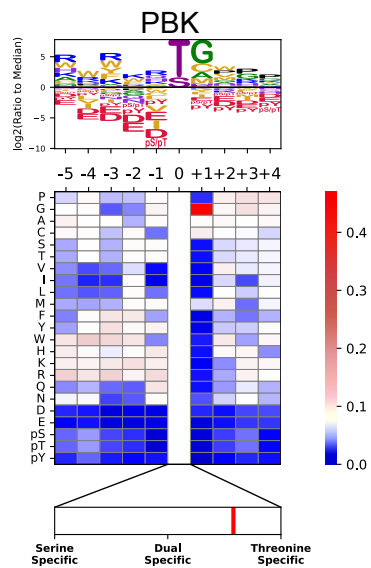




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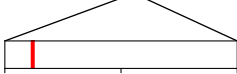
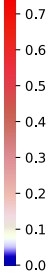
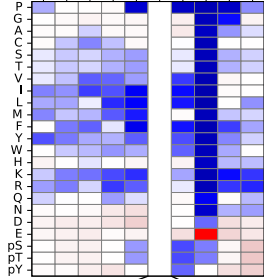
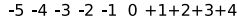
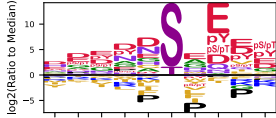




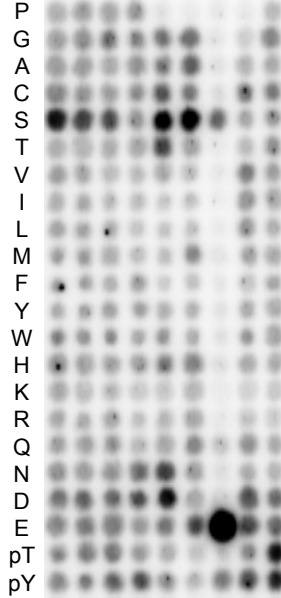
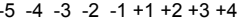


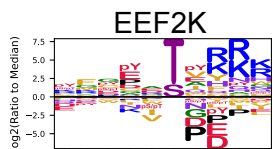
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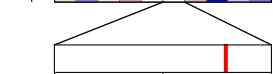
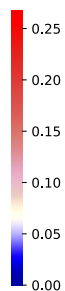
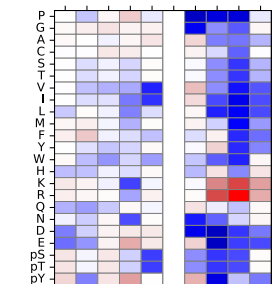


Serine Specific	Dual Specific	Threonine Specific
		



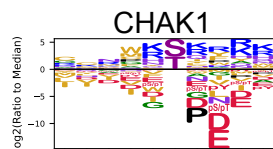
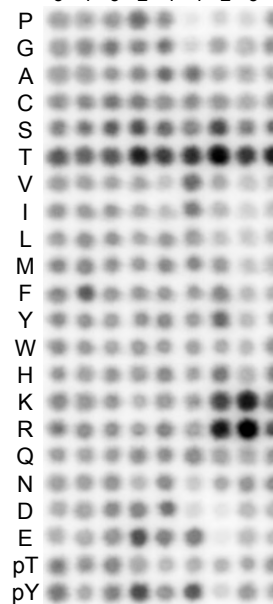


-5 -4 -3 -2 -1 0 +1 +2 +3 +4

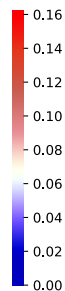
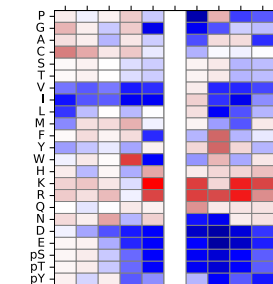


Serine Specific Dual Specific Threonine Specific

-5 -4 -3 -2 -1 +1 +2 +3 +4

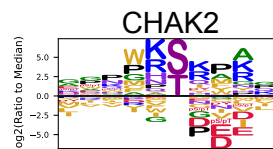
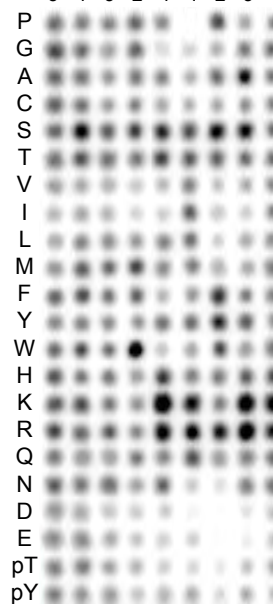


-5 -4 -3 -2 -1 0 +1 +2 +3 +4

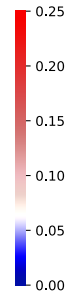
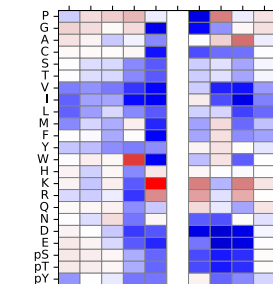


Serine Specific Dual Specific Threonine Specific

-5 -4 -3 -2 -1 +1 +2 +3 +4

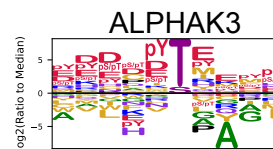
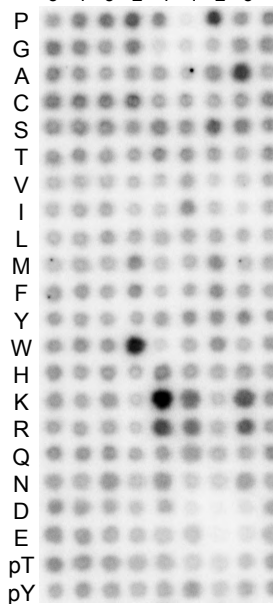


-5 -4 -3 -2 -1 0 +1 +2 +3 +4

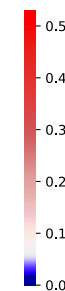
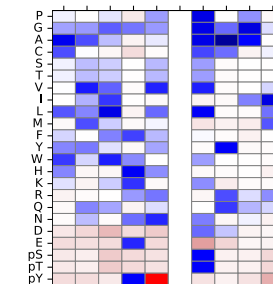


Serine Specific Dual Specific Threonine Specific

-5 -4 -3 -2 -1 +1 +2 +3 +4

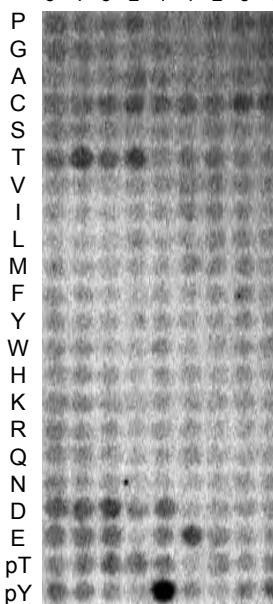


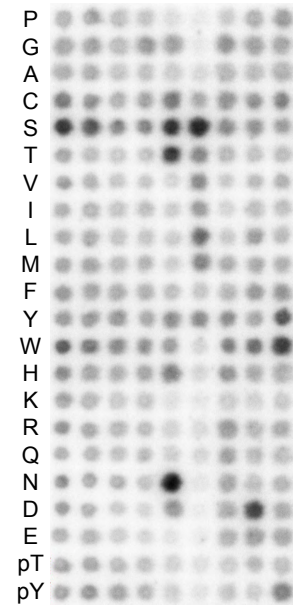
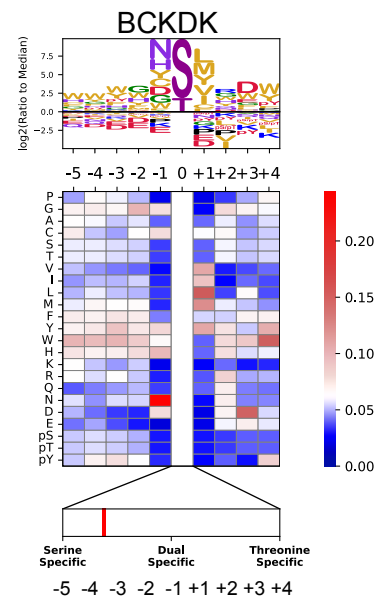
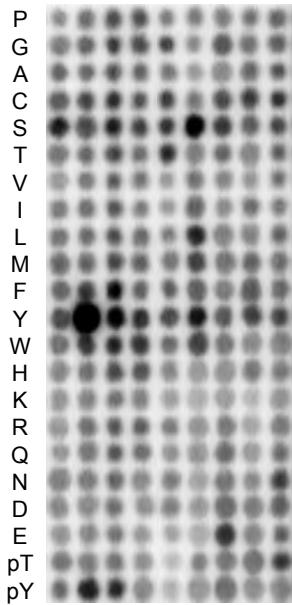
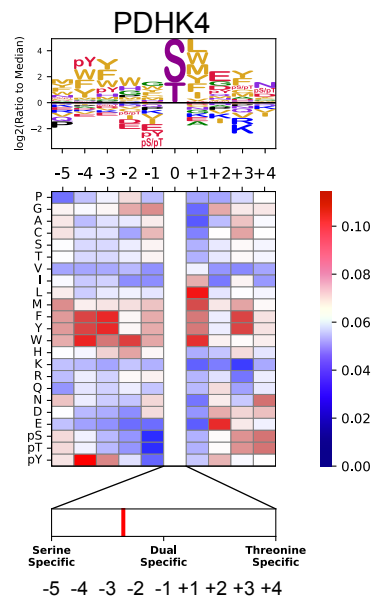
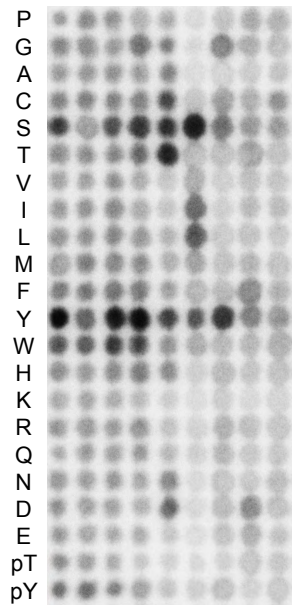
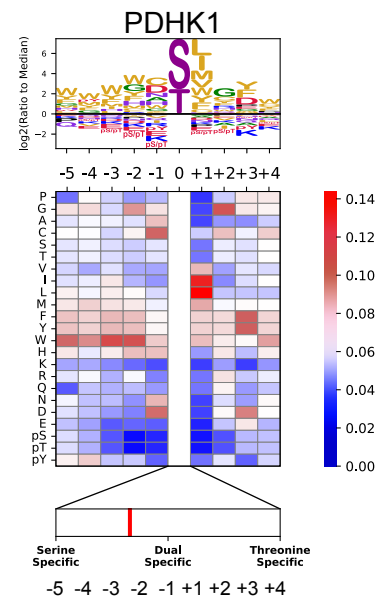
-5 -4 -3 -2 -1 0 +1 +2 +3 +4

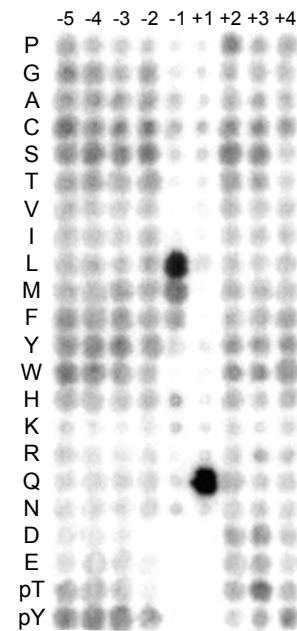
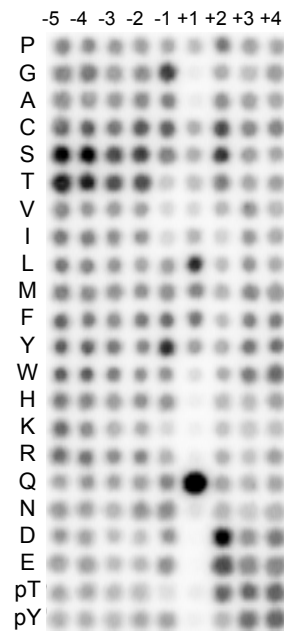
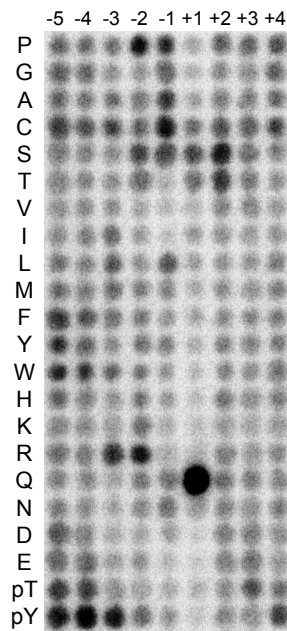
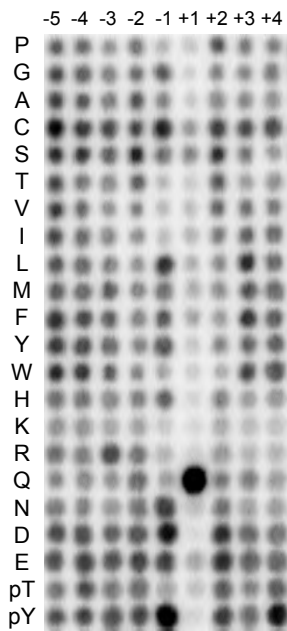
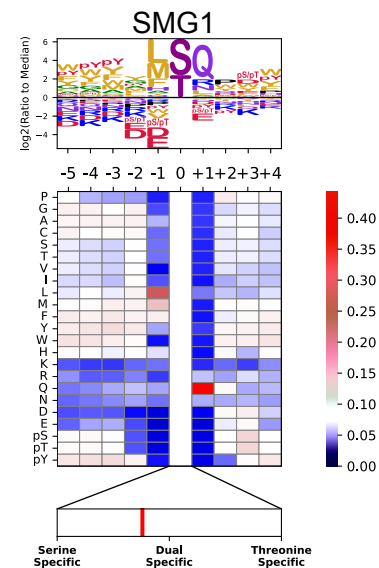
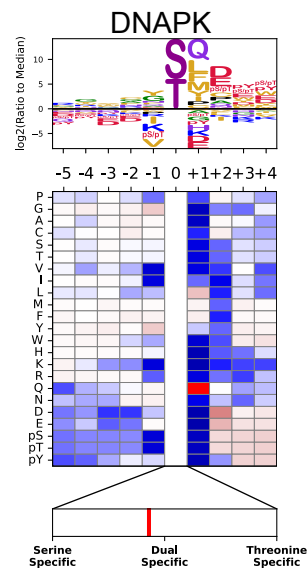
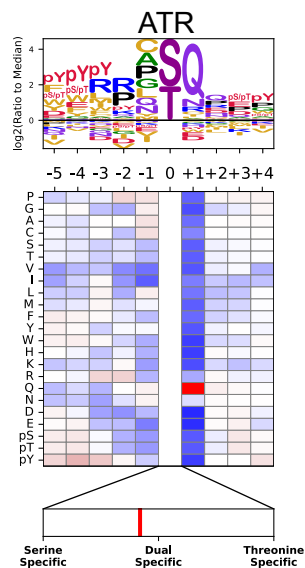
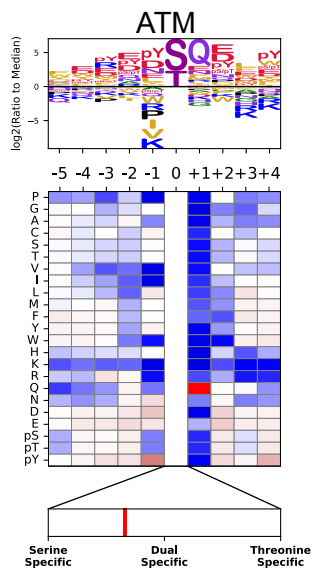


Serine Specific Dual Specific Threonine Specific

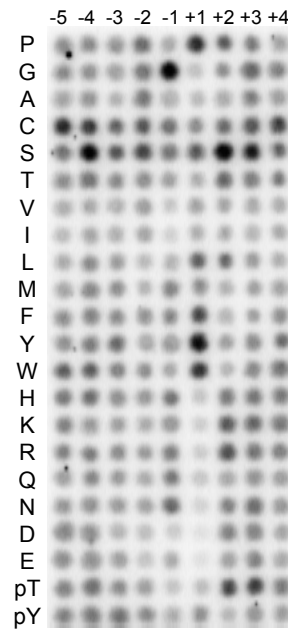
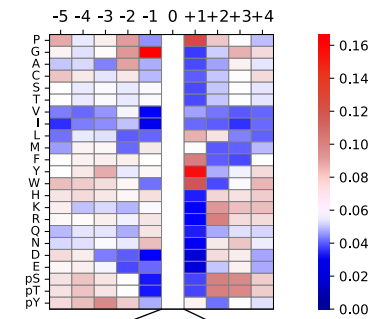
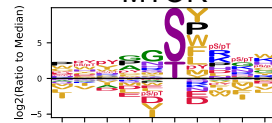
-5 -4 -3 -2 -1 +1 +2 +3 +4







MTOR



Supplementary Figure 2: Fully annotated volcano plots presented in Figs. 4b-g.

Figure 4b

Upreg: 36; Downreg: 64; Unreg: 1800

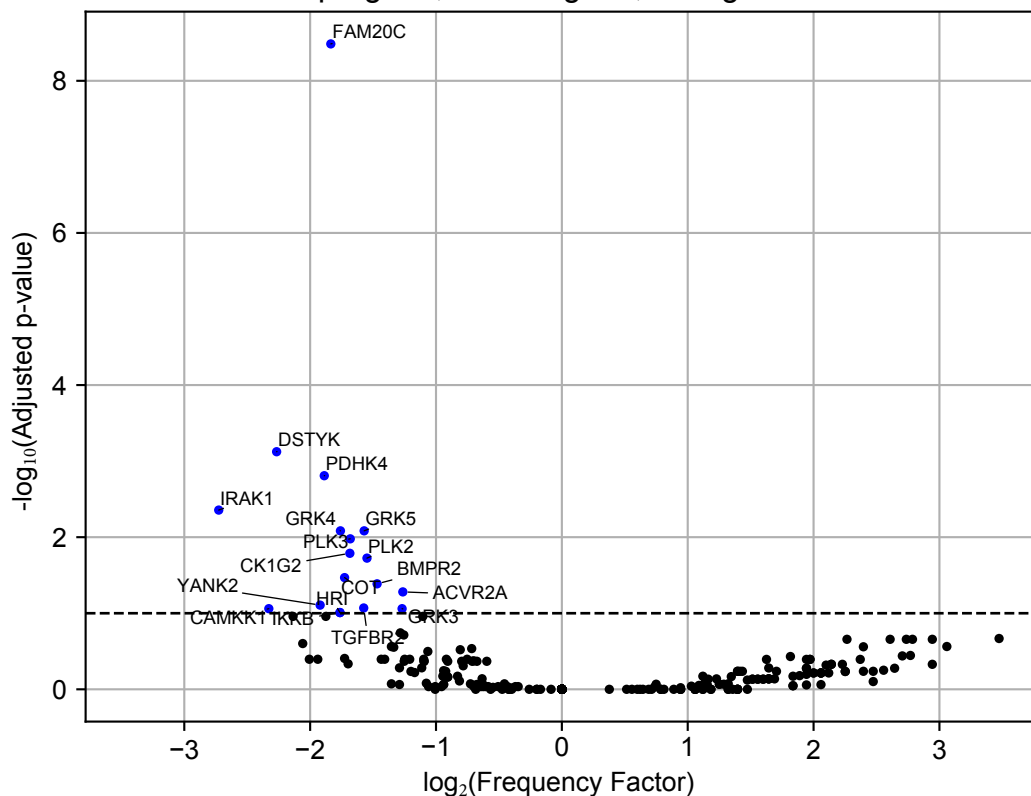


Figure 4c

Upreg: 186; Downreg: 179; Unreg: 2612

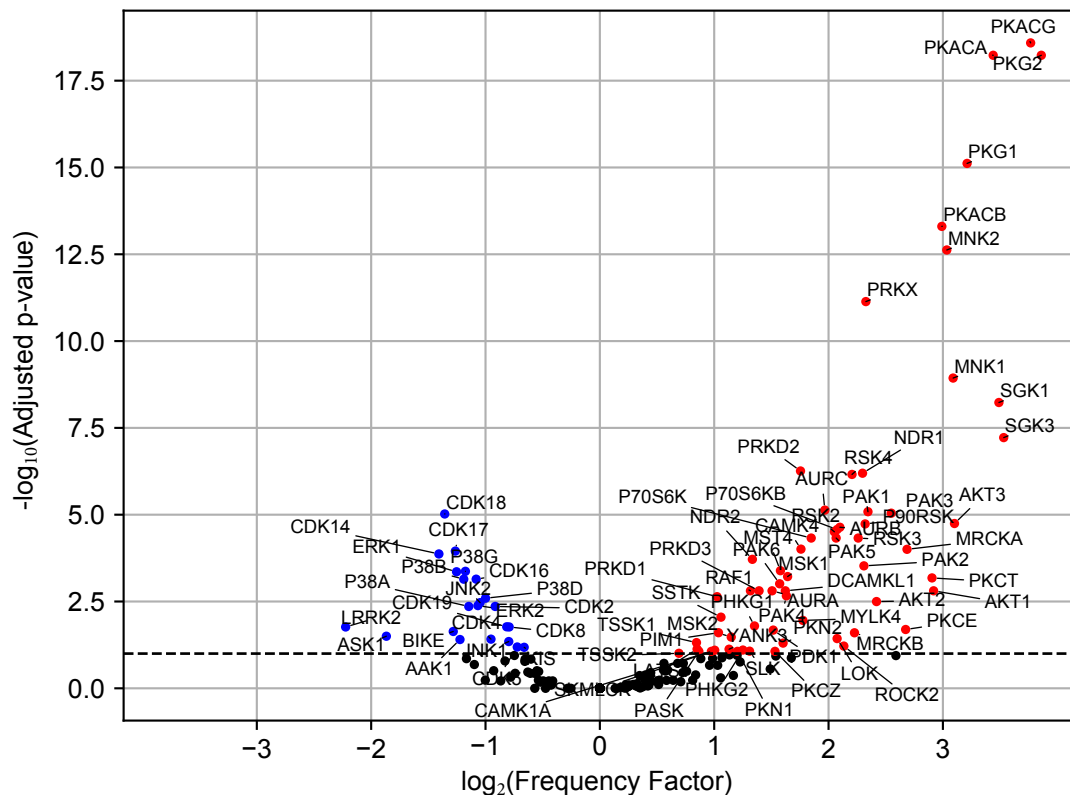


Figure 4d Upreg: 48; Downreg: 93; Unreg: 1702

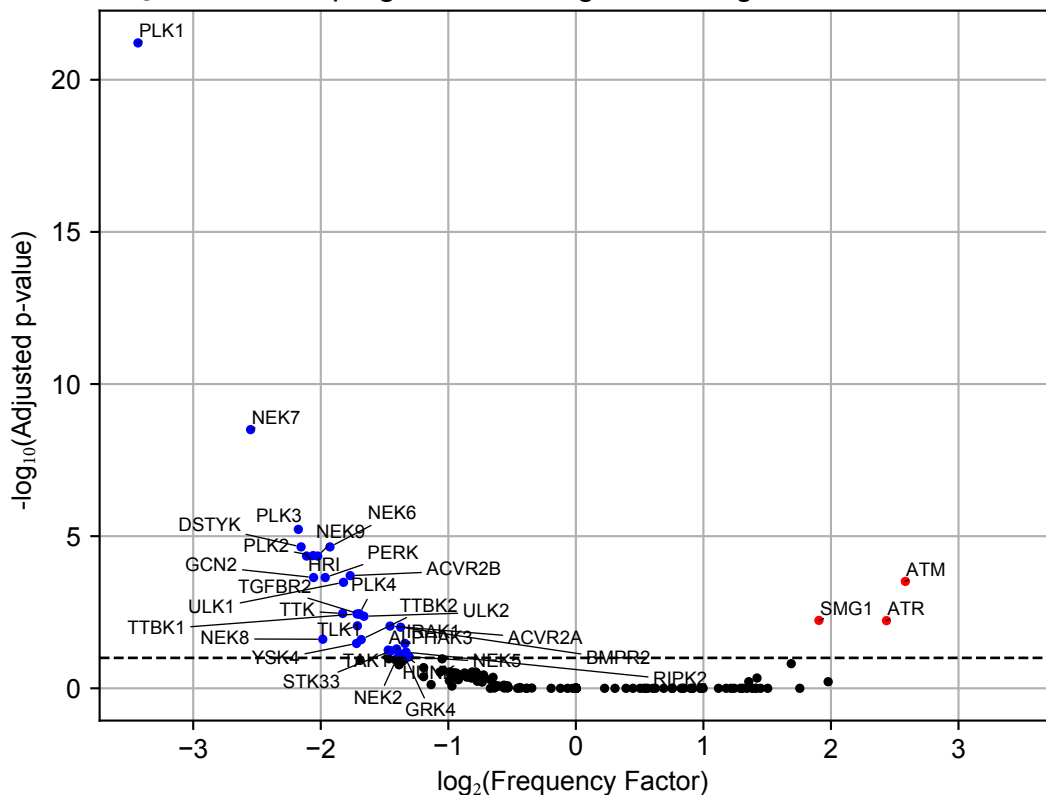


Figure 4e Upreg: 125; Downreg: 116; Unreg: 2521

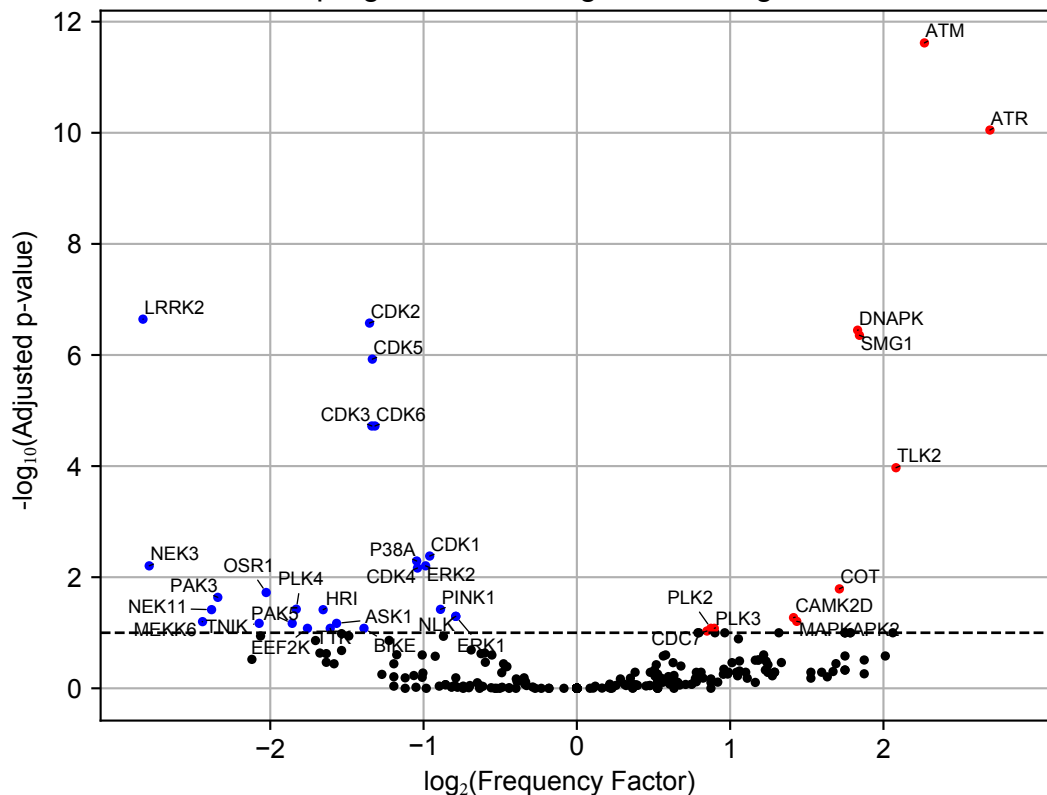


Figure 4f (1 min) Upreg: 269; Downreg: 167; Unreg: 8166

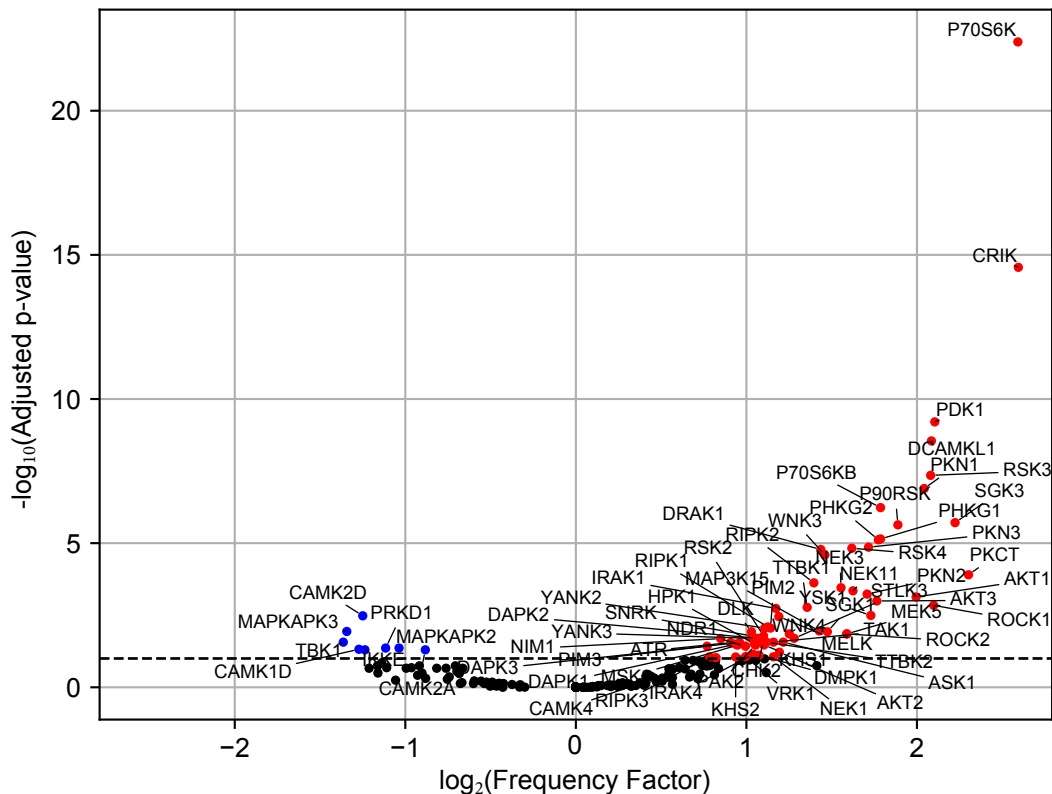


Figure 4f (1 hr) Upreg: 1649; Downreg: 172; Unreg: 8295

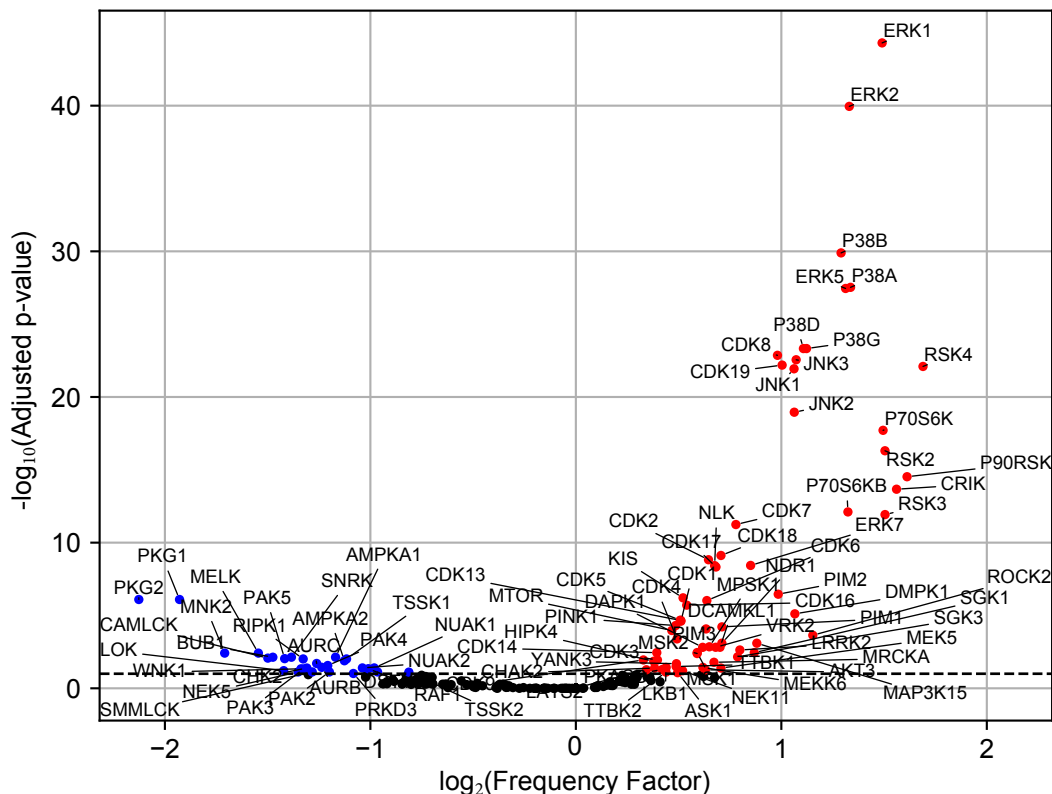


Figure 4g (30 min) Upreg: 2147; Downreg: 600; Unreg: 9408

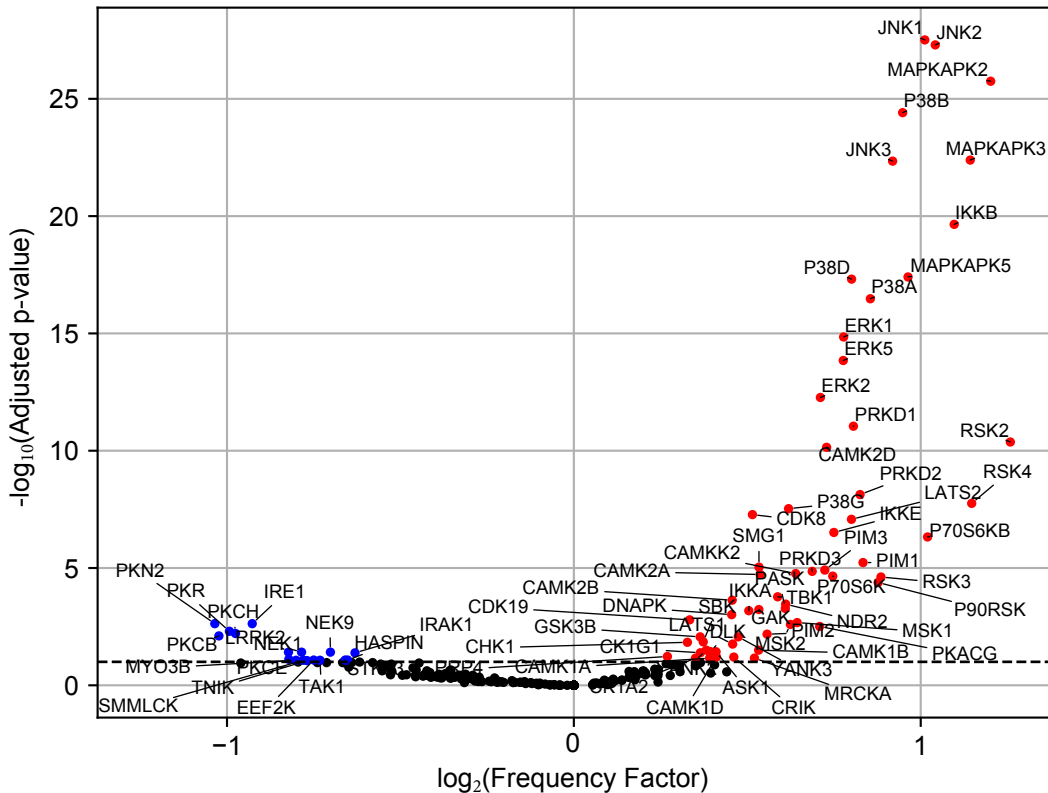
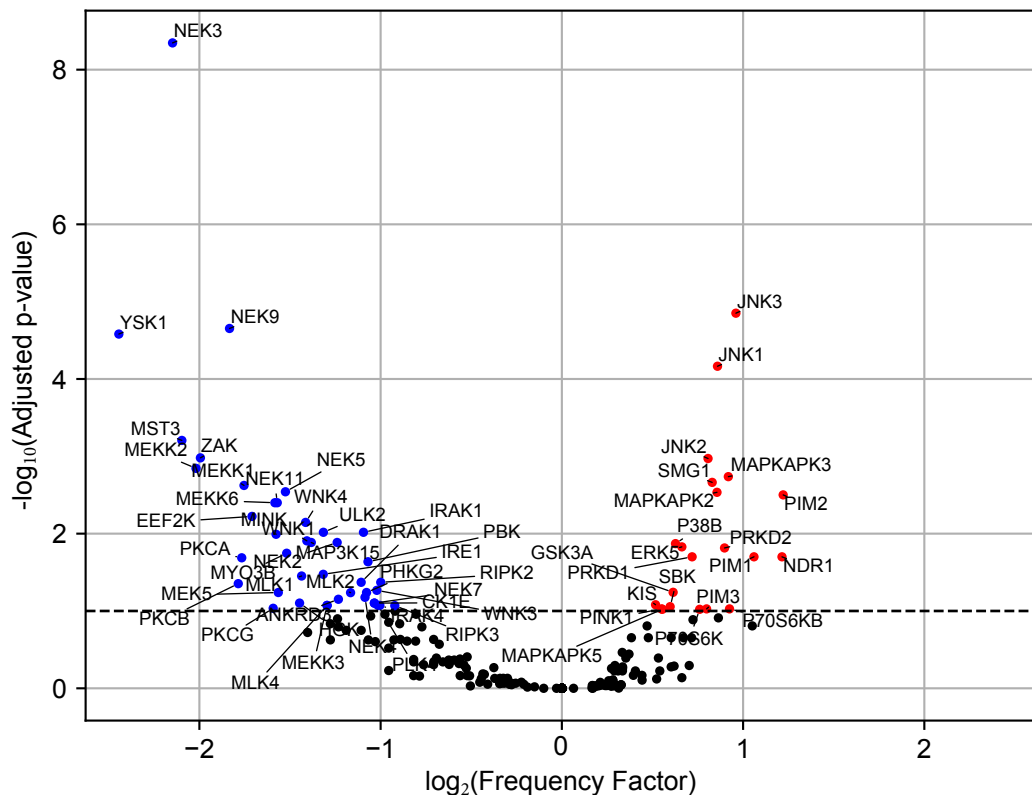


Figure 4g (4 hr) Upreg: 457; Downreg: 179; Unreg: 3471



Supplementary Note 1

$$S_S = \sum_{p=-5}^{+4} M_{S,p}; S_T = \sum_{p=-5}^{+4} M_{T,p}$$

$$S_{ctrl} = 0.75 * S_S - 0.25 * S_T; T_{ctrl} = 0.75 * S_T - 0.25 * S_S$$

$$S_0 = \frac{S_{ctrl}}{\max(S_{ctrl}, T_{ctrl})}; T_0 = \frac{T_{ctrl}}{\max(S_{ctrl}, T_{ctrl})}$$

Supplementary Note 2

$$Raw\ Score_{Kin\ X} = \frac{\prod_{Pos} P_{Kin\ X}(AA, Position)}{\left(\frac{1}{\#Random\ AA}\right)^{length(positions)}}$$