Appendix I - Analysis of Metals

A- Statistical Analysis

I.   Oneway Analysis of metal burden by sex

The results from these analyses indicate that sex is not a significant factor in burden.

Analysis of Variance (Nickel)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	0.273	0.273	0.0017	0.9669
Error	127	19990.092	157.402		
C. Total	128	19990.364			

Analysis of Variance (Copper)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	6.519	6.519	0.0160	0.8994
Error	127	51621.094	406.465		
C. Total	128	51627.613			

Analysis of Variance (Zinc)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	6234	6233.6	0.0664	0.7970
Error	127	11913901	93810.2		
C. Total	128	11920134			

Analysis of Variance (Strontium)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	110.451	110.451	0.9546	0.3304
Error	127	14694.767	115.707		
C. Total	128	14805.219			

Analysis of Variance (Silver)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	0.003206	0.003206	0.0046	0.9461
Error	127	88.589574	0.697556		
C. Total	128	88.592780			

Analysis of Variance (Cadmium)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	7.0118	7.0118	0.5297	0.4681
Error	127	1681.0866	13.2369		
C. Total	128	1688.0985			

Analysis of Variance (Tin)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	0.00001491	0.000015	0.8575	0.3562
Error	127	0.00220878	0.000017		
C. Total	128	0.00222369			

Analysis of Variance (Mercury)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	0.0190327	0.019033	1.5587	0.2142
Error	127	1.5507775	0.012211		
C. Total	128	1.5698102			

Analysis of Variance (Uranium)

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Sex	1	3.30372	3.30372	0.5714	0.4511
Error	127	734.25826	5.78156		
C. Total	128	737.56198			

II. ANOVA analysis

Graphs

Mean(66 Zn (ng/mg)) by Organ within Site

Mean(88 Sr (ng/mg)) by Organ within Site

Mean(107 Ag (ng/mg)) by Organ within Site

Mean(111 Cd (ng/mg)) by Organ within Site

Mean(118 Sn (ng/mg)) — Organ within Site

Mean(202 Hg (ng/mg)) — Organ within Site
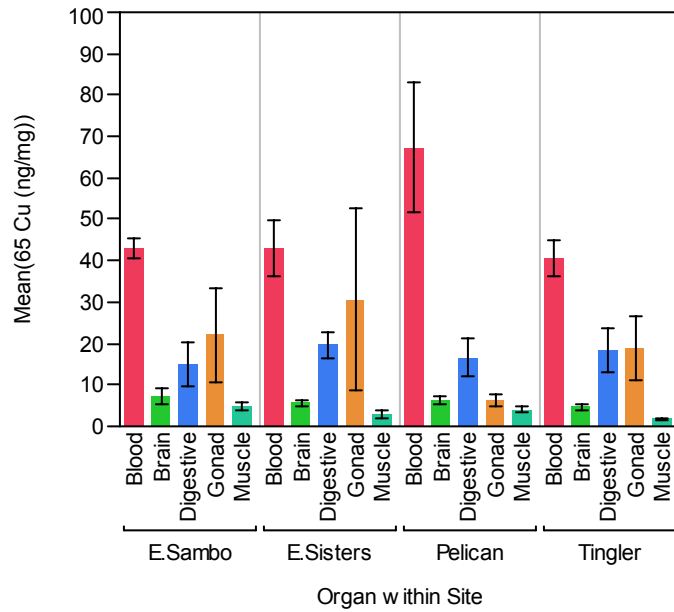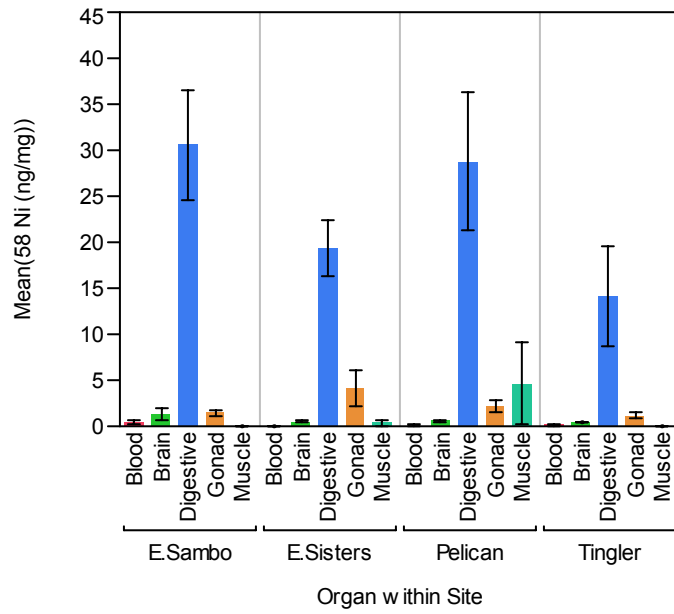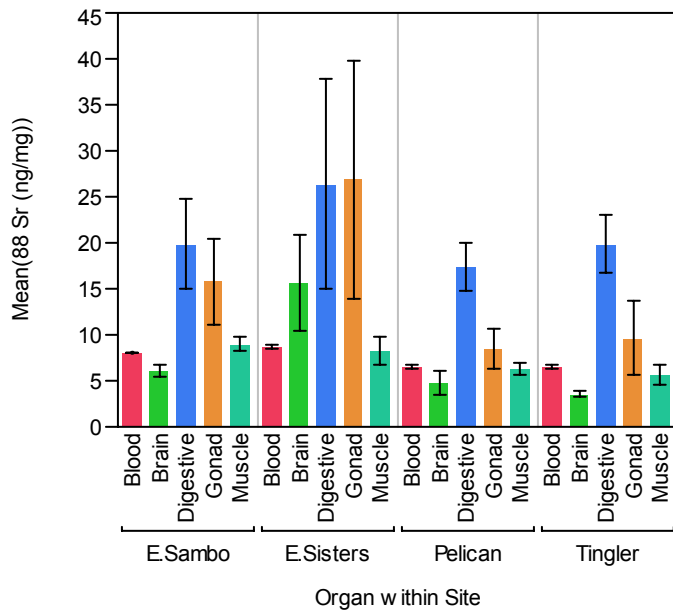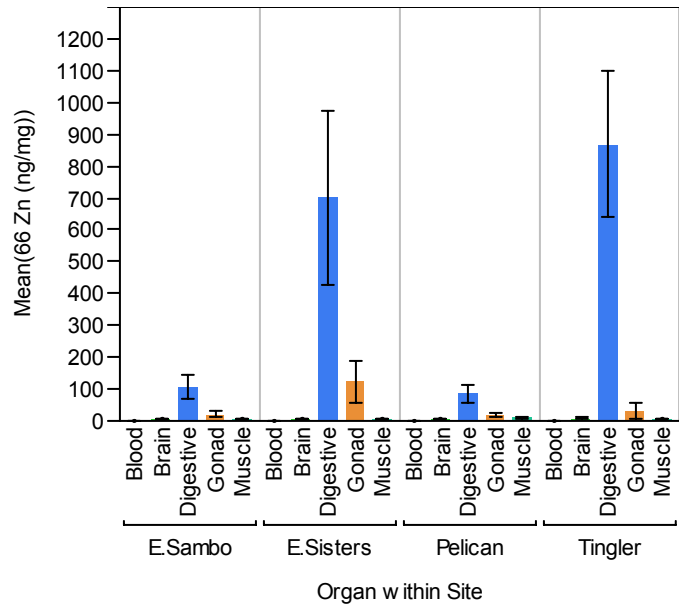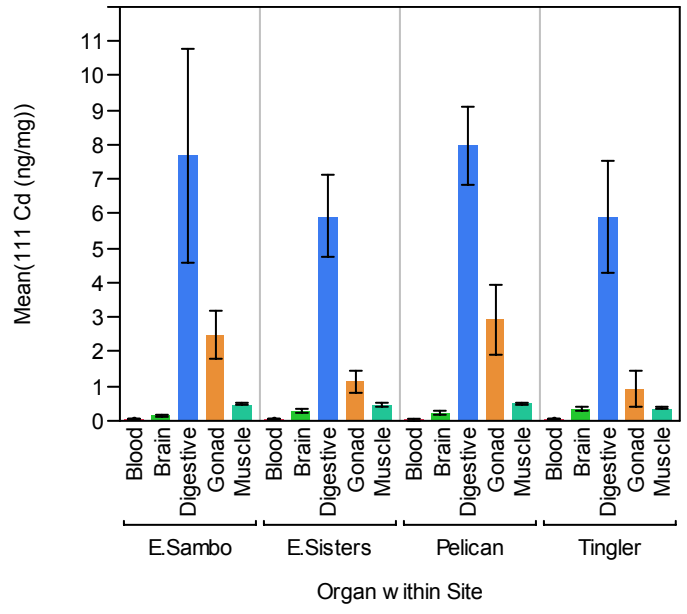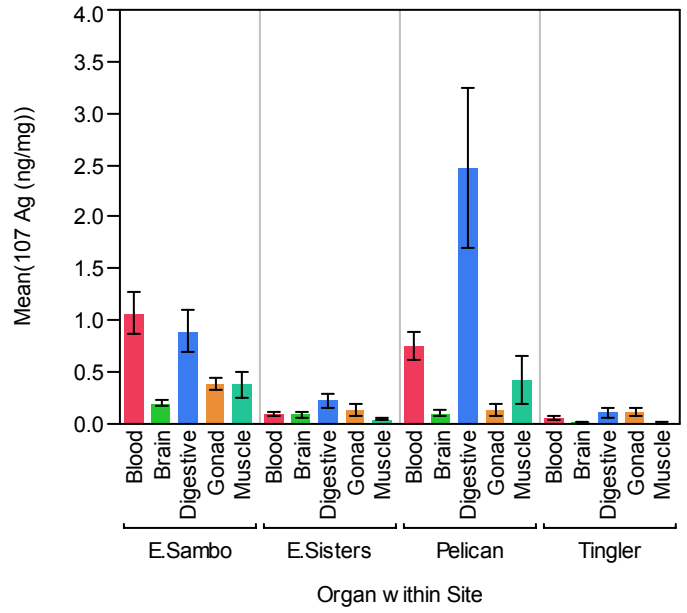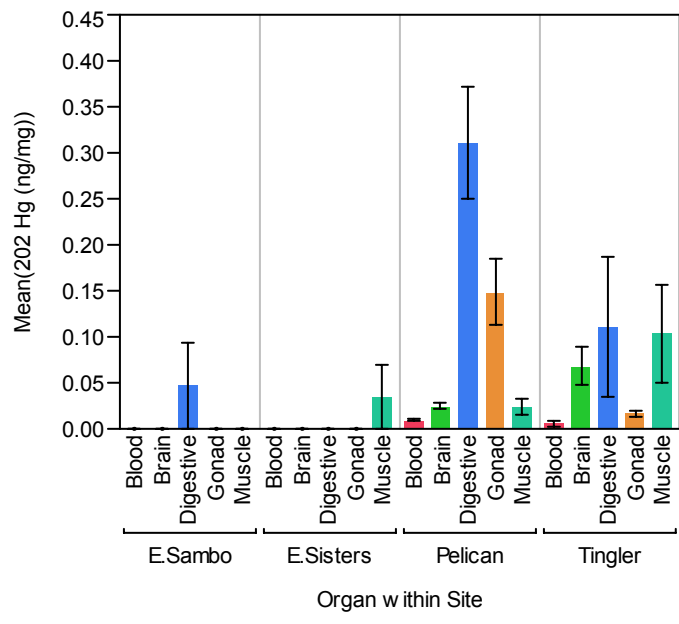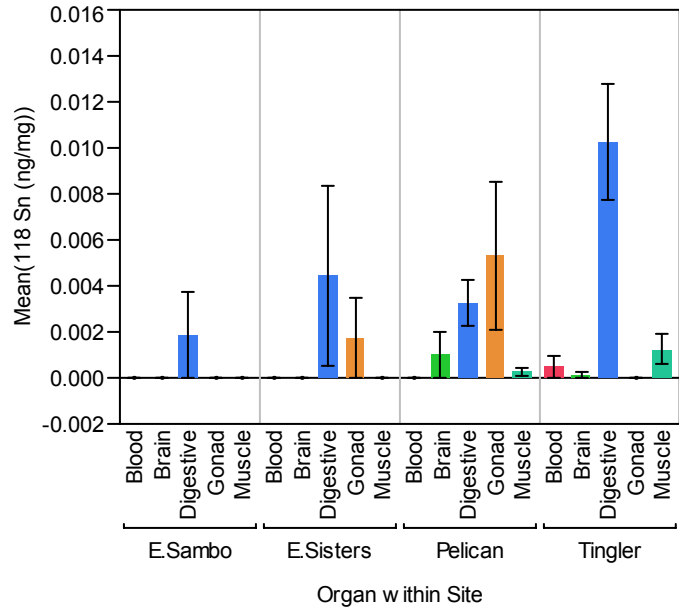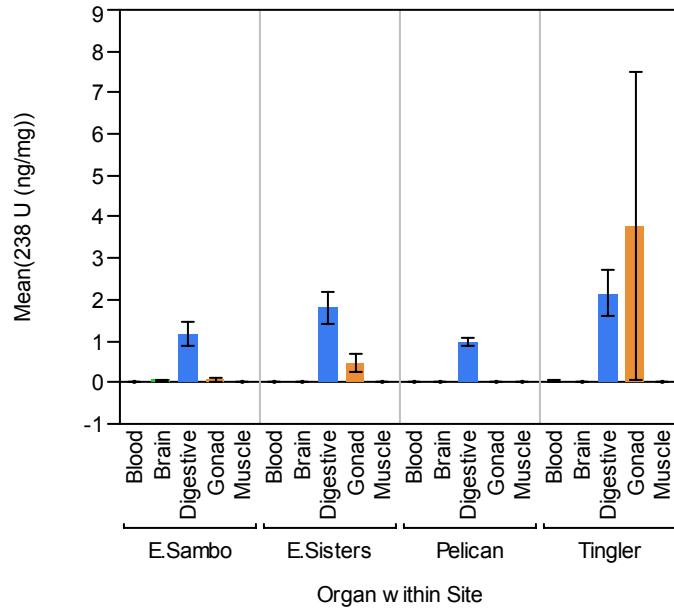
Two way Analysis of Variance
Model: Metal = Site Organ Site*Organ

1.   Nickel

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	12405.062	652.898	9.3821
Error	109	7585.302	69.590	**Prob > F**
C. Total	128	19990.364		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	326.024	1.5616	0.2029
Organ	4	4	10325.260	37.0932	<.0001
Site*Organ	12	12	1060.418	1.2698	0.2468

Interaction Profiles
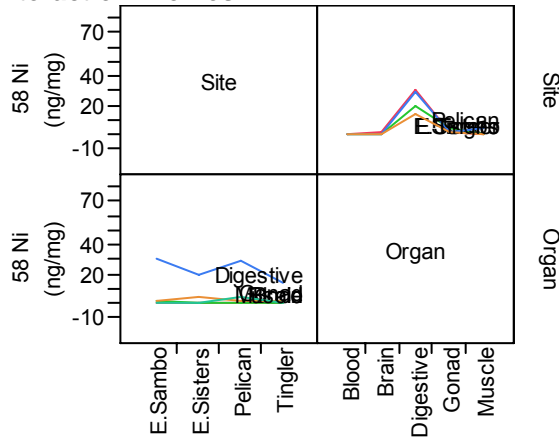
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
Pelican	A	7.2562417
E.Sambo	A	6.7387762
E.Sisters	A	4.8648033
Tingler	A	3.1795857

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Digestive	A		23.187659
Gonad		B	2.252795
Muscle		B	1.273839
Brain		B	0.680195
Blood		B	0.154771

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level					Least Sq Mean
E.Sambo,Digestive	A				30.556286
Pelican,Digestive	A				28.785500
E.Sisters,Digestive		B			19.278600
Tingler,Digestive		B	C		14.130250
Pelican,Muscle				D	4.603250
E.Sisters,Gonad			C	D	4.138250
Pelican,Gonad				D	2.259333
E.Sambo,Gonad				D	1.450167
E.Sambo,Brain				D	1.264571
Tingler,Gonad				D	1.163429
Pelican,Brain				D	0.564125
E.Sisters,Brain				D	0.467833
Tingler,Brain				D	0.424250
E.Sisters,Muscle				D	0.380000
E.Sambo,Blood				D	0.368000
Tingler,Blood				D	0.122750
Pelican,Blood				D	0.069000
E.Sisters,Blood				D	0.059333

Level		Least Sq Mean
Tingler,Muscle	D	0.057250
E.Sambo,Muscle	D	0.054857

Levels not connected by same letter are significantly different.

2.   Copper

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	30558.040	1608.32	8.3204
Error	109	21069.572	193.30	**Prob > F**
C. Total	128	51627.613		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	244.677	0.4219	0.7376
Organ	4	4	28531.686	36.9010	<.0001
Site*Organ	12	12	3254.190	1.4029	0.1754

Interaction Profiles
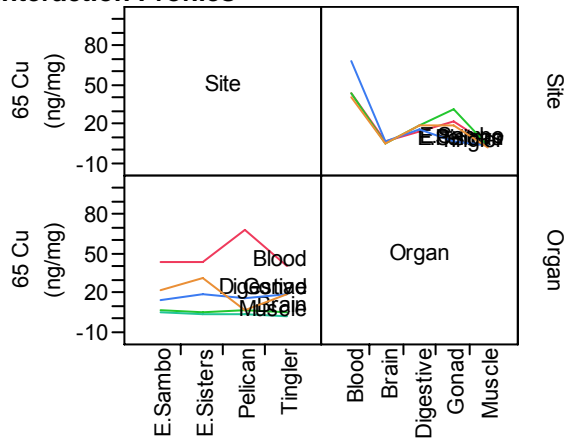
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
E.Sisters	A	20.375823
Pelican	A	20.049783
E.Sambo	A	18.372252
Tingler	A	16.813061

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=
0.050 t=
1.98197

Level				Least Sq Mean
Blood	A			48.418246
Gonad		B		19.426628
Digestive		B		17.429099
Brain			C	5.890234

Level		Least Sq Mean
Muscle	C	3.349443

Levels not connected by same letter are significantly different.

Site*Organ
LSMeans Differences Student's t
α=0.050 t=1.98197

Level							Least Sq Mean
Pelican,Blood	A						67.238667
E.Sisters,Blood		B					43.030833
E.Sambo,Blood		B					42.845857
Tingler,Blood		B					40.557625
E.Sisters,Gonad		B	C				30.634750
E.Sambo,Gonad			C	D			22.019833
E.Sisters,Digestive			C	D	E	F	G	19.591200
Tingler,Gonad			C	D	E	F	18.755429
Tingler,Digestive			C	D	E		18.393625
Pelican,Digestive			C	D	E	F	G	16.644000
E.Sambo,Digestive			C	D	E	F	G	15.087571
E.Sambo,Brain				D	E	F	G	7.211143
Pelican,Gonad				D	E	F	G	6.296500
Pelican,Brain					E	F	G	6.157250
E.Sisters,Brain					E	F	G	5.589167
E.Sambo,Muscle					E	F	G	4.696857
Tingler,Brain						F	G	4.603375
Pelican,Muscle							G	3.912500
E.Sisters,Muscle							G	3.033167
Tingler,Muscle					E	F	G	1.755250

Levels not connected by same letter are significantly different.

3.   Zinc

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	7362674	387509	9.2680
Error	109	4557460	41812	**Prob > F**
C. Total	128	11920134		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	689451.0	5.4965	0.0015
Organ	4	4	3837956.6	22.9479	<.0001
Site*Organ	12	12	2745366.3	5.4717	<.0001

Interaction Profiles

Site Effect
LSMeans Differences Student's t

α=
0.050 t=
1.98197
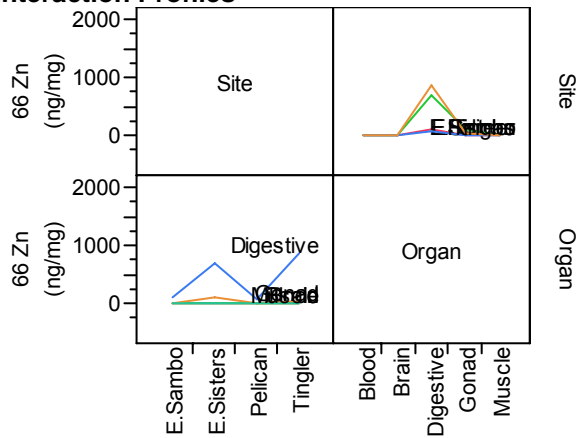
Level			Least Sq Mean
Tingler	A		183.22844
E.Sisters	A		167.88917
E.Sambo		B	27.85236
Pelican		B	23.67078

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t

α=
0.050 t=
1.98197

Level			Least Sq Mean
Digestive	A		440.65805
Gonad		B	48.65052
Brain		B	6.52341
Muscle		B	6.24155
Blood		B	1.22740

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t

α=
0.050 t=
1.98197

Level			Least Sq Mean
Tingler,Digestive	A		869.17350
E.Sisters,Digestive	A		701.76500
E.Sisters,Gonad		B	123.83600
E.Sambo,Digestive		B	106.40257
Pelican,Digestive		B	85.29112
Tingler,Gonad		B	32.79643
E.Sambo,Gonad		B	21.57350
Pelican,Gonad		B	16.39617
Pelican,Muscle		B	10.14012

Level		Least Sq Mean
Tingler,Brain	B	7.96525
E.Sisters,Brain	B	6.51617
E.Sisters,Muscle	B	5.93300
Pelican,Brain	B	5.84950
E.Sambo,Brain	B	5.76271
Tingler,Muscle	B	4.57150
E.Sambo,Muscle	B	4.32157
Tingler,Blood	B	1.63550
E.Sisters,Blood	B	1.39567
E.Sambo,Blood	B	1.20143
Pelican,Blood	B	0.67700

Levels not connected by same letter are significantly different.

4. Strontium

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	5595.987	294.526	3.4860
Error	109	9209.231	84.488	**Prob > F**
C. Total	128	14805.219		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	1271.1215	5.0150	0.0027
Organ	4	4	3870.0912	11.4516	<.0001
Site*Organ	12	12	696.1732	0.6867	0.7611

Interaction Profiles
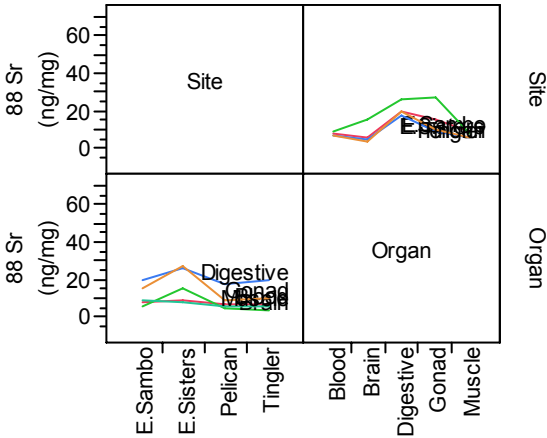
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
E.Sisters	A	17.182193
E.Sambo	B	11.749290
Tingler	B	9.042132
Pelican	B	8.708200

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level				Least Sq Mean
Digestive	A			20.875785
Gonad		B		15.205405
Brain			C	7.511699
Blood			C	7.453735
Muscle			C	7.305646

Levels not connected by same letter are significantly different.

Site*Organ Effect
SMeans Differences Student's t
α=0.050 t=1.98197

Level					Least Sq Mean
E.Sisters,Gonad	A				26.871500
E.Sisters,Digestive	A				26.410800
E.Sambo,Digestive	A				19.860714
Tingler,Digestive	A				19.812750
Pelican,Digestive	A	B			17.418875
E.Sambo,Gonad	A	B	C		15.769167
E.Sisters,Brain	A	B	C		15.595833
Tingler,Gonad		B	C	D	9.655286
E.Sambo,Muscle		B	C	D	8.970000
E.Sisters,Blood		B	C	D	8.745000
Pelican,Gonad		B	C	D	8.525667
E.Sisters,Muscle		B	C	D	8.287833
E.Sambo,Blood		B	C	D	8.037857
Pelican,Blood		B	C	D	6.577333
Tingler,Blood			C	D	6.454750
Pelican,Muscle			C	D	6.261750
E.Sambo,Brain			C	D	6.108714
Tingler,Muscle			C	D	5.703000
Pelican,Brain				D	4.757375
Tingler,Brain				D	3.584875

Levels not connected by same letter are significantly different.

5.   Silver

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	47.156282	2.48191	6.5287
Error	109	41.436498	0.38015	**Prob > F**
C. Total	128	88.592780		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	11.055690	9.6941	<.0001
Organ	4	4	11.853957	7.7956	<.0001
Site*Organ	12	12	19.205440	4.2100	<.0001

Interaction Profiles
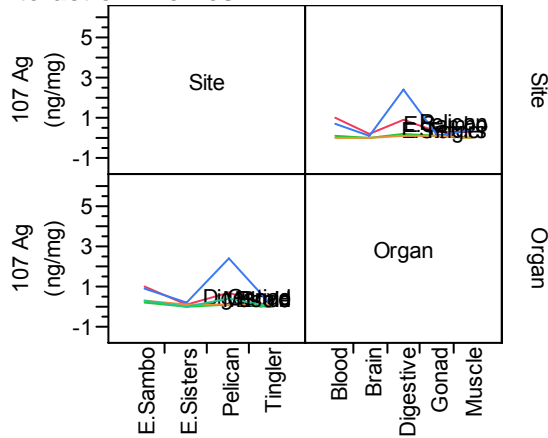
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Pelican	A		0.77589560
E.Sambo	A		0.58662857
E.Sisters		B	0.11811000
Tingler		B	0.05996071

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=
0.050 t=
1.98197

Level				Least Sq Mean
Digestive	A			0.92288304
Blood		B		0.49431101
Muscle		B	C	0.21271280
Gonad		B	C	0.19503914
Brain			C	0.10079762

Levels not connected by same letter are significantly different.

Site*Organ
LSMeans Differences Student's t
α=
0.050 t=
1.98197

Level					Least Sq Mean
Pelican,Digestive	A				2.4663750
E.Sambo,Blood		B			1.0722857
E.Sambo,Digestive		B	C		0.8938571
Pelican,Blood		B	C	D	0.7510000
Pelican,Muscle			C	D	0.4233750
E.Sambo,Gonad			C	D	0.3880000
E.Sambo,Muscle			C	D	0.3791429
E.Sisters,Digestive			C	D	0.2238000
E.Sambo,Brain				D	0.1998571
E.Sisters,Gonad			C	D	0.1402500
Pelican,Gonad				D	0.1364780
Tingler,Gonad				D	0.1154286
Tingler,Digestive				D	0.1075000

Level		Least Sq Mean
Pelican,Brain	D	0.1022500
E.Sisters,Blood	D	0.0978333
E.Sisters,Brain	D	0.0893333
Tingler,Blood	D	0.0561250
E.Sisters,Muscle	D	0.0393333
Tingler,Brain	D	0.0117500
Tingler,Muscle	D	0.0090000

Levels not connected by same letter are significantly different.

6.   Cadmium

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	968.8819	50.9938	7.7283
Error	109	719.2166	6.5983	**Prob > F**
C. Total	128	1688.0985		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	15.63667	0.7899	0.5020
Organ	4	4	865.15583	32.7794	<.0001
Site*Organ	12	12	26.45514	0.3341	0.9813

Interaction Profiles
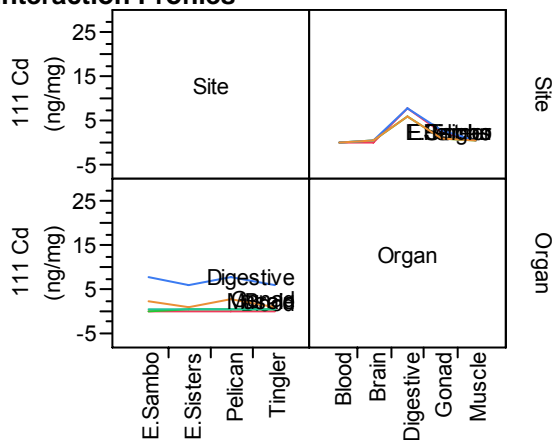
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
Pelican	A	2.3438833
E.Sambo	A	2.1767286
E.Sisters	A	1.5746467
Tingler	A	1.5225036

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
Digestive	A	6.8824750
Gonad	B	1.8722440

Level			Least Sq Mean
Muscle	B	C	0.4601205
Brain		C	0.2575818
Blood		C	0.0497813

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level					Least Sq Mean
Pelican,Digestive	A				7.9846250
E.Sambo,Digestive	A				7.6890000
E.Sisters,Digestive	A	B			5.9354000
Tingler,Digestive	A				5.9208750
Pelican,Gonad		B	C		2.9533333
E.Sambo,Gonad			C	D	2.4775000
E.Sisters,Gonad			C	D	1.1330000
Tingler,Gonad			C	D	0.9251429
Pelican,Muscle			C	D	0.5071250
E.Sambo,Muscle			C	D	0.4858571
E.Sisters,Muscle			C	D	0.4830000
Tingler,Muscle			C	D	0.3645000
Tingler,Brain			C	D	0.3383750
E.Sisters,Brain			C	D	0.2866667
Pelican,Brain			C	D	0.2340000
E.Sambo,Brain			C	D	0.1712857
Tingler,Blood				D	0.0636250
E.Sambo,Blood				D	0.0600000
Pelican,Blood			C	D	0.0403333
E.Sisters,Blood			C	D	0.0351667

Levels not connected by same letter are significantly different.

7. **Tin**

Whole Model
Analysis of Variance
Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	0.00092942	0.000049	4.1197
Error	109	0.00129427	0.000012	**Prob > F**
C. Total	128	0.00222369		<.0001

Effect Tests
Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	0.00007911	2.2208	0.0898
Organ	4	4	0.00043164	9.0879	<.0001
Site*Organ	12	12	0.00036023	2.5281	0.0056

Interaction Profiles
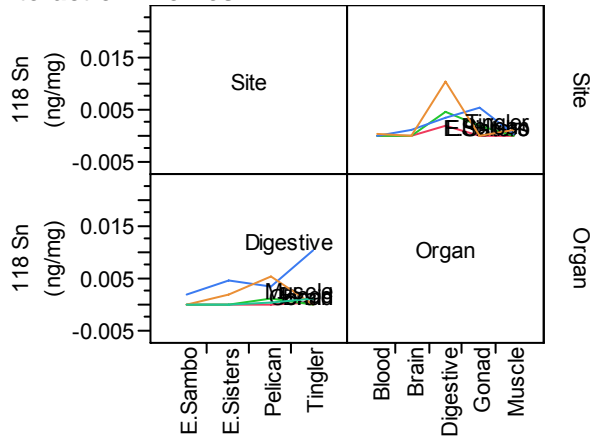
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Tingler	A		0.00242500
Pelican	A	B	0.00196667
E.Sisters	A	B	0.00123000
E.Sambo		B	0.00037143

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
Digestive	A	0.00493929
Gonad	B	0.00177083
Muscle	B	0.00037500
Brain	B	0.00028125
Blood	B	0.00012500

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level					Least Sq Mean
Tingler,Digestive	A				0.0102500
Pelican,Gonad		B			0.0053333
E.Sisters,Digestive		B	C		0.0044000
Pelican,Digestive		B	C	D	0.0032500
E.Sambo,Digestive		B	C	D	0.0018571
E.Sisters,Gonad		B	C	D	0.0017500
Tingler,Muscle		B	C	D	0.0012500
Pelican,Brain			C	D	0.0010000
Tingler,Blood				D	0.0005000
Pelican,Muscle				D	0.0002500
Tingler,Brain				D	0.0001250
E.Sisters,Muscle				D	1.5721e-18
E.Sisters,Blood				D	-1.084e-19
E.Sisters,Brain				D	-1.084e-19
E.Sambo,Muscle				D	-4.337e-19

Level			Least Sq Mean
Tingler,Gonad		D	-4.337e-19
E.Sambo,Blood		D	-1.301e-18
E.Sambo,Brain		D	-1.518e-18
E.Sambo,Gonad		D	-1.952e-18
Pelican,Blood	C	D	-4.77e-18

Levels not connected by same letter are significantly different.

8. Mercury

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	0.8076197	0.042506	6.0788
Error	109	0.7621905	0.006993	**Prob > F**
C. Total	128	1.5698102		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	0.18679918	8.9046	<.0001
Organ	4	4	0.19018562	6.7996	<.0001
Site*Organ	12	12	0.32736639	3.9014	<.0001

Interaction Profiles
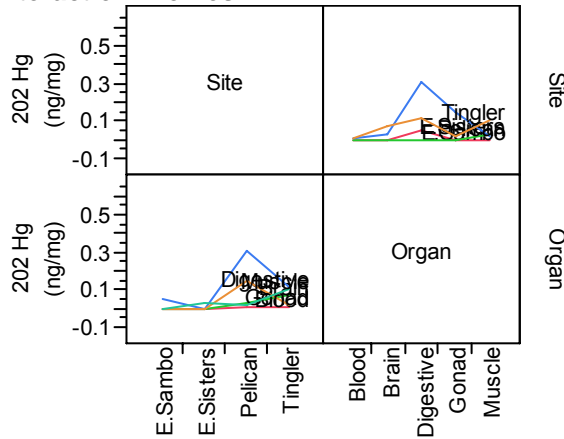
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Pelican	A		0.10333333
Tingler	A		0.06111429
E.Sambo		B	0.00942857
E.Sisters		B	0.00686667

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Digestive	A		0.11728571
Gonad		B	0.04130952
Muscle		B	0.04033333
Brain		B	0.02328125

Level		Least Sq Mean
Blood	B	0.00371875

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level					Least Sq Mean
Pelican,Digestive	A				0.3108750
Pelican,Gonad		B			0.1486667
Tingler,Digestive		B	C		0.1111250
Tingler,Muscle		B	C	D	0.1037500
Tingler,Brain		B	C	D	0.0682500
E.Sambo,Digestive			C	D	0.0471429
E.Sisters,Muscle			C	D	0.0343333
Pelican,Brain				D	0.0248750
Pelican,Muscle				D	0.0232500
Tingler,Gonad				D	0.0165714
Pelican,Blood			C	D	0.0090000
Tingler,Blood				D	0.0058750
E.Sisters,Blood				D	6.245e-17
E.Sisters,Brain				D	3.1225e-17
E.Sisters,Gonad				D	2.2118e-17
E.Sambo,Blood				D	2.0817e-17
E.Sambo,Gonad				D	1.9082e-17
E.Sambo,Muscle				D	-1.041e-17
E.Sambo,Brain				D	-2.429e-17
E.Sisters,Digestive				D	-1.249e-16

Levels not connected by same letter are significantly different.

9.   Uranium

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	19	130.40473	6.86341	1.2322
Error	109	607.15725	5.57025	**Prob > F**
C. Total	128	737.56198		0.2458

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Site	3	3	20.229445	1.2106	0.3094
Organ	4	4	52.238509	2.3445	0.0592
Site*Organ	12	12	49.125663	0.7349	0.7146

Interaction Profiles
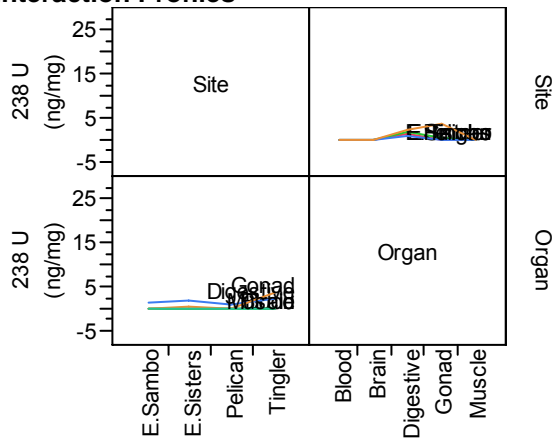
Site Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level		Least Sq Mean
Tingler	A	1.1978714
E.Sisters	A	0.4568926
E.Sambo	A	0.2544778
Pelican	A	0.2055750

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Digestive	A		1.5179574
Gonad	A	B	1.0799465
Brain		B	0.0266031
Blood		B	0.0176050
Muscle		B	0.0014090

Levels not connected by same letter are significantly different.

Site*Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.98197

Level			Least Sq Mean
Tingler,Gonad	A		3.773857
Tingler,Digestive	A	B	2.156500
E.Sisters,Digestive	A	B	1.786208
E.Sambo,Digestive		B	1.153121
Pelican,Digestive		B	0.976000
E.Sisters,Gonad		B	0.465921
E.Sambo,Gonad		B	0.061341
E.Sambo,Brain		B	0.047696
Tingler,Blood		B	0.037125
Pelican,Brain		B	0.024625
Pelican,Gonad		B	0.018667
Tingler,Brain		B	0.017625

Level		Least Sq Mean
E.Sisters,Brain	B	0.016467
E.Sisters,Blood	B	0.015730
E.Sambo,Blood	B	0.010231
Pelican,Blood	B	0.007333
Tingler,Muscle	B	0.004250
Pelican,Muscle	B	0.001250
E.Sisters,Muscle	B	0.000136
E.Sambo,Muscle	B	-1.11e-16

Levels not connected by same letter are significantly different.

III.   Analysis considering proximity to shore

Initial one-way ANOVA analysis of metal burden as a function of proximity to shore indicated that zinc and silver has significant differences between locations.

Zinc
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Inshore/Offshore	1	778557	778557	8.8746	0.0035
Error	127	11141577	87729		
C. Total	128	11920134			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Inshore	62	183.311	37.616	108.9	257.75
Offshore	67	27.820	36.185	-43.8	99.42

Std Error uses a pooled estimate of error variance

Silver
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio	Prob > F
Inshore/Offshore	1	12.318500	12.3185	20.5108	<.0001
Error	127	76.274280	0.6006		
C. Total	128	88.592780			

Means for Oneway Anova

Level	Number	Mean	Std Error	Lower 95%	Upper 95%
Inshore	62	0.085258	0.09842	-0.1095	0.28002
Offshore	67	0.703759	0.09468	0.5164	0.89111

Std Error uses a pooled estimate of error variance

To followup, a multiple ANOVA was performed with organ and location (inshore/offshore) as the factors for Zinc and Silver

Zinc
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	7253461	805940	20.5514
Error	119	4666673	39216	**Prob > F**

Source	DF	Sum of Squares	Mean Square	F Ratio
C. Total	128	11920134		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Inshore/Offshore	1	1	720839.7	18.3814	<.0001
Organ	4	4	4167448.5	26.5674	<.0001
Inshore/Offshore*Organ	4	4	2664624.7	16.9870	<.0001

Interaction Profiles
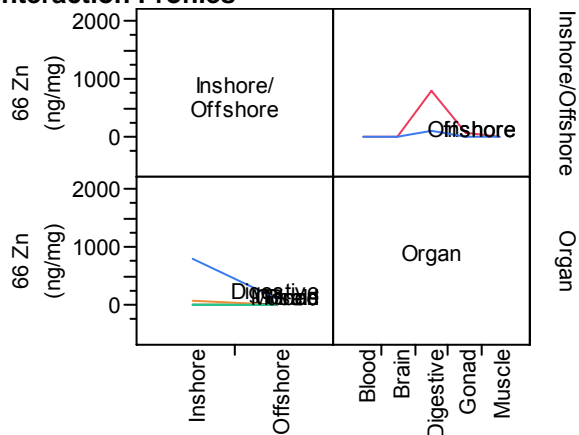
Shore
LSMeans Differences Student's t
α=0.050 t=1.9801

Level			Least Sq Mean
Inshore	A		176.99053
Offshore		B	25.68117

Levels not connected by same letter are significantly different.

Organ
LSMeans Differences Student's t
α=0.050 t=1.9801

Level			Least Sq Mean
Digestive	A		449.96437
Gonad		B	42.44328
Brain		B	6.57661
Muscle		B	6.40660
Blood		B	1.28841

Levels not connected by same letter are significantly different.

Shore*Organ
LSMeans Differences Student's t
α=0.050 t=1.9801

Level			Least Sq Mean
Inshore,Digestive	A		804.78562
Offshore,Digestive		B	95.14313
Inshore,Gonad		B	65.90173
Offshore,Gonad		B	18.98483
Offshore,Muscle		B	7.42480
Inshore,Brain		B	7.34421
Offshore,Brain		B	5.80900
Inshore,Muscle		B	5.38840
Inshore,Blood		B	1.53271
Offshore,Blood		B	1.04410

Levels not connected by same letter are significantly different.

Silver

Whole Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	9	37.403020	4.15589	9.6611
Error	119	51.189761	0.43017	**Prob > F**
C. Total	128	88.592780		<.0001

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Inshore/Offshore	1	1	12.089818	28.1050	<.0001
Organ	4	4	13.031146	7.5733	<.0001
Inshore/Offshore*Organ	4	4	10.512132	6.1093	0.0002

Interaction Profiles
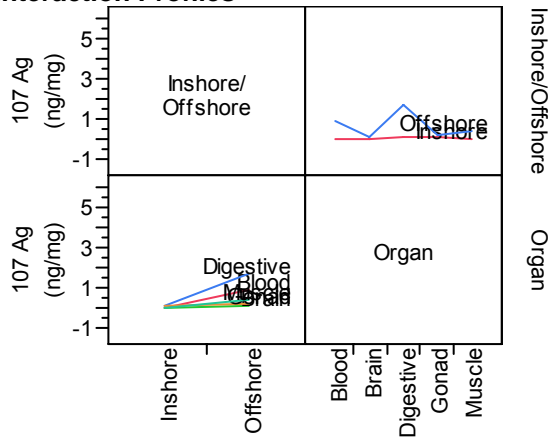
Shore Effect
LSMeans Differences Student's t
α=0.050 t=1.9801

Level		Least Sq Mean
Offshore	A	0.70424113
Inshore	B	0.08457706

Levels not connected by same letter are significantly different.

Organ Effect
LSMeans Differences Student's t
α=0.050 t=1.9801

Level			Least Sq Mean
Digestive	A		0.94238205
Blood	B		0.52495000
Muscle	B	C	0.21496667
Gonad	B	C	0.19334677
Brain		C	0.09640000

Levels not connected by same letter are significantly different.

Shore*Organ
LSMeans Differences Student's t
α=0.050 t=1.9801

Level			Least Sq Mean
Offshore,Digestive	A		1.7325333
Offshore,Blood		B	0.9759000
Offshore,Muscle		C	0.4027333
Offshore,Gonad		C	0.2622390
Inshore,Digestive		C	0.1522308
Offshore,Brain		C	0.1478000
Inshore,Gonad		C	0.1244545
Inshore,Blood		C	0.0740000
Inshore,Brain		C	0.0450000
Inshore,Muscle		C	0.0272000

Levels not connected by same letter are significantly different.
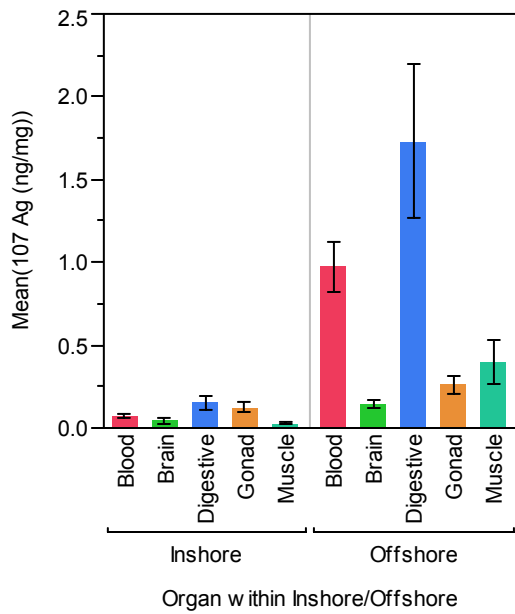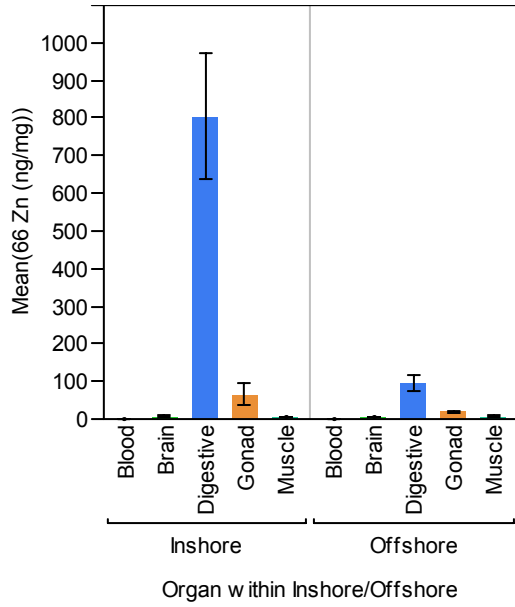
Appendix II –Tables of Chemistry of Water Samples from POCIS and SPMD collectors. SPMD concentrations were converted using the U.S. Gelological Survey methods methods found at the following URL:
http://www.cerc.usgs.gov/research/spmd.htm

Results in Site Waters, pg/L

Analyte	Offshore	Nearshore
alpha-BHC	ND	ND
Hexachlorobenzene	ND	ND
beta-BHC	ND	ND
gamma-BHC	ND	ND
delta-BHC	ND	ND
Heptachlor	ND	ND
Aldrin	ND	ND
Heptachlor Epoxide	<5.32	ND
Oxychlordane	ND	ND
trans-Chlordane	ND	ND
o,p-DDE	ND	ND
Endosulfan I	ND	ND
cis-Chlordane	0.27	0.11
trans-Nonachlor	ND	ND
p,p-DDE	ND	ND
Dieldrin	ND	ND
o,p-DDD	ND	ND
Endrin	ND	ND
Endosulfan II	ND	ND
p,p-DDD	ND	5.02
o,p-DDT	ND	ND
cis,-Nonachlor	<1.93	<1.28
Endrin Aldehyde	ND	ND
Endosulfan Sulfate	ND	ND
p,p-DDT	ND	ND
Endrin Ketone	ND	ND
Methoxychlor	ND	ND
Mirex	ND	ND
Kepone	ND	ND
Toxaphene	ND	ND
PAH		
Naphthalene	ND	ND
Acenaphthylene	ND	ND
Acenaphthene	ND	ND
Fluorene	ND	ND

Phenanthrene	ND	ND
Anthracene	ND	ND
Fluoranthene	ND	ND
Pyrene	ND	ND
Chrysene	2.52	3.88
Benz[a]anthracene	3.21	12.68
Benzo[b]fluoranthene	ND	15.13
Benzo[k]fluoranthene	ND	6.24
Benzo[a]pyrene	ND	6.11
Indeno[1,2,3-cd]pyrene	ND	7.40
Dibenz[a,h]anthracene	ND	ND
Benzo[g,h,i]perylene	ND	ND
Total PCBs	ND	ND

ND, analyzed for but not detected (below limit of detection)
BQL, below limit of quantitation (estimated values italicized)

Appendix III - Immunohistochemistry of ELH and APGWamide

All slides were photographed using FITC = Fluorescein Isothiocyanate Microscopy.
Designations for all photographs follow the identification scheme:

NF1 APGW 2

Collection
site

Sex

Sample
number
from site

Antibody
used to
stain slide

Photograph # from
that particular slide
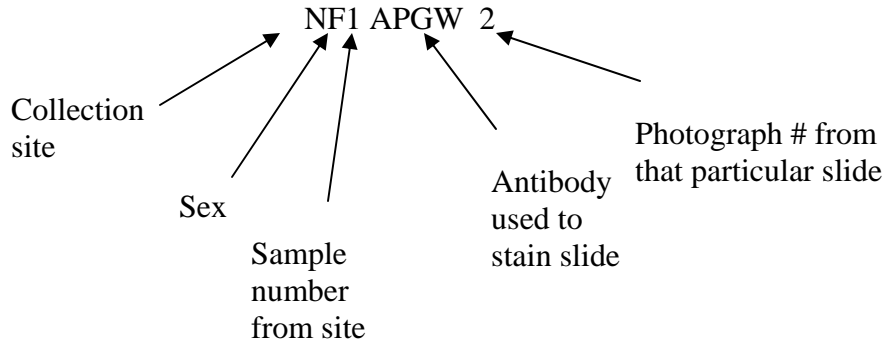
N= Nearshore
O= Offshore
F= Female
M= Male
APGW= Anti-APGWamide staining
ELH= Anti-ELH staining (Egg Laying Hormone)

Anti-APGWamide staining
All exposures at 10X (unless noted) using FITC

Date: 3-14-2008
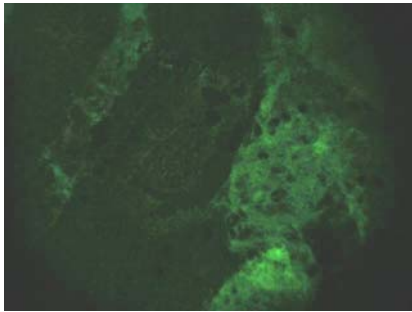
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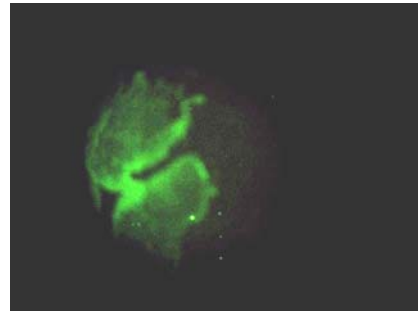
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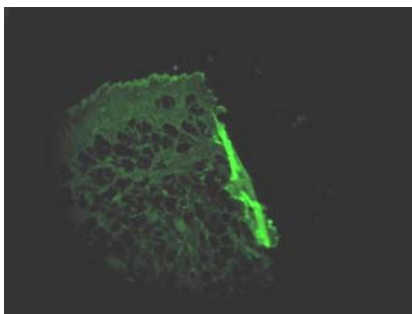
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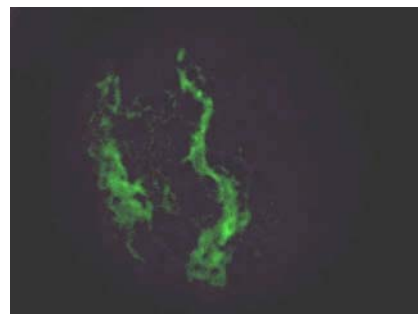
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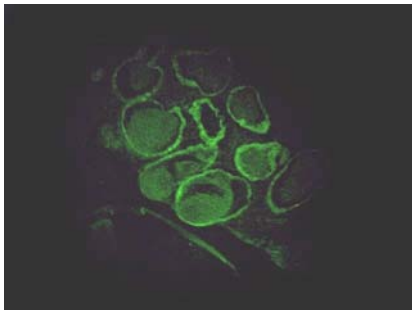
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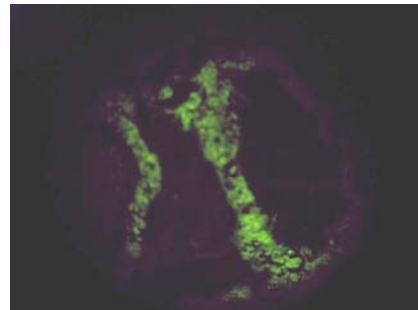
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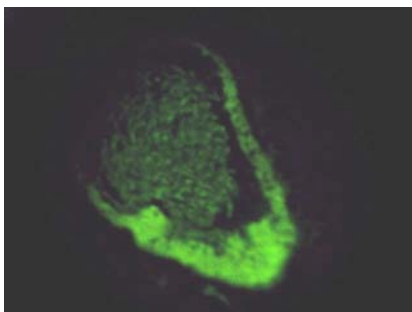
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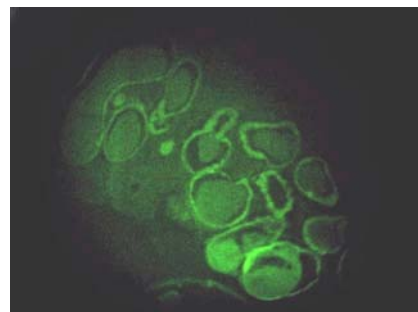
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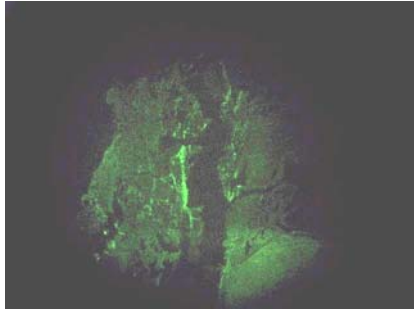
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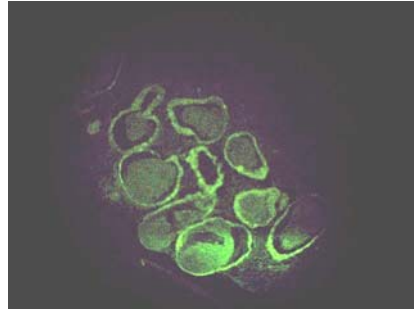
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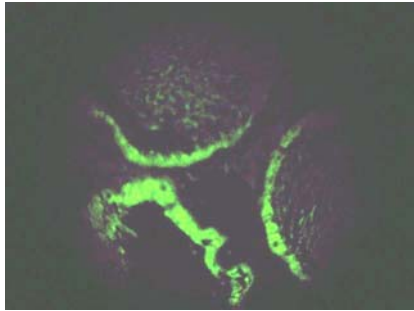
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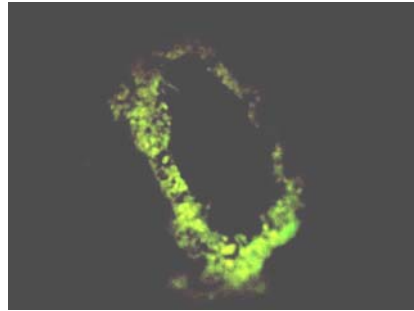
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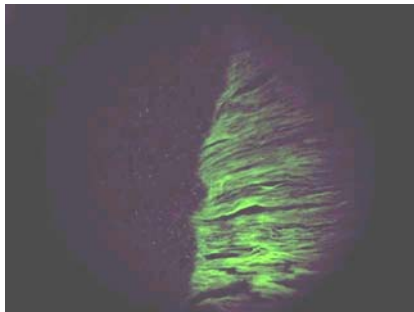
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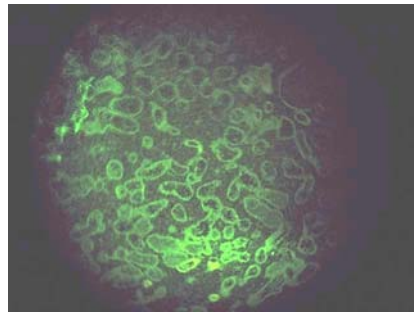
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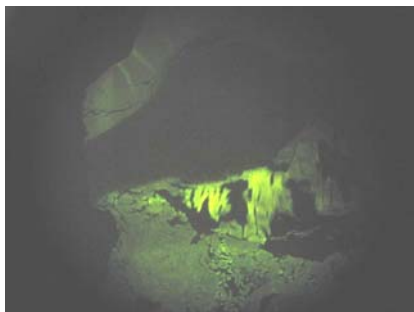
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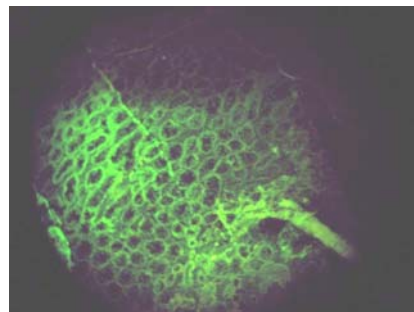
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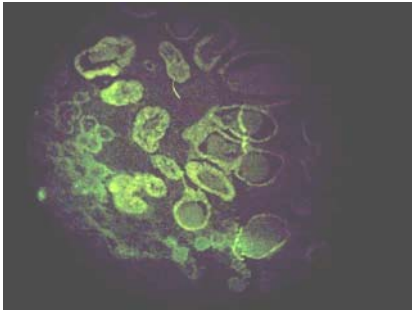
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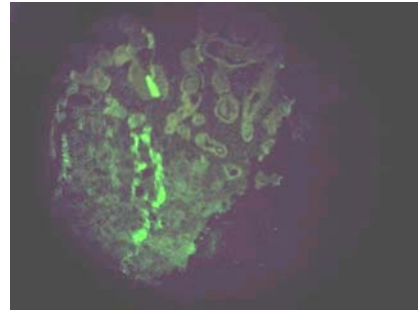
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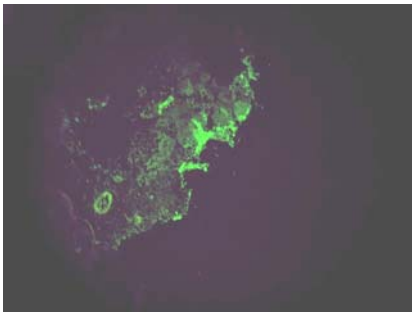
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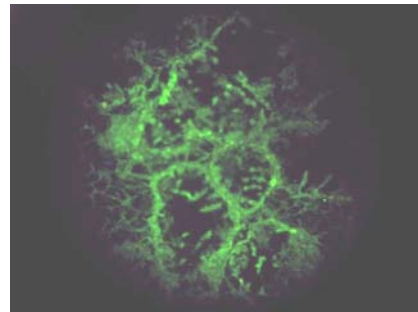
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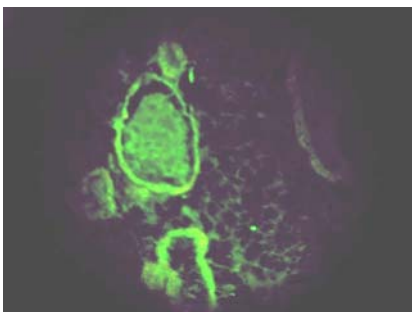
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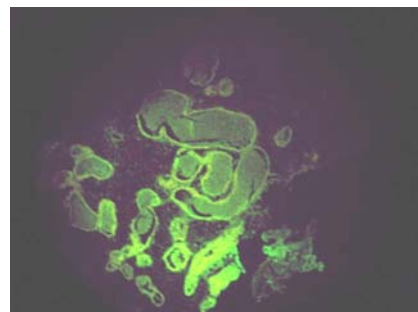
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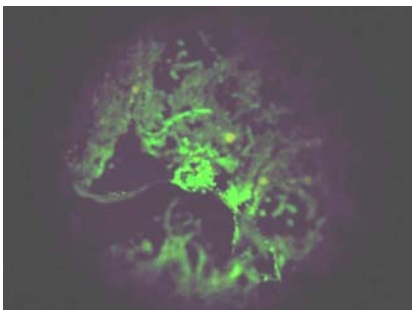
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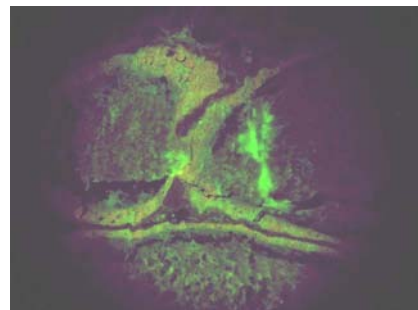
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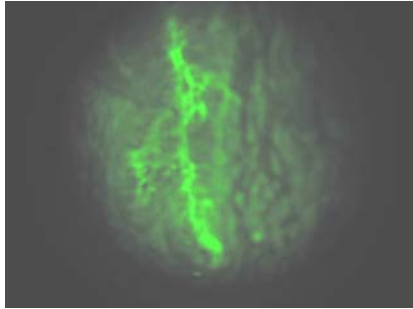
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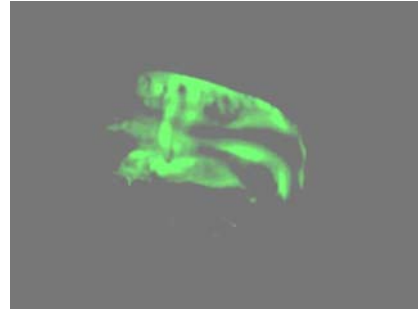
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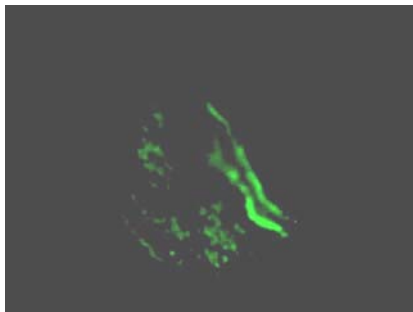
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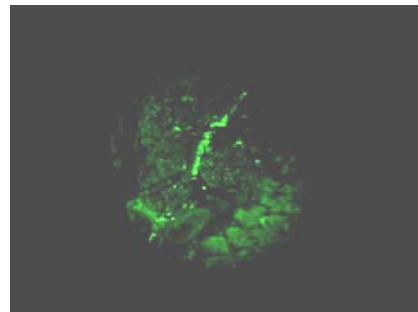
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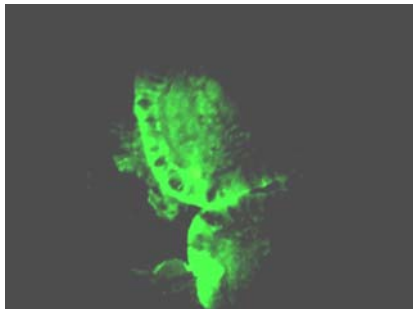
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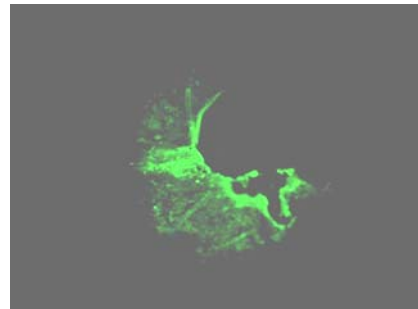
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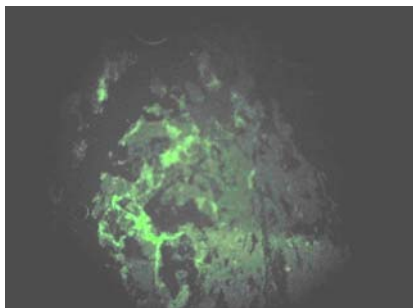
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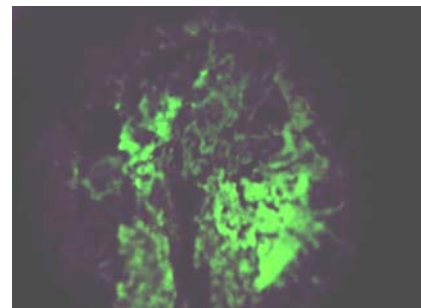
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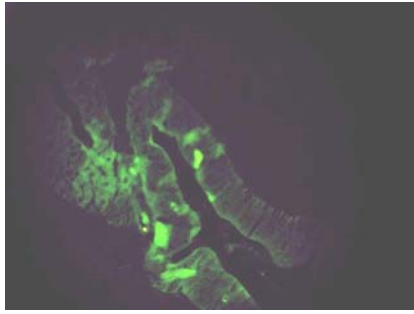
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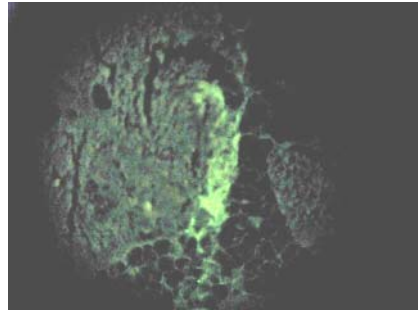
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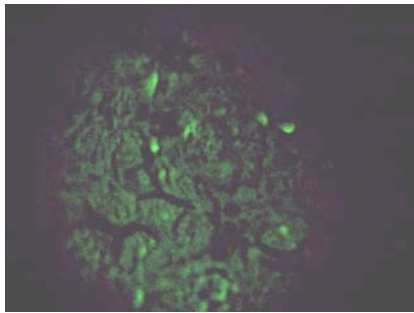
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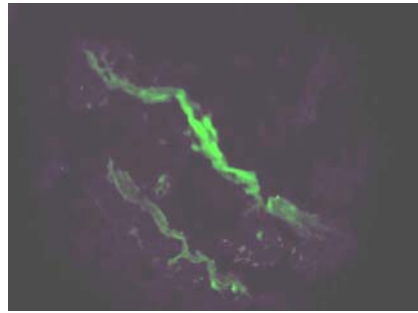
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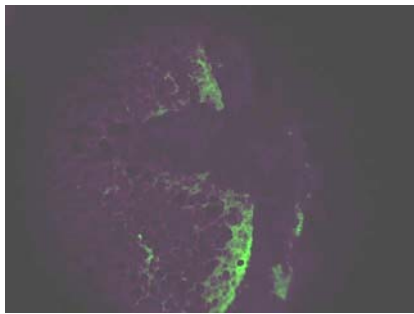
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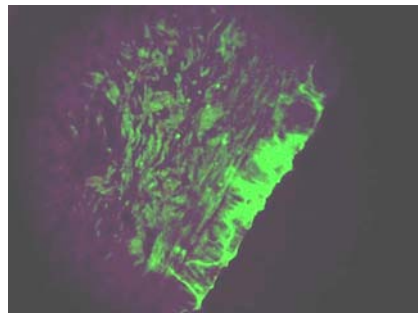
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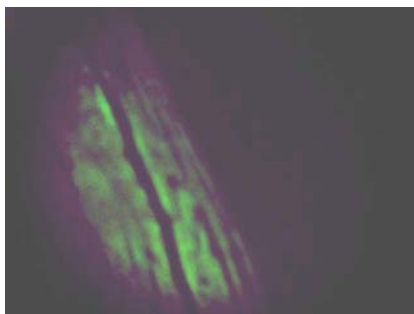
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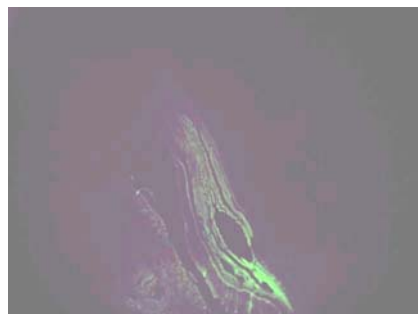
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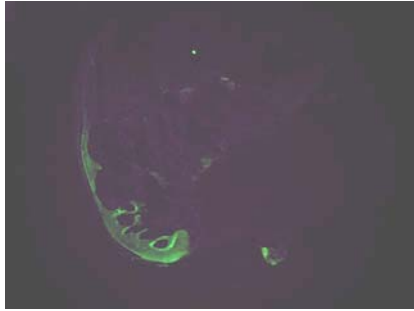
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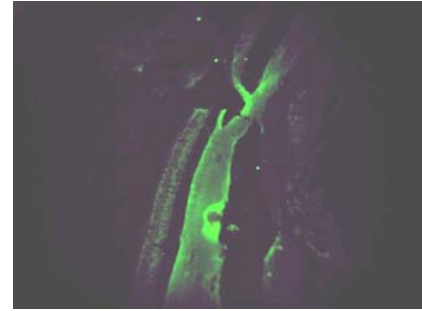
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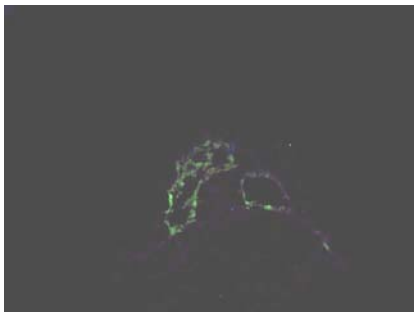
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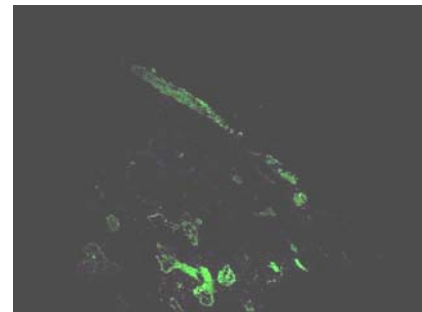
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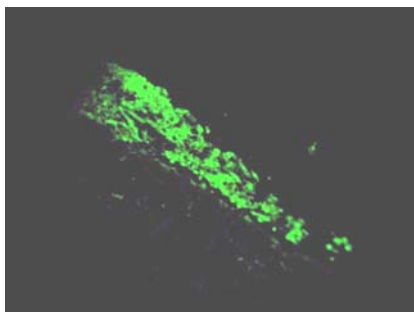
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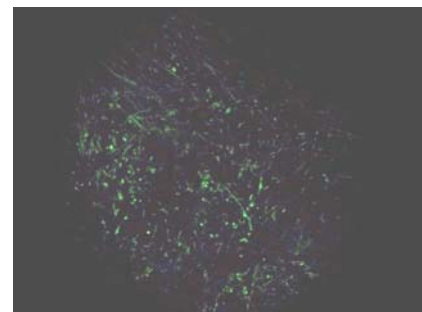
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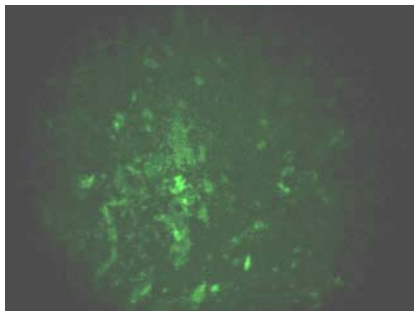
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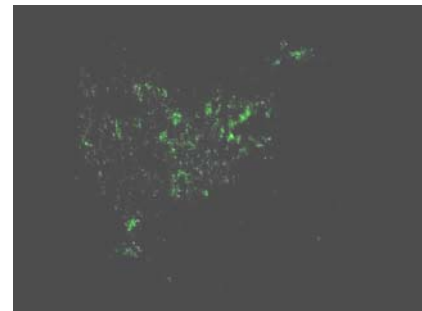
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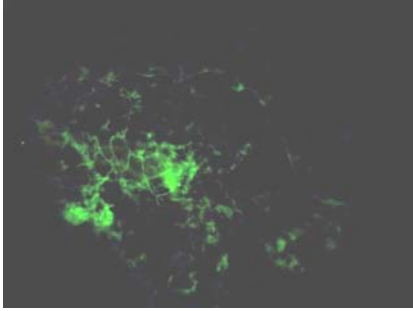
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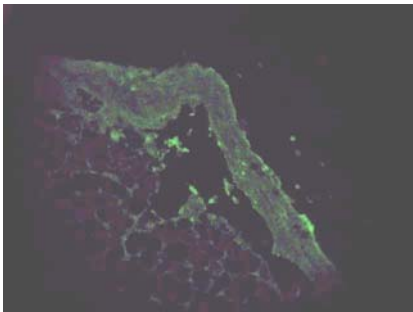
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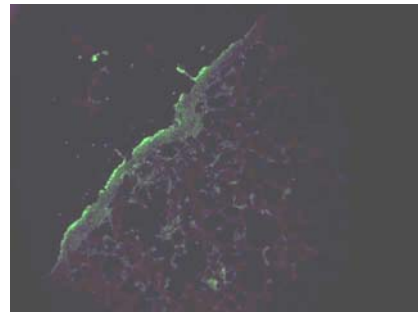
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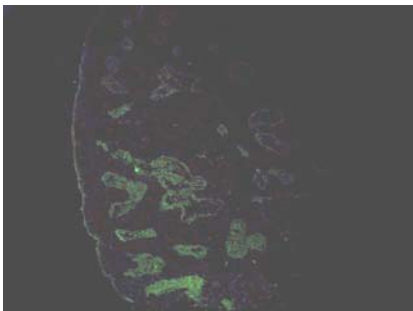
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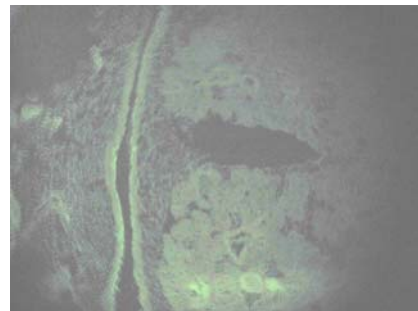
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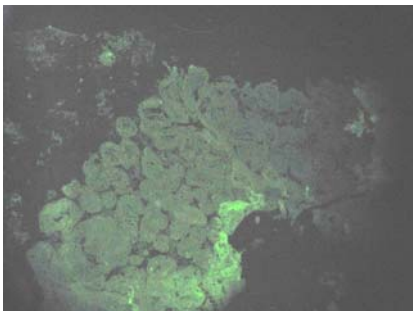
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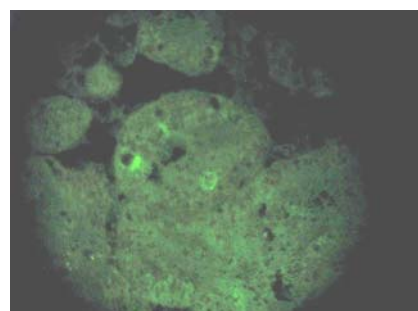
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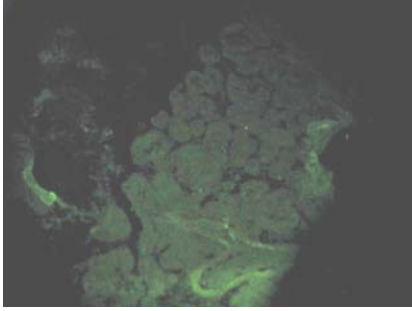
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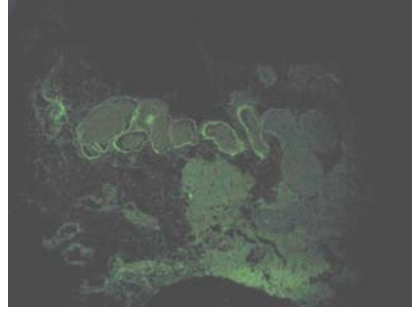
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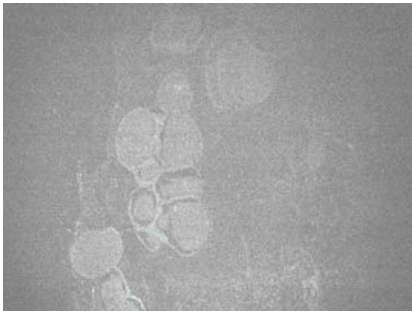
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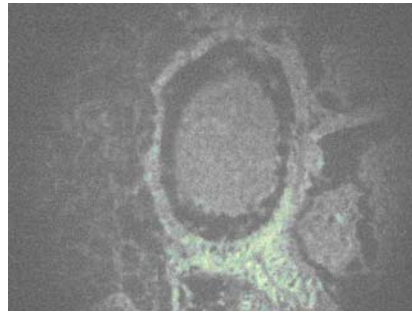
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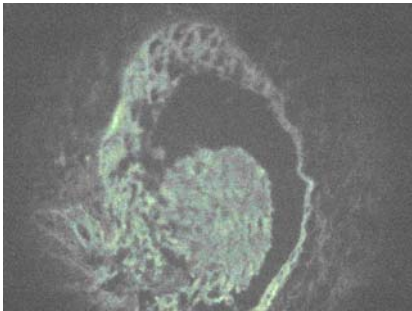
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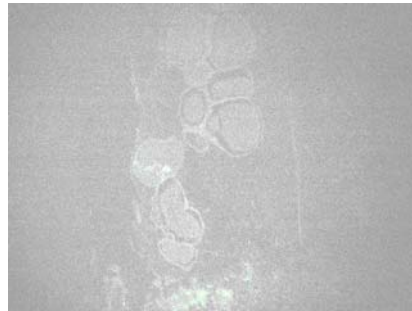
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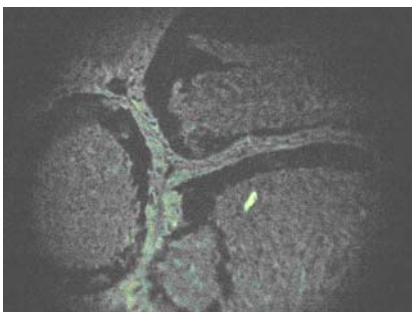
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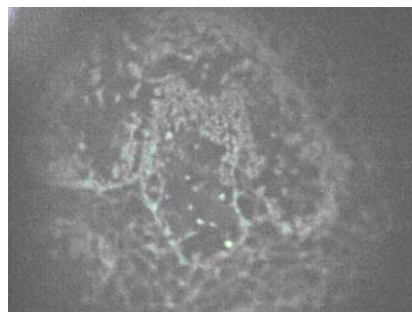
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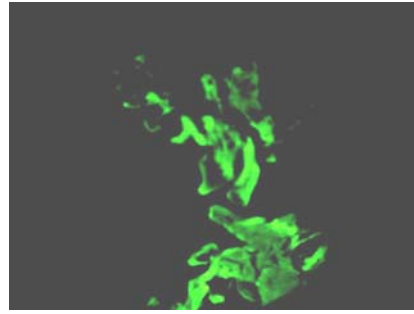
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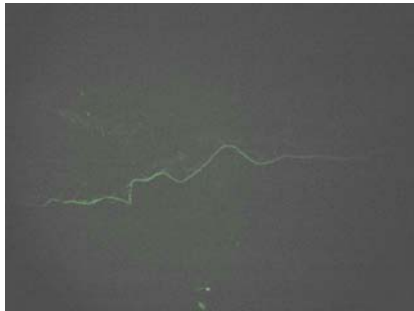
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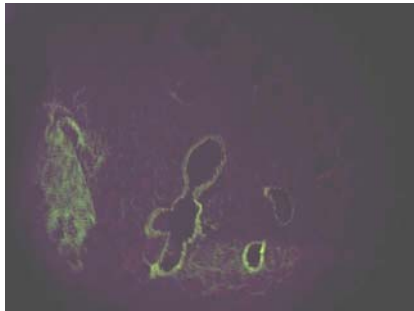
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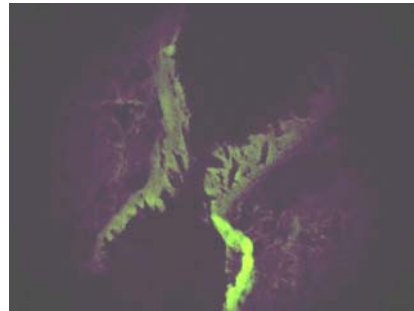
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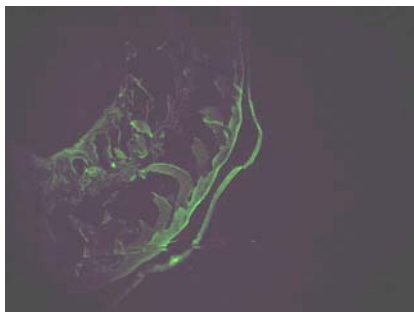
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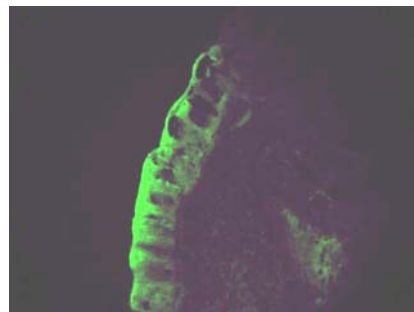
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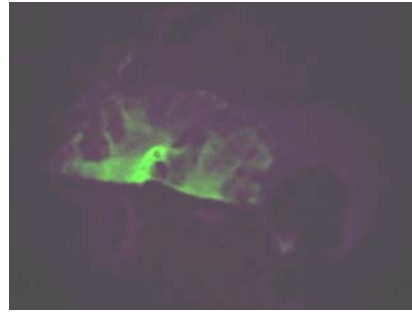
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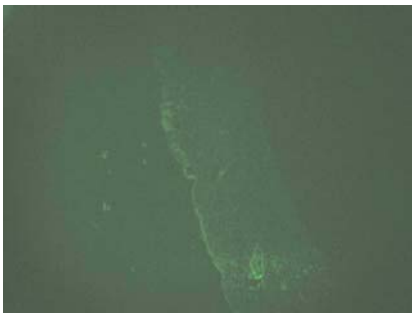
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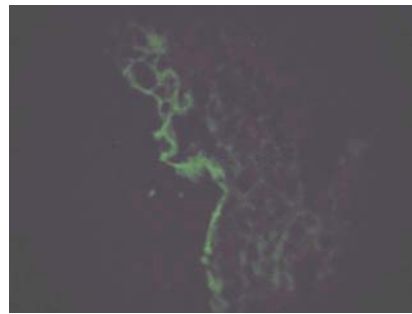
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Anti-ELH staining
All exposures at 10X (unless noted) using FITC
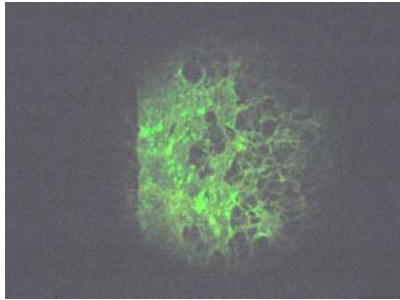
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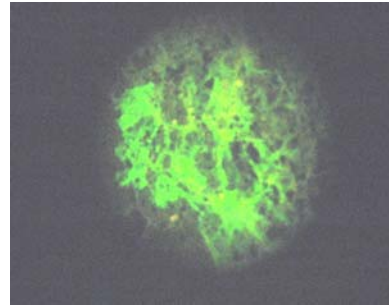
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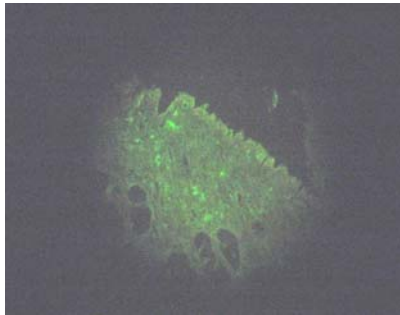
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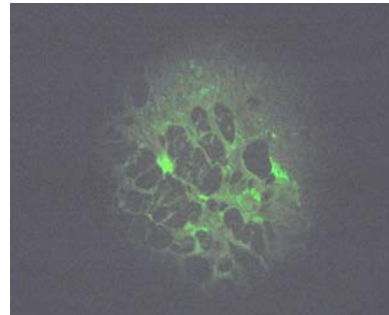
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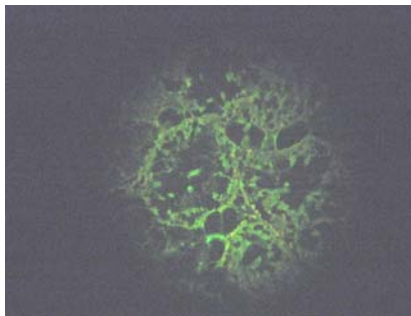
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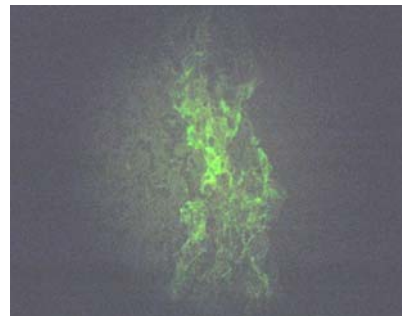
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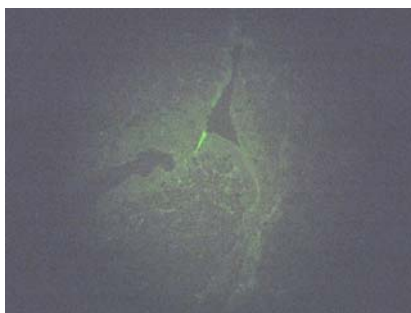
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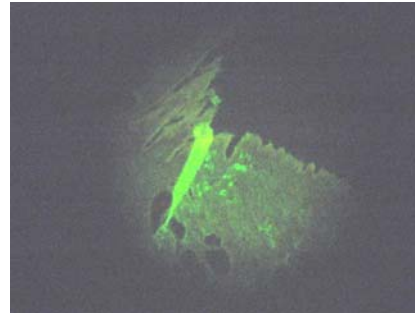
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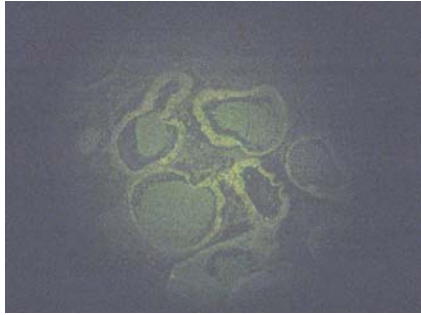
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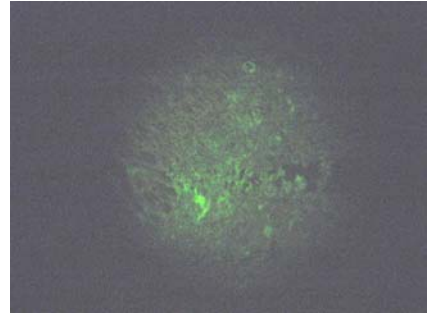
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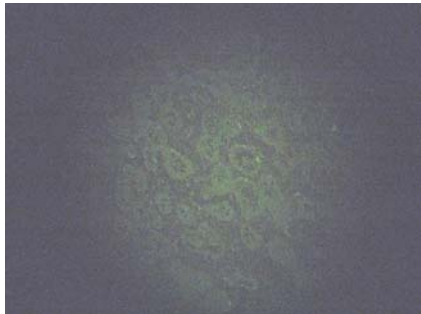
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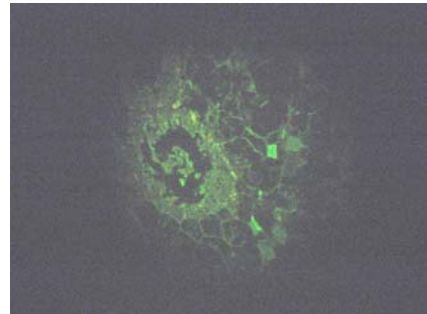
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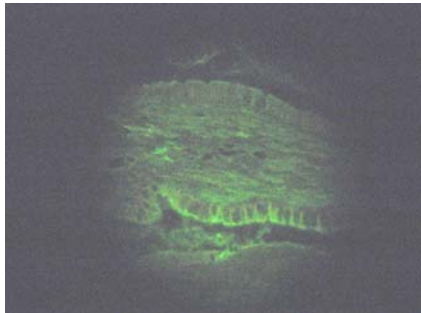
OM2 ELH 13

OM2 ELH 15 (20X)
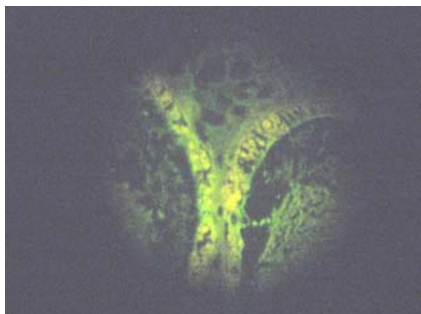
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OM3 ELH 1 (20X)
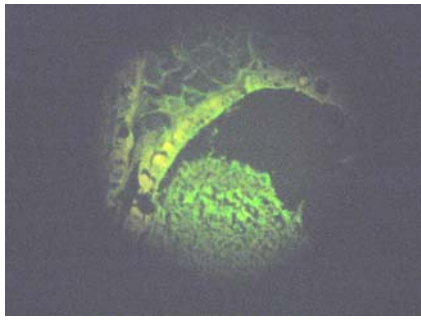
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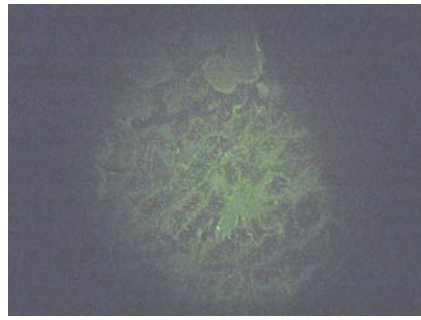
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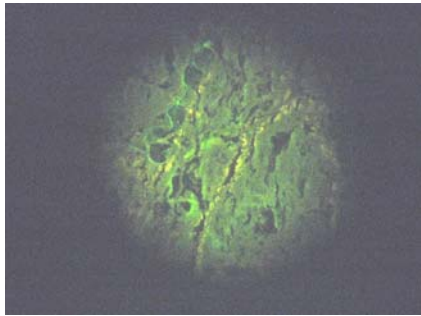
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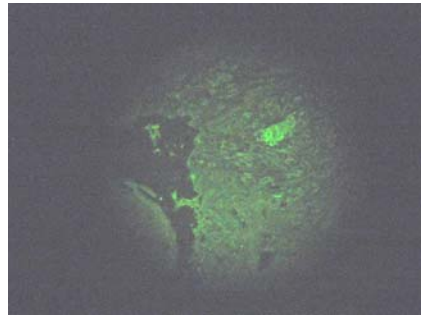
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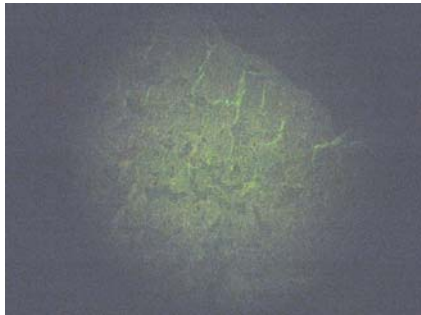
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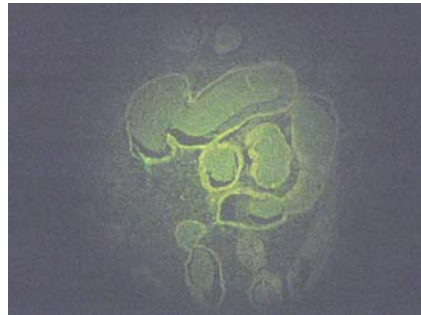
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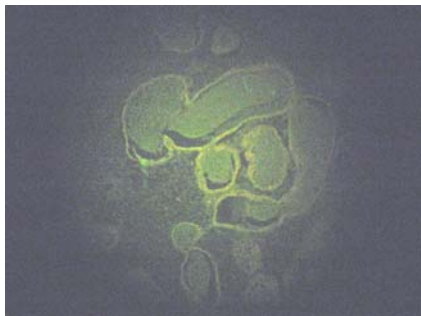
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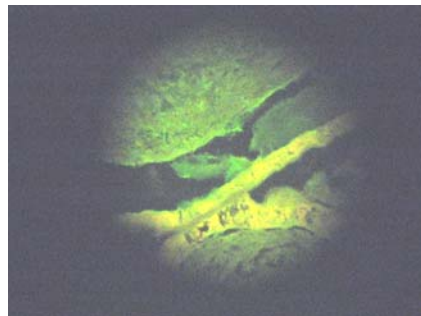
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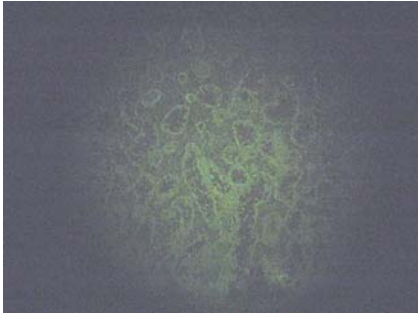
OM4 ELH 6

OM4 ELH 14
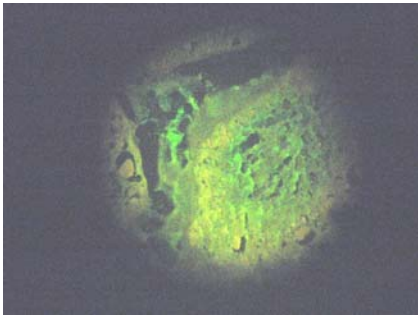
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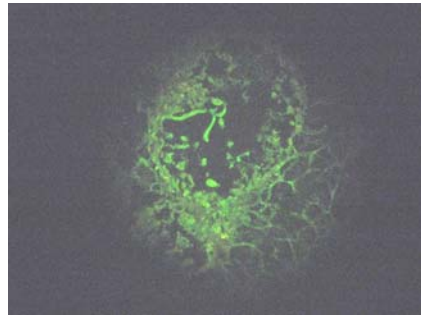
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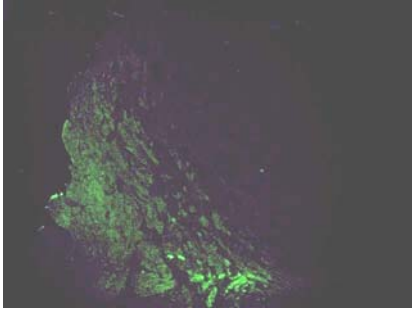
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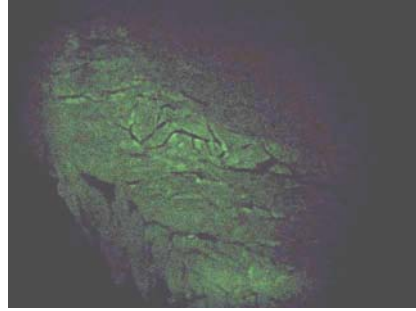
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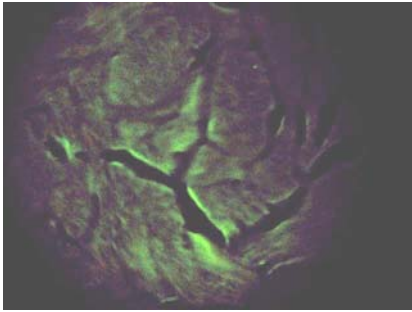
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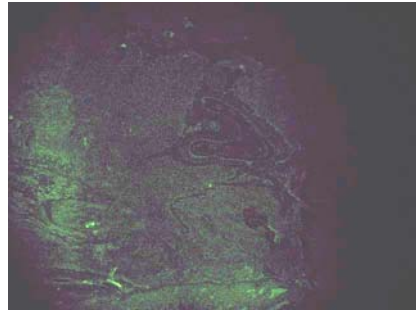
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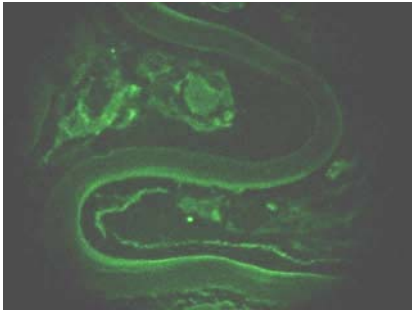
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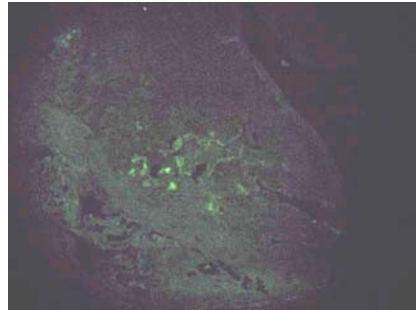
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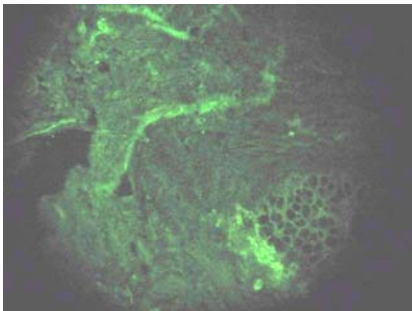
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OF1-2 ELH 1

Appendix III-16
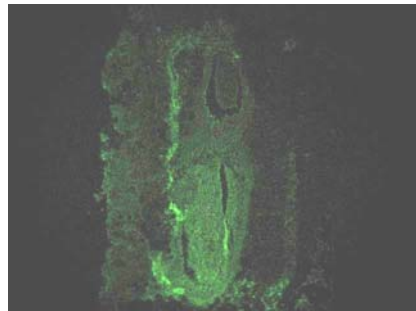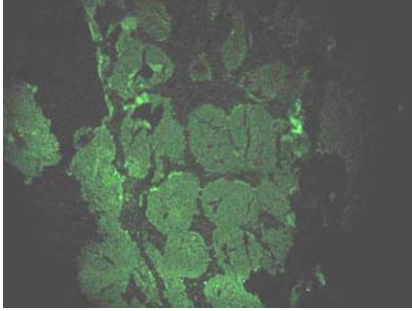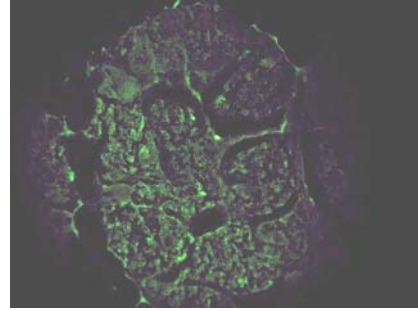
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OF1-2 ELH 4
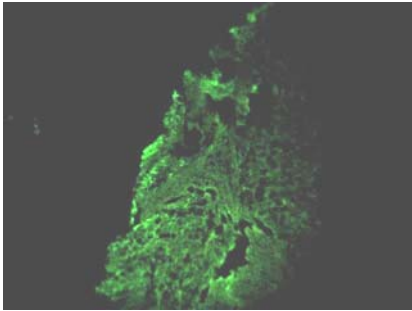
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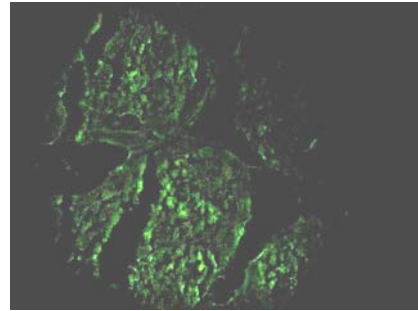
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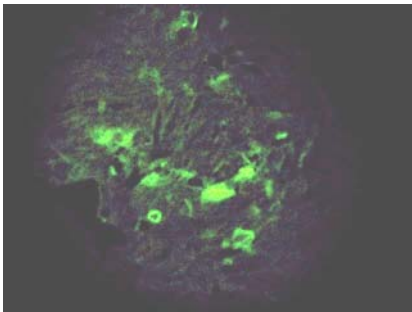
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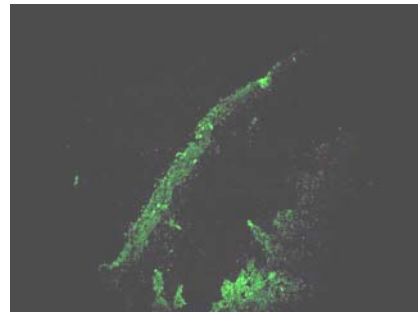
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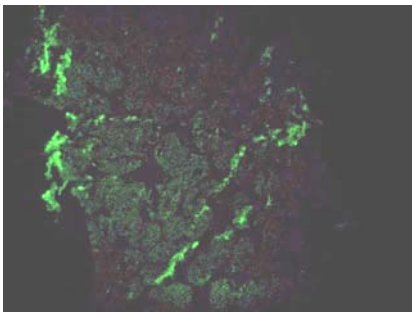
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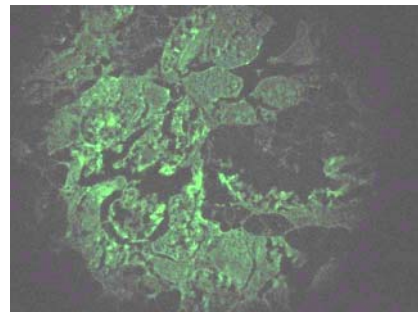
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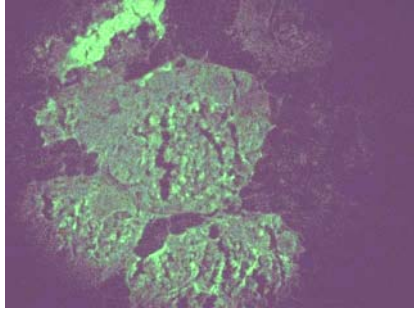
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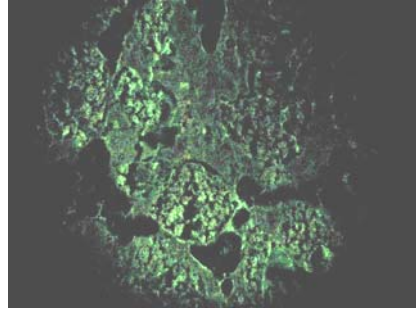
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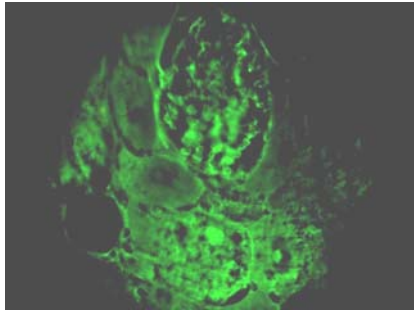
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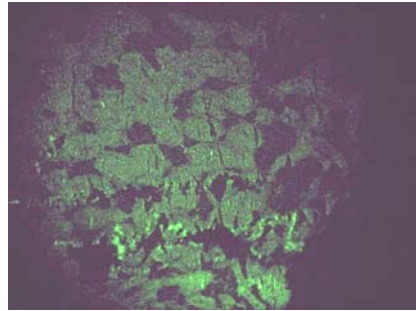
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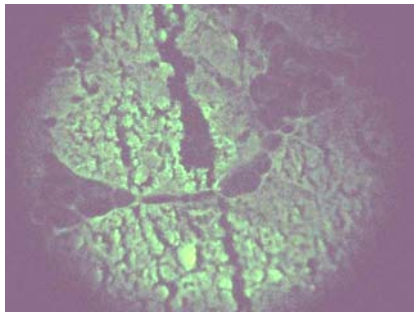
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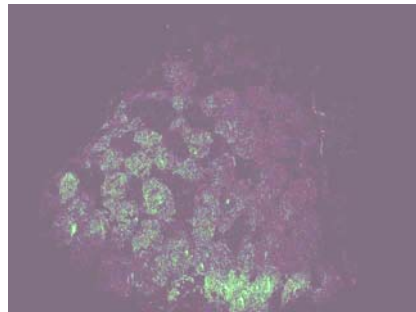
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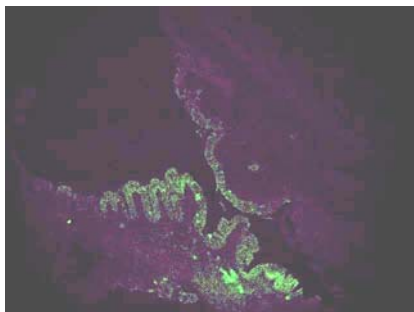
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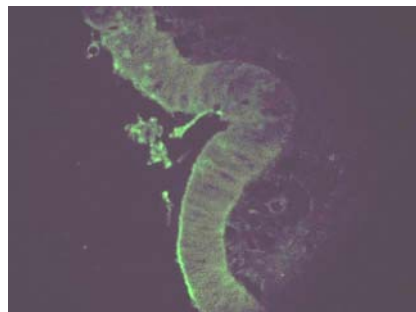
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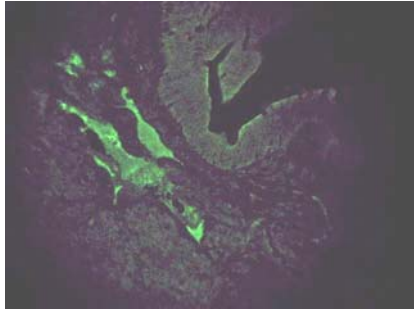
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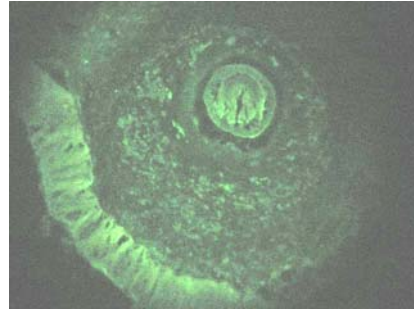
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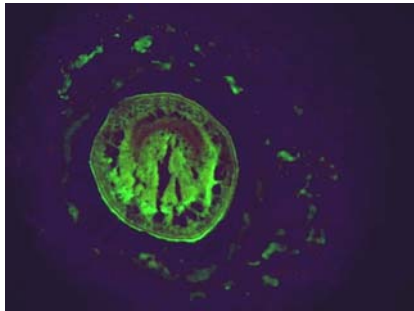
OF3 ELH 13-1 (100X)
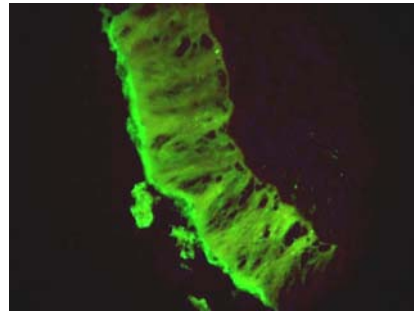
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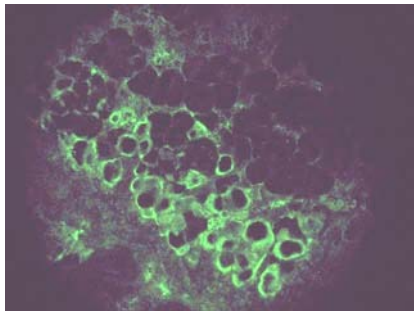
OF3 ELH 15
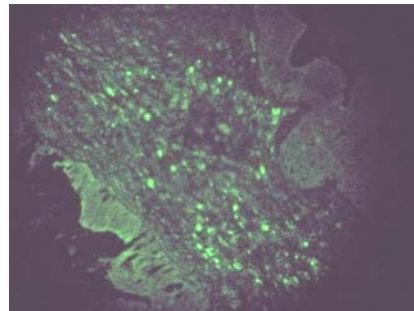
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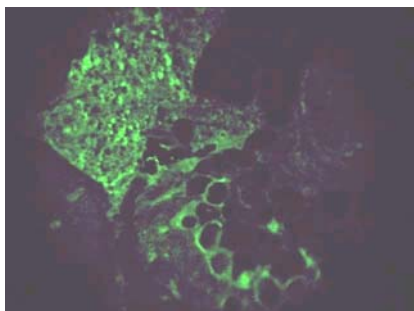
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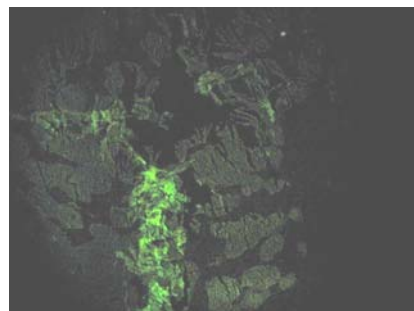
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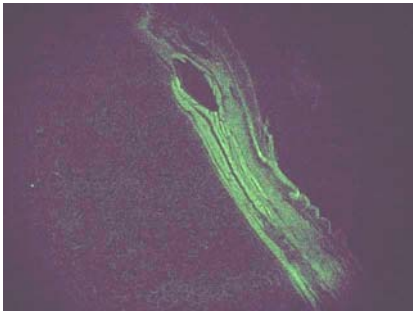
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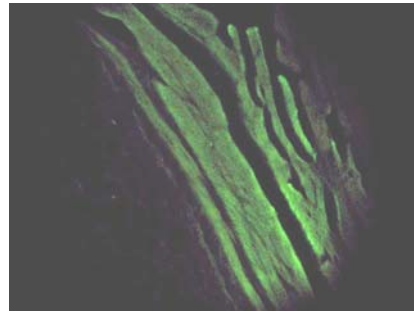
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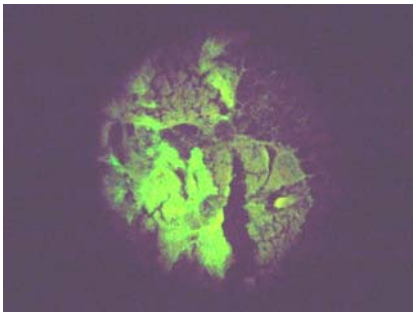
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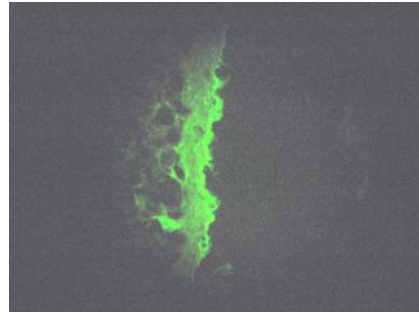
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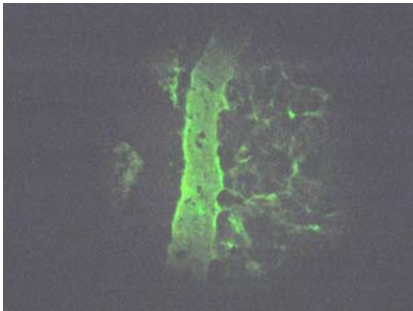
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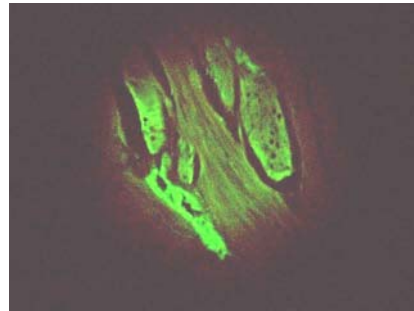
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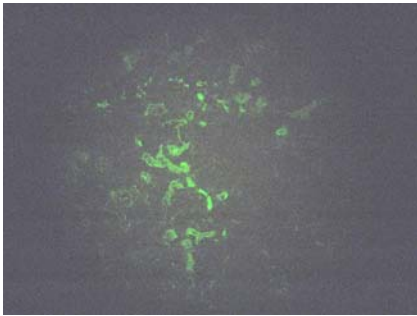
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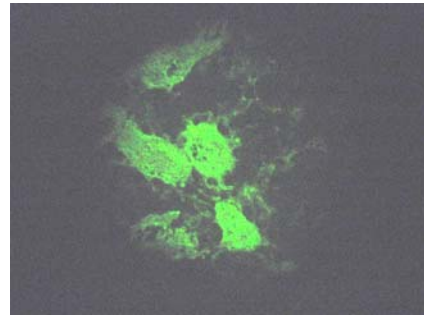
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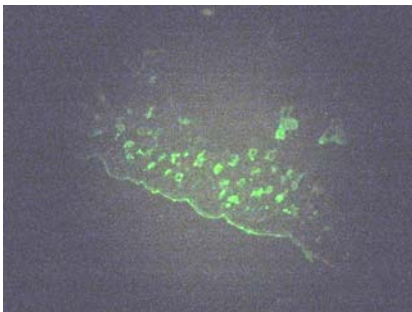
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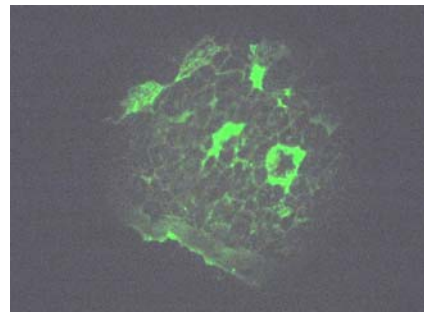
NM1 ELH 7 (20X)
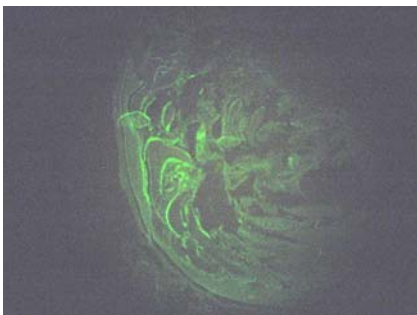
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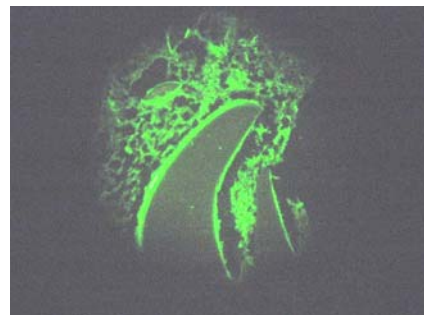
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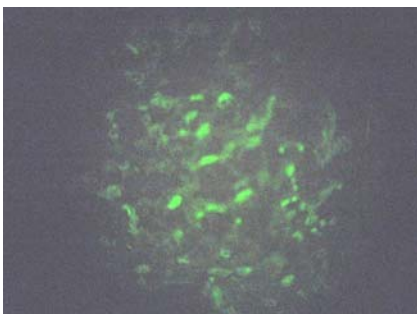
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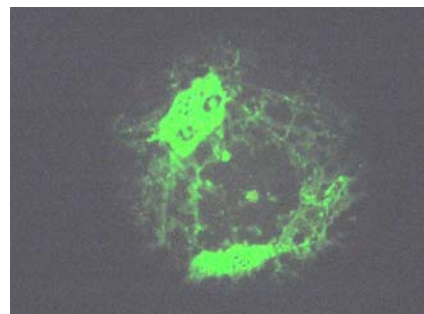
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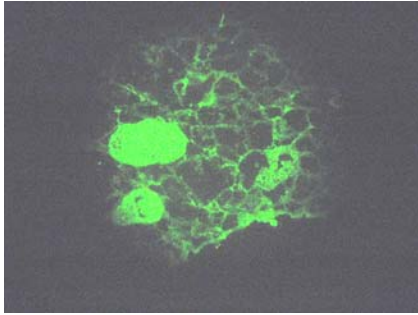
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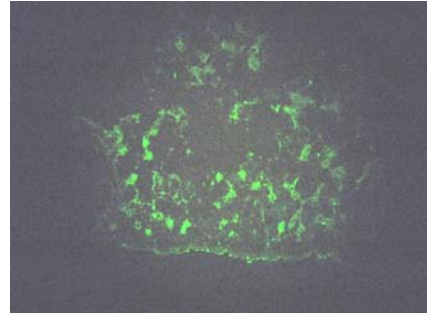
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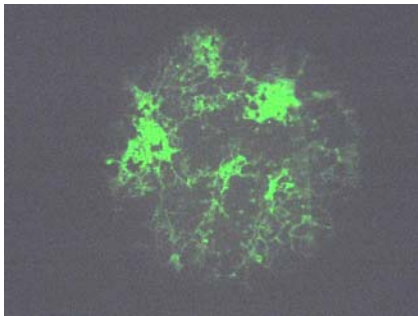
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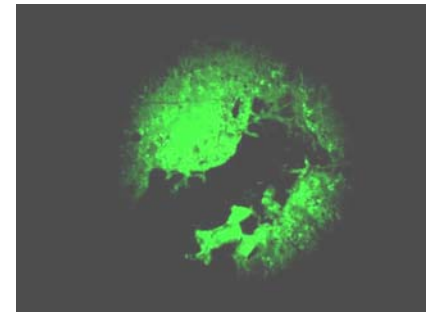
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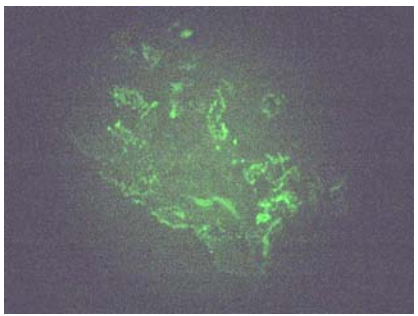
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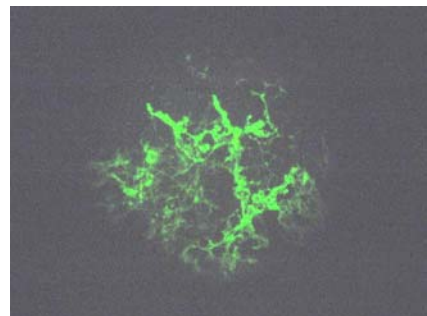
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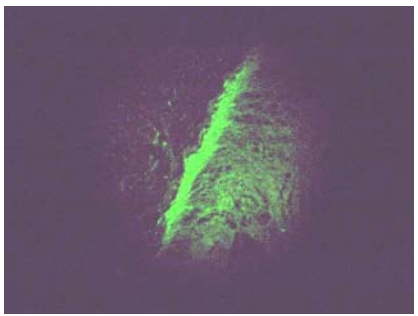
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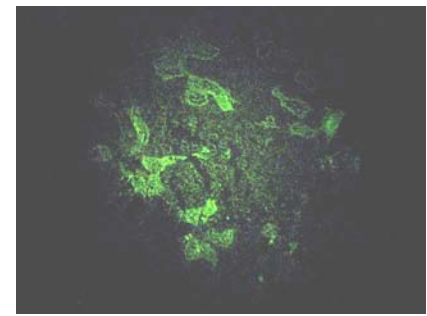
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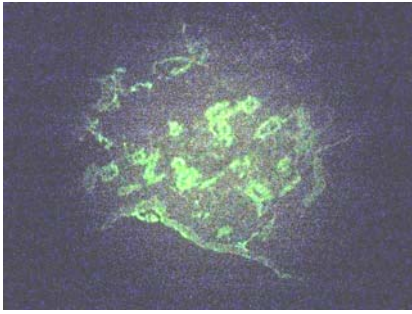
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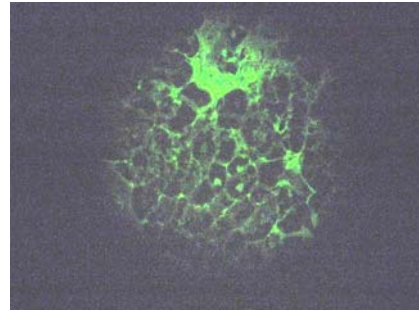
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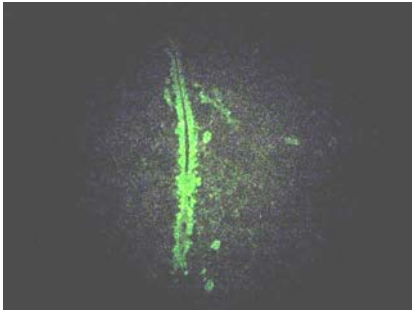
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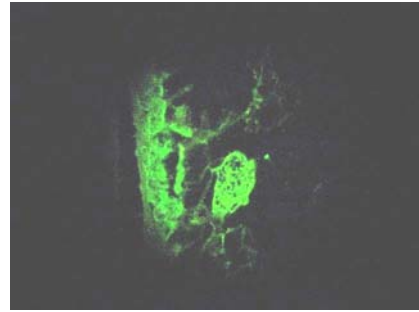
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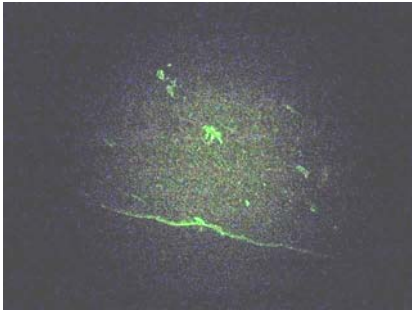
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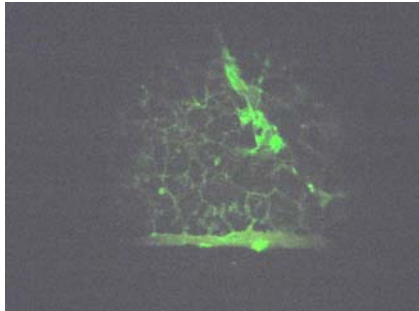
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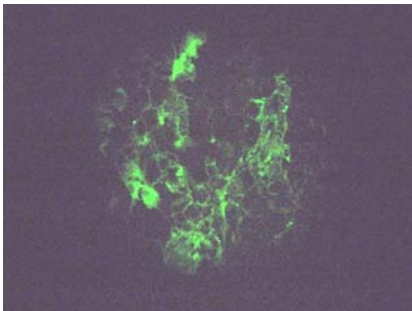
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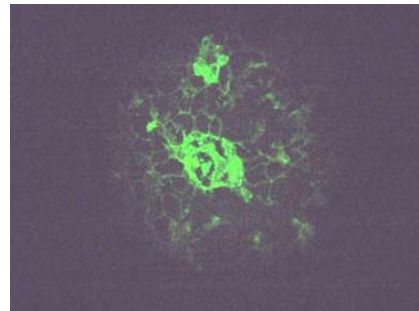
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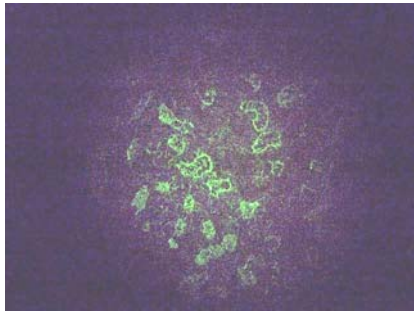
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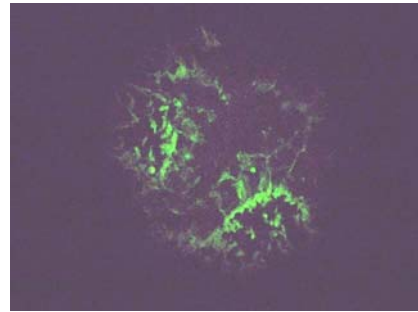
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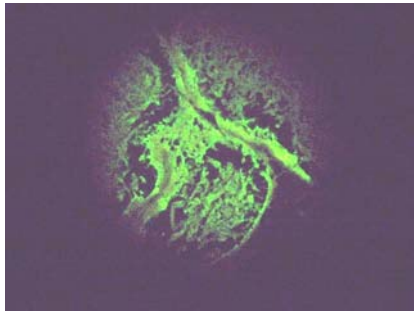
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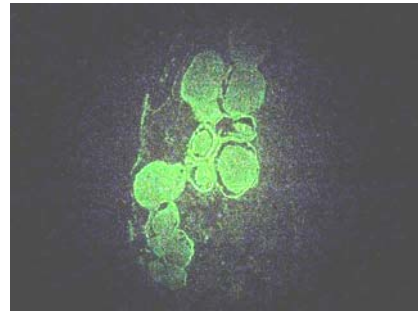
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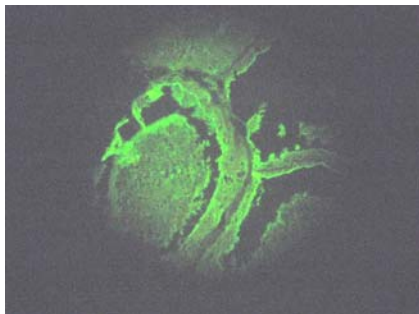
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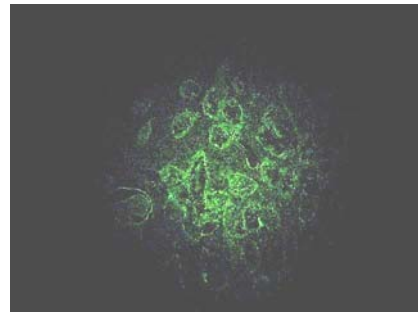
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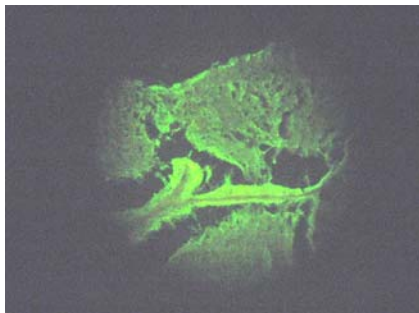
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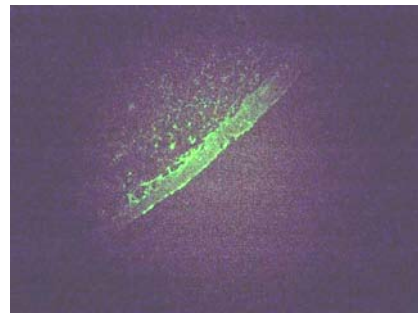
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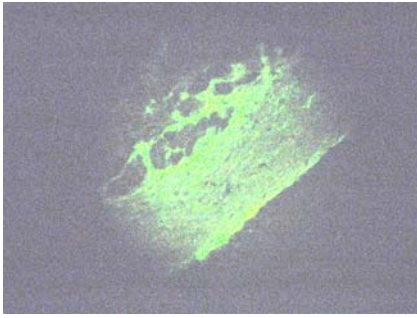
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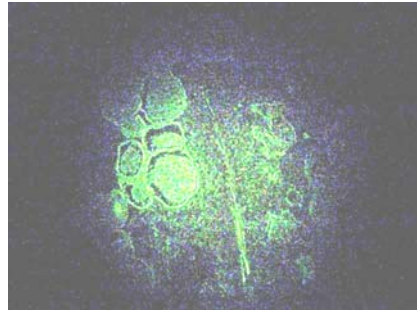
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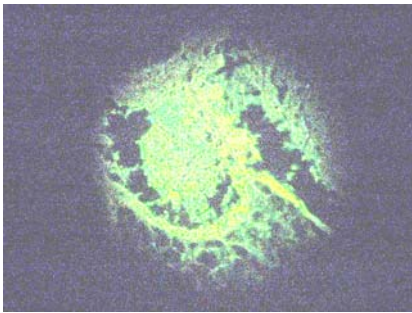
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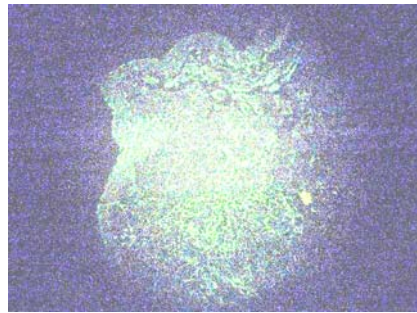
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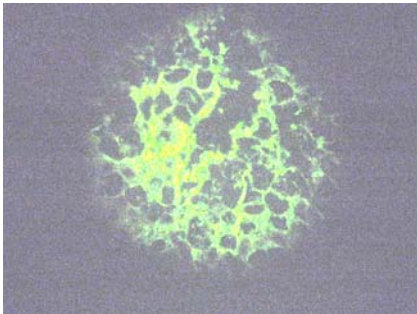
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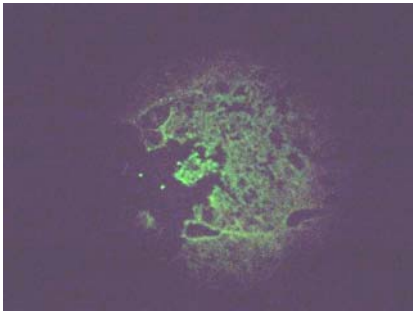
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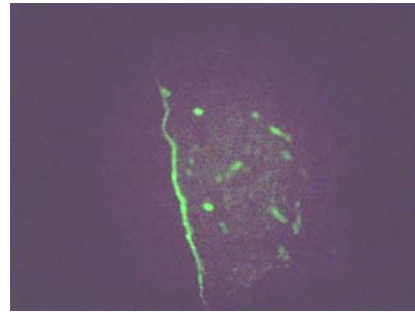
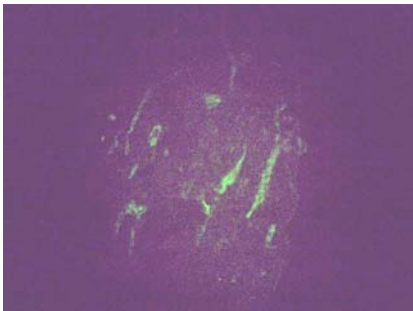NF1 ELH 5
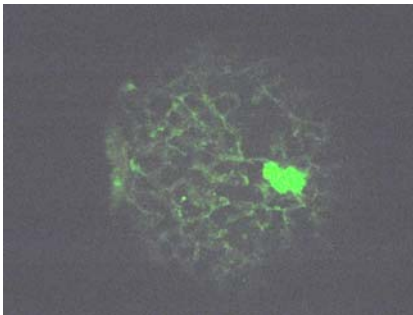
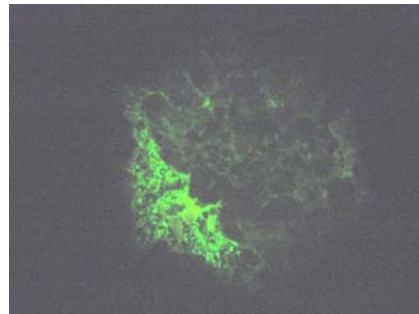NF1 ELH 6
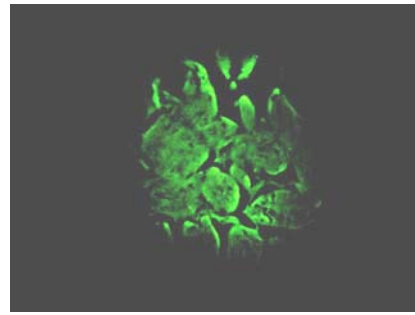
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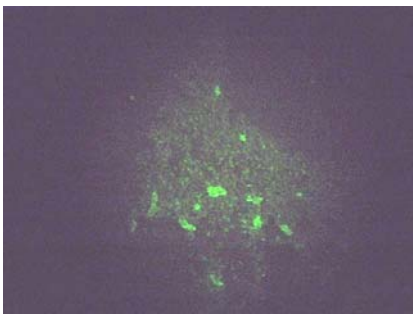
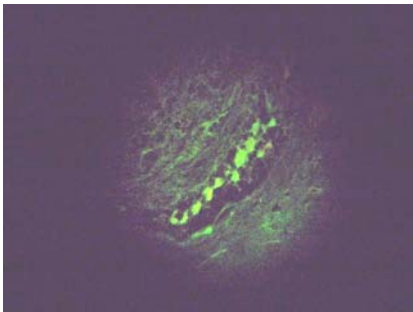NF1 ELH 10
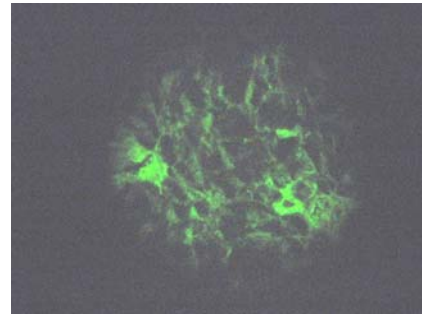
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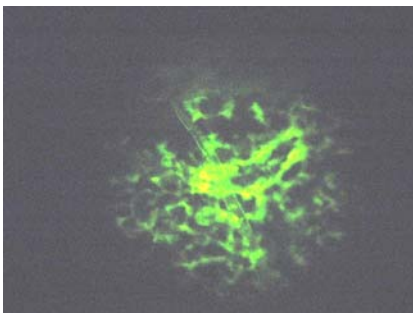
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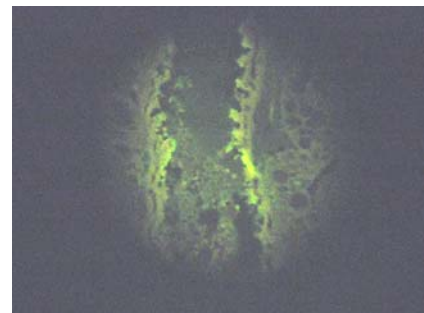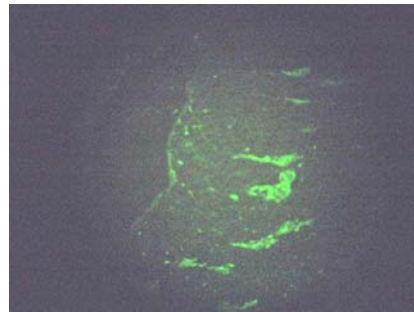

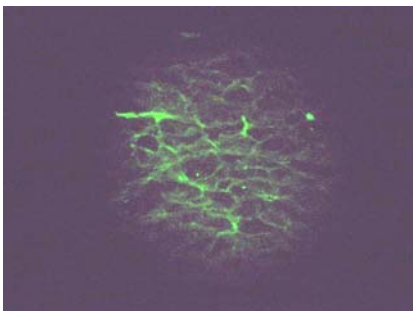NF2 ELH 2 (20X)
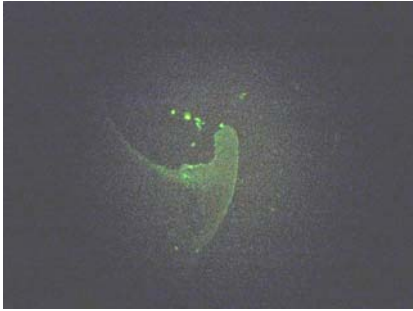
NF3 ELH 1
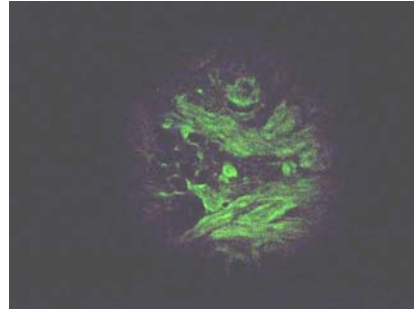
NF3 ELH 5
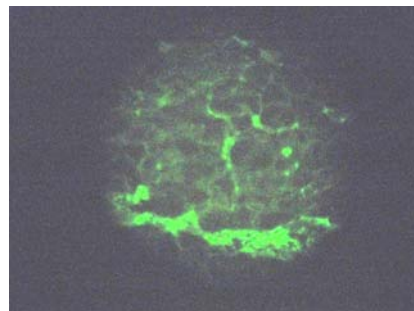

NF3 ELH 6

NF3 ELH 7

NF3 ELH 10

NF3 ELH 12

NF3 ELH 13

NF3 ELH 14

Appendix IV – An Annotated Library of Queen Conch Expressed Sequence Tags

<u>See Supplemental CD</u>