

## ANALYSIS OF HISTONES IN *XENOPUS LAEVIS*

**PART I: A DISTINCT INDEX OF ENRICHED VARIANTS AND MODIFICATIONS EXISTS IN EACH CELL TYPE AND IS REMODELED DURING DEVELOPMENTAL TRANSITIONS**  
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### **Supplemental Figure 1. Sequence of *Xenopus* Histone H1fx**

Sequence alignment of Human (Hs\_) and *Xenopus laevis* (Xl\_) H1fx/H1x proteins. The *Xenopus* H1fx protein is listed as NCBI GI number 83318207.

### **Supplemental Figure 2. Sequence of *Xenopus* Histone H1B.Sp**

Sequence alignment of *Xenopus laevis* (Xl\_) H1B and H1B.Sp proteins. The *Xenopus* H1B.Sp protein is annotated as “hypothetical protein LOC779170” under NCBI GI number 148235653.

### **Supplemental Figure 3. MS identification of 2D TAU/SDS gel slices**

Proteins found in each gel slice are listed, with the number of tryptic peptides from each protein, the NCBI gi database number of the respective protein, and the common name(s) of the protein. **A.** Sperm histone 2D gel slices. **B.** Egg histone 2D gel slices. **C.** Early embryo (pronuclei) histone 2D gel slices. **D.** Erythrocyte histone 2D gel slices.

	1	10	20	30	40	57																																								
Hs_H1x	S	V	E	L	E	E	A	L	P	V	T	A	E	G	-----	M	A	K	K	V	T	K	A	G	G	S	A	A	L	S	P	S	K	K	R	K	N	S	K	K	K	N	Q	P	G	K
Xl_H1fx	A	L	E	L	E	E	N	L	H	S	T	E	E	E	DEEEEEEEEGDE	M	R	S	R	S	T	R	N	K	G	G	A	A	S	S	G	N	K	K	K	K	-	K	K	K	N	Q	P	G	R	
Consensus	A	L	E	L	E	E	L	T	E		M	K	T	K	G	A	A	S	K	K	K	K	K	K	K	N	Q	P	G	K																

  

	58	70	80	90	100	114																																																			
Hs_H1x	Y	S	Q	L	V	V	E	T	I	R	R	L	G	E	R	N	G	S	S	L	A	K	I	Y	T	E	A	K	K	V	P	W	F	D	Q	Q	N	G	R	T	Y	L	K	Y	S	I	K	A	L	V	Q	N	D	T	L	L	Q
Xl_H1fx	Y	S	Q	L	V	V	D	T	I	R	K	L	G	E	R	N	G	S	S	L	A	K	I	Y	S	E	A	K	K	V	S	W	F	D	Q	Q	N	G	R	T	Y	L	K	Y	S	I	K	A	L	V	Q	N	D	T	L	L	Q
Consensus	Y	S	Q	L	V	V	D	T	I	R	K	L	G	E	R	N	G	S	S	L	A	K	I	Y	S	E	A	K	K	V	W	F	D	Q	Q	N	G	R	T	Y	L	K	Y	S	I	K	A	L	V	Q	N	D	T	L	L	Q	

  

	115	120	130	140	150	160	171																																																	
Hs_H1x	V	K	G	T	G	A	N	G	S	F	K	L	N	R	K	K	L	E	G	G	E	R	R	G	A	P	A	A	A	T	A	P	A	P	T	A	H	K	A	K	K	A	A	P	G	A	A	G	S	R	R	A	D	K	K	P
Xl_H1fx	V	K	G	V	G	A	N	G	S	F	R	L	N	K	K	K	L	E	G	L	P	Y	D	K	K	P	P	P	A	K	P	S	S	S	S	S	N	K	K	Q	Q	Q	Q	G	P	S	S	S	P	S	-----	K	S			
Consensus	V	K	G	G	A	N	G	S	F	K	L	N	K	K	K	L	E	G	K	P	A	A	A	S	K	A	P	A	A	S	K	A	P	A	A	S	K	A	P	A	A	S	K													

  

	172	180	190	200	210	224																																															
Hs_H1x	A	R	G	Q	K	P	E	Q	R	S	H	K	K	G	A	G	A	K	K	D	K	G	G	K	A	K	K	T	A	A	A	G	G	K	K	V	K	K	A	A	K	P	S	V	P	K	V	P	K	G	R	K	-
Xl_H1fx	H	K	K	A	K	P	K	A	K	A	E	K	E	K	P	K	T	S	S	A	K	A	K	S	P	K	K	S	A	A	K	G	-	K	K	M	K	K	G	A	K	P	S	V	R	K	A	P	K	S	K	K	A
Consensus	K	K	P	K	A	K	K	A	K	K	S	A	K	A	K	S	A	A	G	K	K	M	K	K	A	A	K	P	S	V	K	P	K	K	A																		

Supplemental Figure 1. Sequence of H1fx

	(1)	1	10	20	30	40	57					
XI_H1B.Sp	(1)	-----MAETAP	PPAEPAAKAK	KK--	QPK--	KAAAKAKKPSG	PSASDLIVKAVSASKE					
XI_H1B	(1)	MTATTETAPVA	PPAEPAAAK	TKKQ	QPKKVA	GGAKAKKPSG	PSASELIVKAVSSSKE					
Consensus	(1)		PPAEPAA	K K	QPK	AAAKAKKPSG	PSASDLIVKAVSASKE					
	(58)	58	70	80	90	100	114					
XI_H1B.Sp	(49)	RSGVSLAALKKALAAGGYD	VDKNN	SRLK	LALKALVT	KGTLTQV	KGTTGASGSF					
XI_H1B	(58)	RSGVSLAALKKALAAGGYD	VDKNN	SRLK	LALKALVT	KGTLTQV	KGTTGASGSF					
Consensus	(58)	RSGVSLAALKKALAAGGYD	VDKNN	SRLK	LALKALVT	KGTLTQV	KGTTGASGSF					
	(115)	115	120	130	140	150	160	171				
XI_H1B.Sp	(106)	QLE	GKDKAVAKK	-KK	PAAPK	VKKP	AKKAPKSP	KKPKKVS	AKS--	PKKVKA	AATGAK	
XI_H1B	(115)	QLE	TKDKAAK	KKPAA	PKAKK	TAAG	AKKAPKSP	KKPKKVS	AAAKS	PKKVKL	AKAAK-	
Consensus	(115)	QLE	KDKA	KK	P A K		AKKAPKSP	KKPKKVS	A	PKKVK	A A	
	(172)	172	180	190	200	210	228					
XI_H1B.Sp	(160)	SPKKP	---KAKKAT	KS	AAKKA	AKPKA	AKSPT	TKPSK	PKAT	KPKAAK	PKAAAK	AKKAA
XI_H1B	(171)	SPKKP	KAVKAKKVA	KS	PAKKA	T	KPKT	AKSPA	K--AK	--VA	KPKAAK	-----AKKPA
Consensus	(172)	SPKKP	KAKK	KS	AKKA	KPK	AKSP	K AK	KPKAAK		AKK	A
	(229)	2291										
XI_H1B.Sp	(214)	PKK										
XI_H1B	(218)	PKK										
Consensus	(229)	PKK										

Supplemental Figure 2. Sequence of H1B.Sp

Gel Slice	Number of Peptides	NCBI gi Number	Protein
<b>1</b>	3	148227628	H2A
	2	147902910	H2A
	1	73535880	H2A
	3	82201002	H2A.F/Z
	2	90108630	H2B
	3	28948510	H3
	4	46015166	H4
<b>2</b>	5	82201002	H2A.F/Z
<b>3</b>	1	4504239	H2A
	2	82201002	H2A.F/Z
	5	296216	H2B
	1	46015145	H3
	8	134104559	H3
	1	147906226	H3
	2	46015166	H4
<b>4</b>	1	27469648	H1, member X
	1	4504239	H2A
	3	90108630	H2B
	3	28948510	H3
	7	46015166	H4
<b>5</b>	1	27469648	H1, member X
	1	82201002	H2A.F/Z
	8	122034	H2B
	3	90108630	H2B
	4	46015166	
<b>6</b>	3	148234692	H1(0)-1
	1	27469648	H1, member X
	3	147906637	H1A
	1	121922	H1B
	2	122034	H2B
	2	46015166	H4
	1	559620	sperm-specific basic nuclear protein 5
<b>7</b>	2		H1(0)-1
	2	27469648	H1, member X
	1	122108	H1.0-B
	10	147906637	H1A
	2	148226616	H1A
	2	121922	H1B
	1	4885381	H1B
	3	147901299	H1B
	1	121924	H1B
	4	296140	H1B
	2	28948510	H1C
	2	134104559	H2B
	2	46015166	H3
	2	147907314	H3
	1	148223673	H4
	4	148235653	similar to H1
	1	1168088	sperm-specific basic nuclear protein-4

Supplemental Figure 3A. MS Identification of 2D TAU/SDS gel slices - Sperm Histones

Gel Slice	Number of Peptides	NCBI gi Number	Protein
<b>1</b>	9	gi 49522766 gb AAH74176.1	H2A.X
	8	gi 18000277 gb AAL54900.1	ribosomal protein S15 isoform
	7	gi 27881711 gb AAH44715.1	HMG-X protein
	7	gi 62857617 ref NP_001015968.1	Histone H2A
<b>2</b>	8	gi 30268544 emb CAD89679.1	H3
	6	gi 51258855 gb AAH80133.1	ribosomal protein S2e
	6	gi 50603982 gb AAH77634.1	ribosomal protein S23
	14	gi 47122925 gb AAH70591.1	40S ribosomal protein S4
	10	gi 18000277 gb AAL54900.1	ribosomal protein S15 isoform
<b>3</b>	8	gi 28316746 ref NP_783583.1	H4
<b>4</b>	4	gi 50370206 gb AAH77046.1	60S ribosomal protein L23a
	3	gi 62858675 ref NP_001016009.1	alpha globin larval-5
	3	gi 62858431 ref NP_001016402.1	LSM2 homolog, U6 small nuclear RNA associated
	3	gi 50370198 gb AAH77007.1	40S ribosomal protein S25
	3	gi 49671156 gb AAH75196.1	alpha(I)-globin
	3	gi 46249524 gb AAH68730.1	Pterin-4-alpha-carbinolamine dehydratase 2
	10	gi 28316746 ref NP_783583.1	H4
	5	gi 46249459 gb AAH68628.1	heat shock 10kDa protein 1
	4	gi 50542223 gb AAT78451.1	H4
<b>5</b>	11	gi 62857833 ref NP_001017251.1	histone 2, H2bf
	9	gi 1124998 emb CAA63927.1	ribosomal protein L22
	7	gi 871774 emb CAA90077.1	ribosomal protein S13
	6	gi 49256128 gb AAH73013.1	alpha globin larval-1
	6	gi 34194029 gb AAH56505.1	ribosomal protein S19
	7	gi 871774 emb CAA90077.1	ribosomal protein S13
	6	gi 49256128 gb AAH73013.1	alpha globin larval-1
	6	gi 34194029 gb AAH56505.1	ribosomal protein S19
	5	gi 50370206 gb AAH77046.1	Rpl23a protein
	5	gi 49671156 gb AAH75196.1	alpha(I)-globin
	5	gi 49115440 gb AAH73375.1	ribosomal protein S9
	5	gi 27881711 gb AAH44715.1	HMG-X protein
	<b>6</b>	19	gi 49115440 gb AAH73375.1
14		gi 62858861 ref NP_001017063.1	peptidylprolyl isomerase B (cyclophilin B)
13		gi 62859791 ref NP_001016697.1	basic transcription factor 3
13		gi 54261578 gb AAH84369.1	Ppib-prov protein
11		gi 58332190 ref NP_001011243.1	Btf3l4 protein
9		gi 871774 emb CAA90077.1	ribosomal protein S13
9		gi 27881711 gb AAH44715.1	HMG-X protein
8		gi 50370206 gb AAH77046.1	Rpl23a protein
6		gi 64737 emb CAA32067.1	B4 protein
6		gi 62858565 ref NP_001016946.1	Histone H1.4
<b>Z</b>	9	gi 50370206 gb AAH77046.1	ribosomal protein L23a
	5	gi 545362 gb AAB29881.1	H1A
<b>8</b>	19	gi 27881711 gb AAH44715.1	HMG-X protein
	13	gi 38181929 gb AAH61601.1	HMG-X protein
	11	gi 49115440 gb AAH73375.1	ribosomal protein S9
	9	gi 49522962 gb AAH75290.1	Hmgb3-prov protein
	8	gi 62858175 ref NP_001016486.1	ribosomal protein L13a
	7	gi 709959 gb AAC59859.1	high mobility group protein-1
	7	gi 62857979 ref NP_001016566.1	40S ribosomal protein S8
	6	gi 62858459 ref NP_001016391.1	B4 protein

Supplemental Figure 3B. MS Identification of 2D TAU/SDS gel slices - Egg Histones

Gel Slice	Number of Peptides	NCBI gi Number	Protein
<b><u>1</u></b>	11	gi 30268544 emb CAD89679.1	Hist1h3f protein
	6	gi 49257812 gb AAH74652.1	polyubiquitin C
	5	gi 49522766 gb AAH74176.1	Histone H2A.x
	1	gi 49115274 gb AAH73272.1	Macro H2A
<b><u>2a</u></b>	4	gi 49522766 gb AAH74176.1	H2AX-F
	3	gi 50603936	H2A
	1	gi 34785262 gb AAH56660.1	H2AX-F
<b><u>2b</u></b>	7	gi 50603936	H2A
	3	gi 49522766 gb AAH74176.1	H2A.X-F
<b><u>3</u></b>	7		H3
	1		H3.2
	1		H3.3
<b><u>4</u></b>	7		H4
<b><u>5</u></b>	5	gi 62857833 ref NP_001017251.1	histone H2B
<b><u>6</u></b>	6	gi 27696450 gb AAH44011.1	H2A.ZI2 protein
	2	gi 27697448 ref XP_214093.1	H2A histone family, member V isoform
	4	gi 28316746 ref NP_783583.1	histone 4, H4
	5	gi 30268544 emb CAD89679.1	histone H3
<b><u>7</u></b>	3	gi 27697448 ref XP_214093.1	Histone H2AV (H2A.F/Z)
<b><u>8</u></b>	4	gi 62858459 ref NP_001016391.1	B4 protein
	2	gi 64737 emb CAA32067.1	B4 protein
<b><u>9</u></b>	5		Histone H1A
<b><u>10</u></b>	1	gi 47575778 ref NP_001001233.1	H1fx-prov protein

Supplemental Figure 3C. MS Identification of 2D TAU/SDS gel slices - Early-embryo Equivalent (pronuclei) Histones

Gel Slice	Number of Peptides	NCBI gi Number	Protein
<u>1</u>	3	148222886	histone H2A
<u>2</u>	6	122034	histone H2B
	2	148228507	H4 histone family, member A
<u>3</u>	7	76780124	H3 histone
<u>4</u>	8	50604163	histone H4
<u>5</u>	3	121918	Histone H1A
	2	121922	Histone H1B
	2	121923	Histone H1C (Clone XLHW2)
	2	121924	Histone H1C (Clone XLHW8)
	2	122108	Histone H1.0-B (Histone H1(0)-2) (Histone H5A)
	2	545362	H1A
	2	147901299	similar to H1B from X. laevis
<u>6</u>	2	121918	Histone H1A
	3	121922	Histone H1B
	2	296140	linker histone H1C
<u>7</u>	4	122108	Histone H1.0-B (Histone H1(0)-2) (Histone H5A)
	2	147907210	histone H1(0)-1

Supplemental Figure 3D. MS Identification of 2D TAU/SDS gel slices - Erythrocyte Histones