

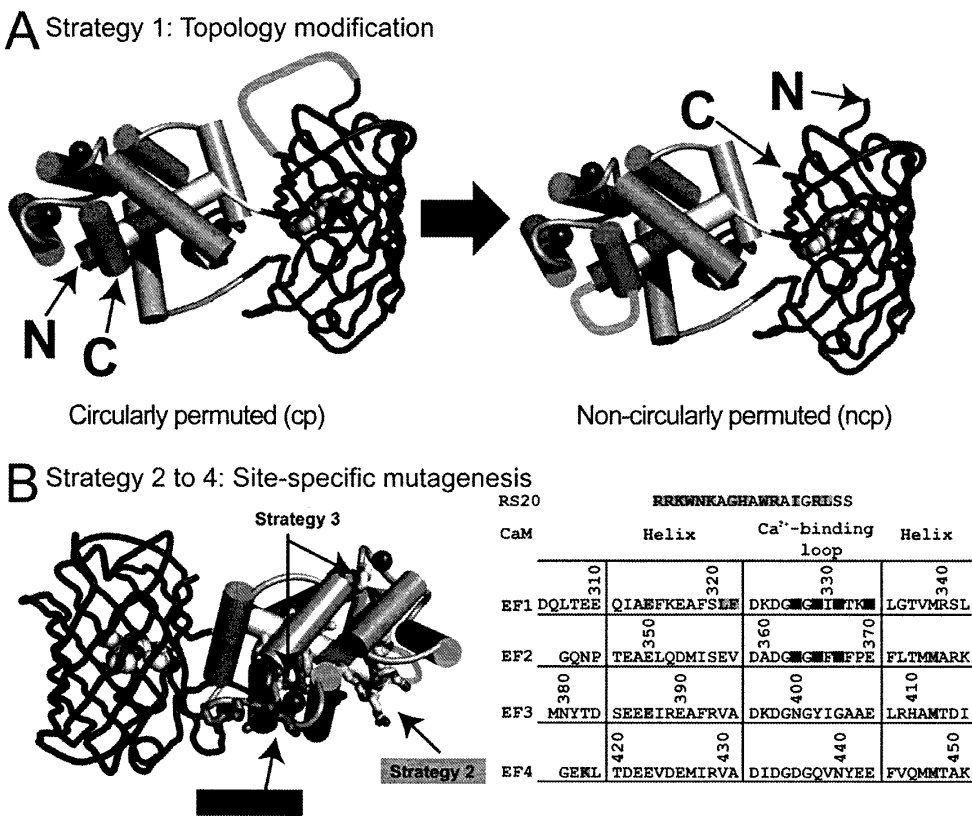


Figure 1

GCaMP #s	Linker	CaM
LAR-GECO1	303 304 305 306 307 308 309 310 311	
LAR-GECO1.5		
LAR-GECO2		
LAR-GECO3		
LAR-GECO4		
GCaMP #s		
LAR-GECO1	312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351	
LAR-GECO1.5		
LAR-GECO2		
LAR-GECO3		
LAR-GECO4		
GCaMP #s		
LAR-GECO1	352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391	
LAR-GECO1.5		
LAR-GECO2		
LAR-GECO3		
LAR-GECO4		
GCaMP #s		
LAR-GECO1	392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431	
LAR-GECO1.5		
LAR-GECO2		
LAR-GECO3		
LAR-GECO4		
GCaMP #s	neg linker	
LAR-GECO1	432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450	
LAR-GECO1.5		
LAR-GECO2		
LAR-GECO3		
LAR-GECO4		

Figure 2 (continued)

GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

R820																			
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
S	S	R	R	K	W	N	K	A	G	H	A	W	R	A	I	G	R	L	S
S	S	R	R	K	W	N	K	A	G	H	A	W	R	A	I	G	R	L	S
S	S	R	R	K	W	N	K	A	G	H	A	W	R	A	I	G	R	L	S
S	S	R	R	K	W	N	K	A	G	H	A	W	R	A	I	G	R	L	S

Linker

GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

K	E	G	L	R	L	K	D	G	G	H	Y	A	-	-	E	R	K	T	T
K	E	G	L	R	L	K	D	G	G	H	Y	A	-	-	E	R	K	T	T
K	E	G	L	R	L	K	D	G	G	H	Y	A	-	-	E	R	K	T	T
K	E	G	L	R	L	K	D	G	G	H	Y	A	-	-	E	R	K	T	T

GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

D	I	V	S	-	H	N	E	D	Y	T	I	V	E	Q	C	E	R	A	E
D	I	V	S	-	H	N	E	D	Y	T	I	V	E	Q	C	E	R	A	E
D	I	V	S	-	H	N	E	D	Y	T	I	V	E	Q	C	E	R	A	E
D	I	V	S	-	H	N	E	D	Y	T	I	V	E	Q	C	E	R	A	E

cp linker

152	153	154	155	156	157	158
D	I	V	S	-	H	N
D	I	V	S	-	H	N
D	I	V	S	-	H	N

GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

V	S	K	G	E	E	D	N	M	A	I	I	K	E	F	M	R	F	K	V
V	S	K	G	E	E	D	N	M	A	I	I	K	E	F	M	R	F	K	V
V	S	K	G	E	E	D	N	M	A	I	I	K	E	F	M	R	F	K	V
V	S	K	G	E	E	D	N	M	A	I	I	K	E	F	M	R	F	K	V

GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

P	Y	E	A	F	Q	T	A	K	L	K	V	T	K	G	G	P	L	P	F
P	Y	E	A	F	Q	T	A	K	L	K	V	T	K	G	G	P	L	P	F
P	Y	E	A	F	Q	T	A	K	L	K	V	T	K	G	G	P	L	P	F
P	Y	E	A	F	Q	T	A	K	L	K	V	T	K	G	G	P	L	P	F

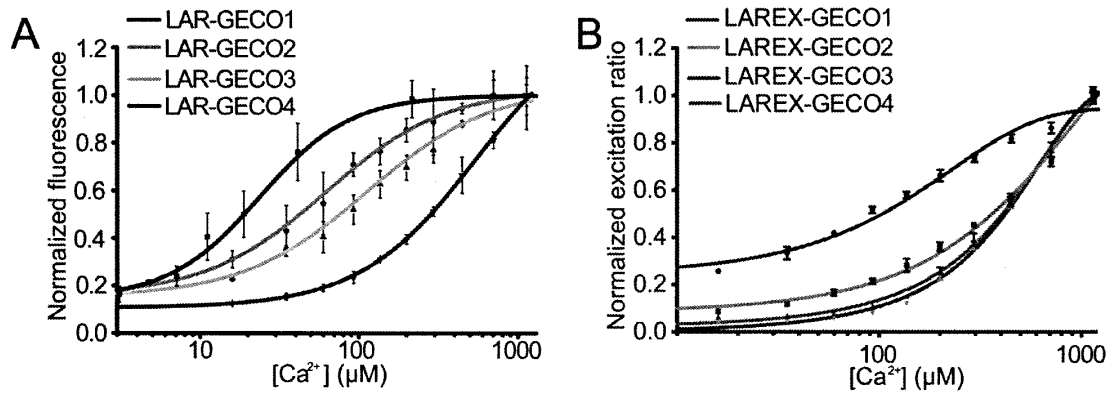
GCaMP #s
LAREX-GECO1
LAREX-GECO2
LAREX-GECO3
LAREX-GECO4

A	D	I	P	-	-	D	Y	F	K	L	S	F	P	E	G	F	R	W	E
A	D	I	P	-	-	D	Y	F	K	L	S	F	P	E	G	F	R	W	E
A	D	I	P	-	-	D	Y	F	K	L	S	F	P	E	G	F	R	W	E
A	D	I	P	-	-	D	Y	F	K	L	S	F	P	E	G	F	R	W	E

Figure 3

	Linker										CaM																																					
GCaMP #s																																																
LAREX-GECO1	D	G	V	F	I	Y	K	V	K	L	R	G	T	N	F	P	P	D	G	P	V	M	Q	K	K	T	M	G	W	E	P	T	R	D	Q	L	T	E	E	Q								
LAREX-GECO2	D	G	V	F	I	Y	K	V	K	L	R	G	T	N	F	P	P	D	G	P	V	M	Q	K	K	T	M	G	W	E	P	T	R	D	Q	L	T	E	E	Q								
LAREX-GECO3	D	G	V	F	I	Y	K	V	K	L	R	G	T	N	F	P	P	D	G	P	V	M	Q	K	K	T	M	G	W	E	P	T	R	D	Q	L	T	E	E	Q								
LAREX-GECO4	D	G	V	F	I	Y	K	V	K	L	R	G	T	N	F	P	P	D	G	P	V	M	Q	K	K	T	M	G	W	E	P	T	R	D	Q	L	T	E	E	Q								
GCaMP #s	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351								
LAREX-GECO1	I	A	E	F	K	E	A	F	S	L	F	D	K	D	G	D	G	T	M	T	T	K	E	L	G	T	V	L	R	S	L	G	Q	N	P	T	E	A	E	L								
LAREX-GECO2	I	A	E	F	K	E	A	F	S	L	F	D	K	D	G	N	G	T	M	T	T	K	E	L	G	T	V	L	R	S	L	G	Q	N	P	T	E	A	E	L								
LAREX-GECO3	I	A	E	F	K	E	A	F	S	L	F	D	K	D	G	D	G	T	M	T	T	K	E	L	G	T	V	L	R	S	L	G	Q	N	P	T	E	A	E	L								
LAREX-GECO4	I	A	E	F	K	E	A	F	S	L	F	D	K	D	G	D	G	T	M	T	T	K	E	L	G	T	V	L	R	S	L	G	Q	N	P	T	E	A	E	L								
GCaMP #s	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391								
LAREX-GECO1	Q	D	M	I	N	E	V	D	A	D	G	D	G	T	F	F	P	E	F	L	T	M	M	A	R	K	M	N	D	S	D	S	E	E	E	I	R	E	A									
LAREX-GECO2	Q	D	M	I	N	E	V	D	A	D	G	N	G	T	F	F	P	E	F	L	T	M	M	A	R	K	M	N	D	S	D	S	E	E	E	I	R	E	A									
LAREX-GECO3	Q	D	M	I	N	E	V	D	A	D	G	N	G	T	F	F	P	E	F	L	T	M	M	A	R	K	M	N	D	S	D	S	E	E	E	I	R	E	A									
LAREX-GECO4	Q	D	M	I	N	E	V	D	A	D	G	N	G	T	F	F	P	E	F	L	T	M	M	A	R	K	M	N	D	S	D	S	E	E	E	I	R	E	A									
GCaMP #s	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431								
LAREX-GECO1	F	R	V	A	D	K	D	G	N	G	Y	I	G	A	A	E	L	R	H	A	M	T	D	I	G	E	K	L	T	D	E	E	V	D	E	M	I	R	V	A								
LAREX-GECO2	F	R	V	A	D	K	D	G	N	G	Y	I	G	A	A	E	L	R	H	A	M	T	D	I	G	E	K	L	T	D	E	E	V	D	E	M	I	R	V	A								
LAREX-GECO3	F	R	V	A	D	K	D	G	N	G	Y	I	G	A	A	E	L	R	H	A	M	T	D	I	G	E	K	L	T	D	E	E	V	D	E	M	I	R	V	A								
LAREX-GECO4	F	R	V	A	D	K	D	G	N	G	Y	I	G	A	A	E	L	R	H	A	M	T	D	I	G	E	K	L	T	D	E	E	V	D	E	M	I	R	V	A								
GCaMP #s	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	ncp linker																											
LAREX-GECO1	D	I	D	G	D	G	Q	V	N	Y	E	E	F	V	Q	M	M	T	A	K	G	G	G	S	V	D																						
LAREX-GECO2	D	I	D	G	D	G	Q	V	N	Y	E	E	F	V	Q	M	M	T	A	K	G	G	G	S	V	D																						
LAREX-GECO3	D	I	D	G	D	G	Q	V	N	Y	E	E	F	V	Q	M	M	T	A	K	-																											
LAREX-GECO4	D	I	D	G	D	G	Q	V	N	Y	E	E	F	V	Q	M	M	T	A	K	G	G	G	S	V	D																						

Figure 3 (continued)

**Figure 4**

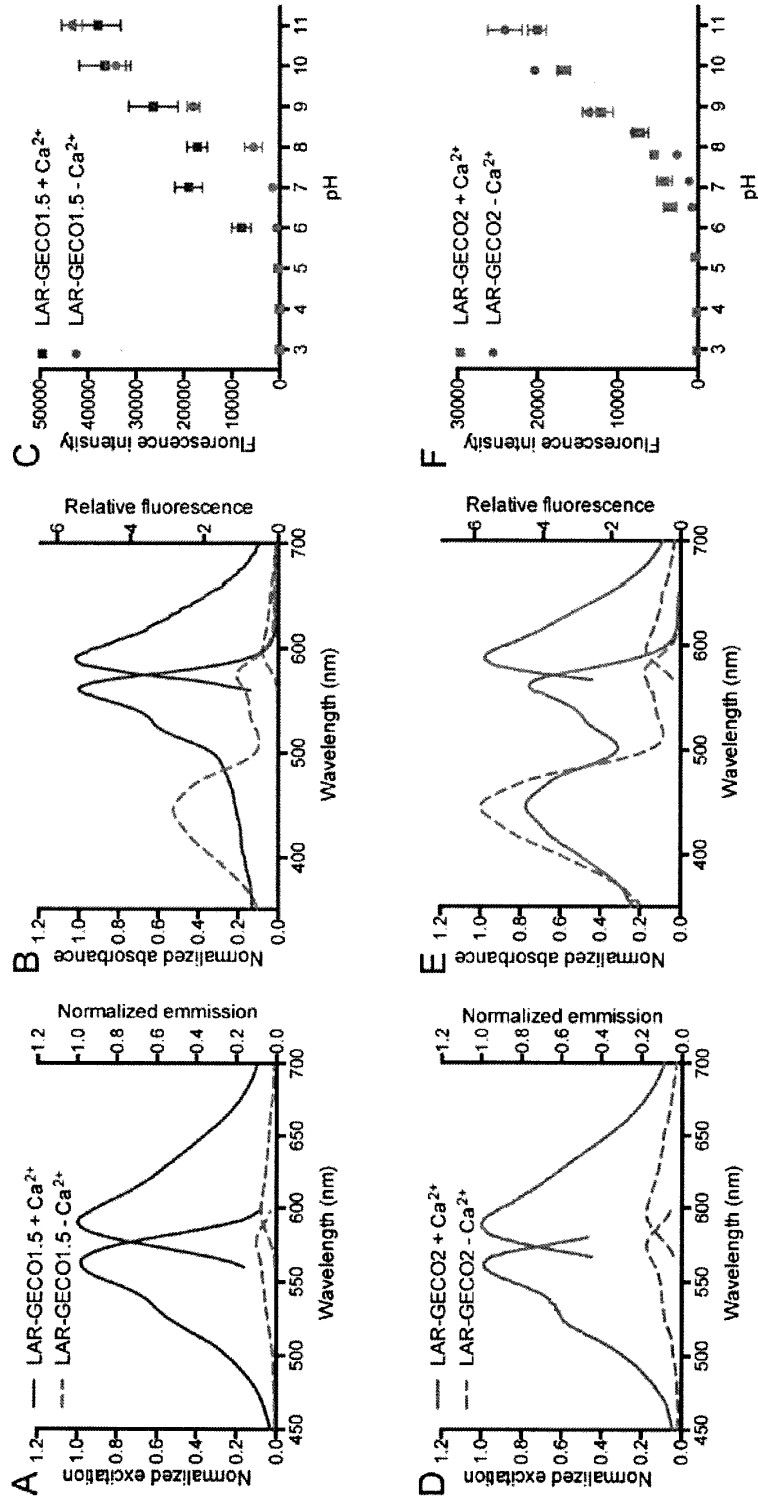


Figure 5

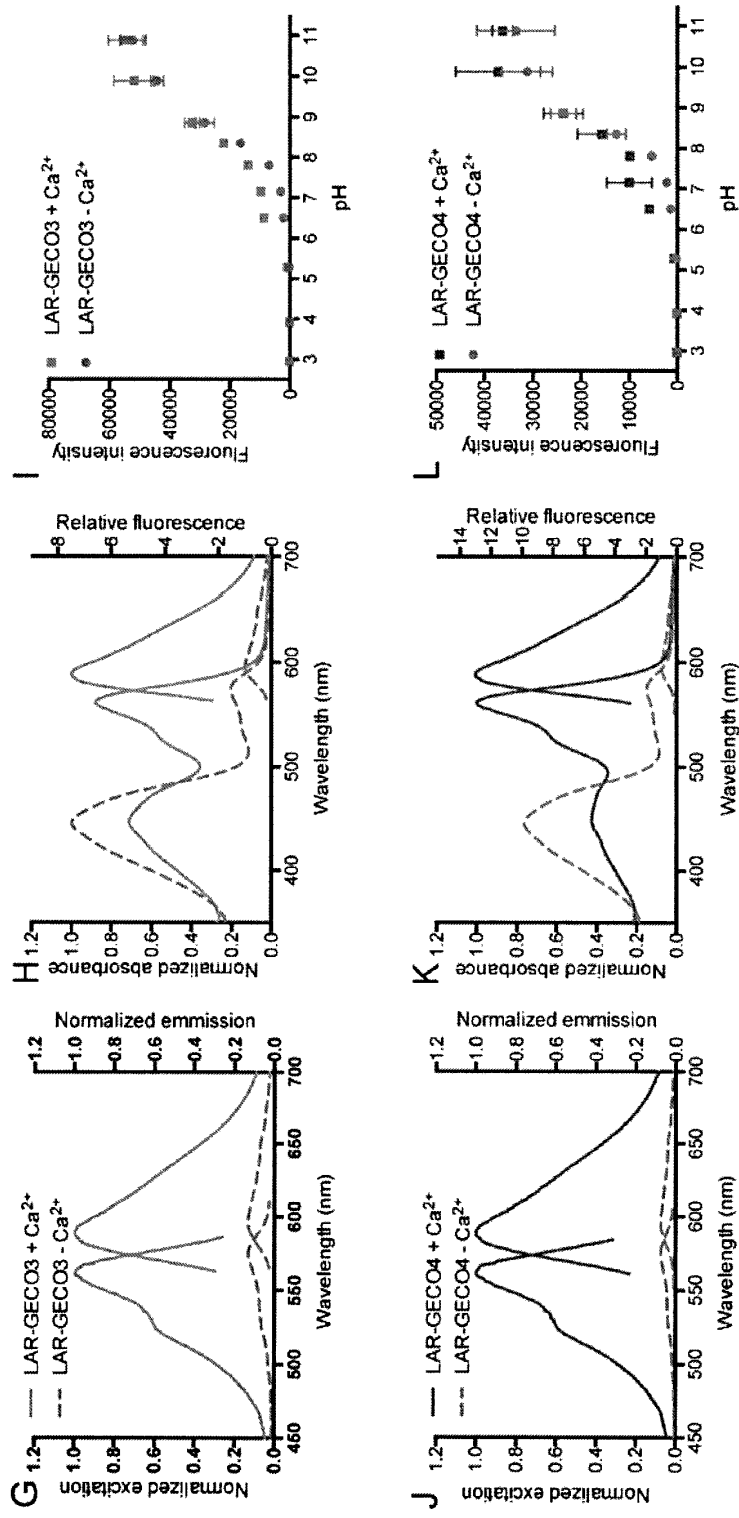


Figure 5 (continued)

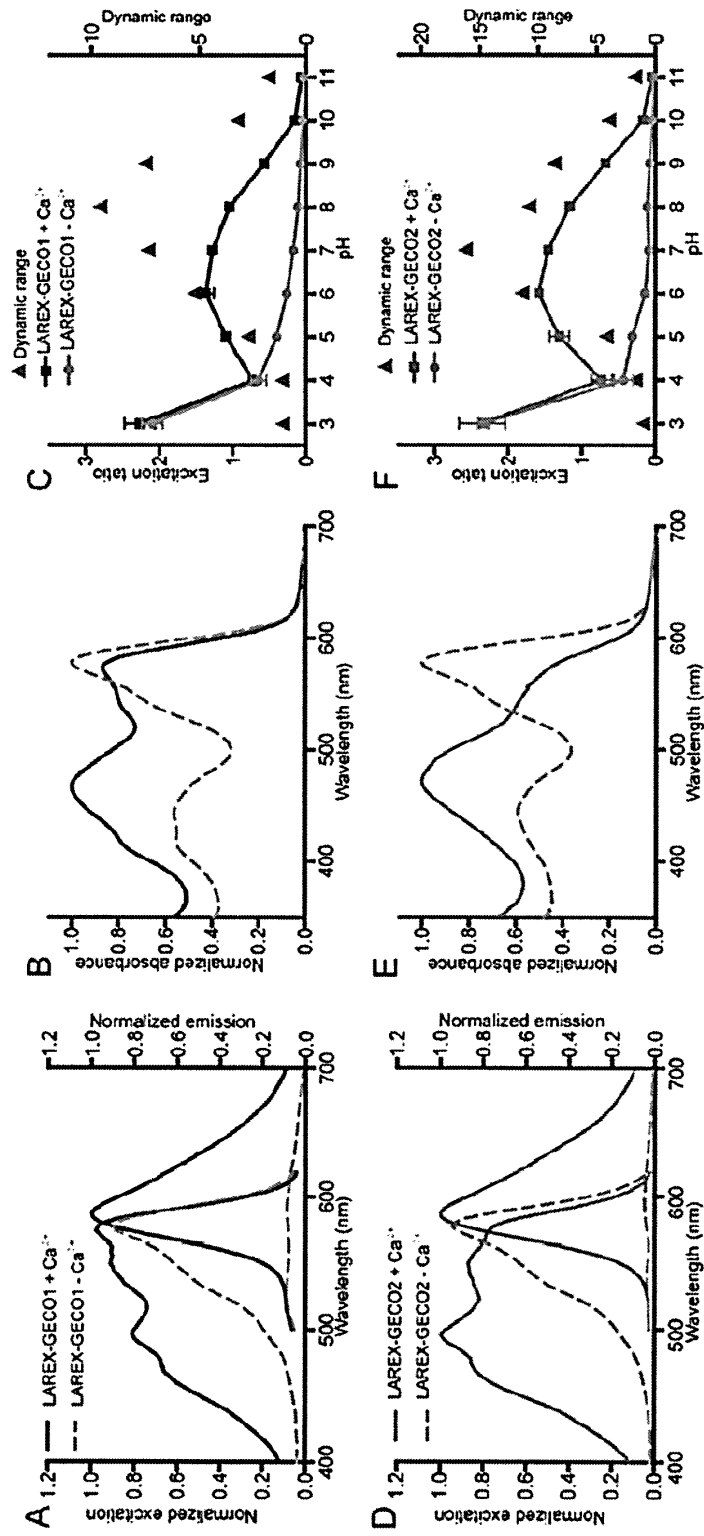


Figure 6

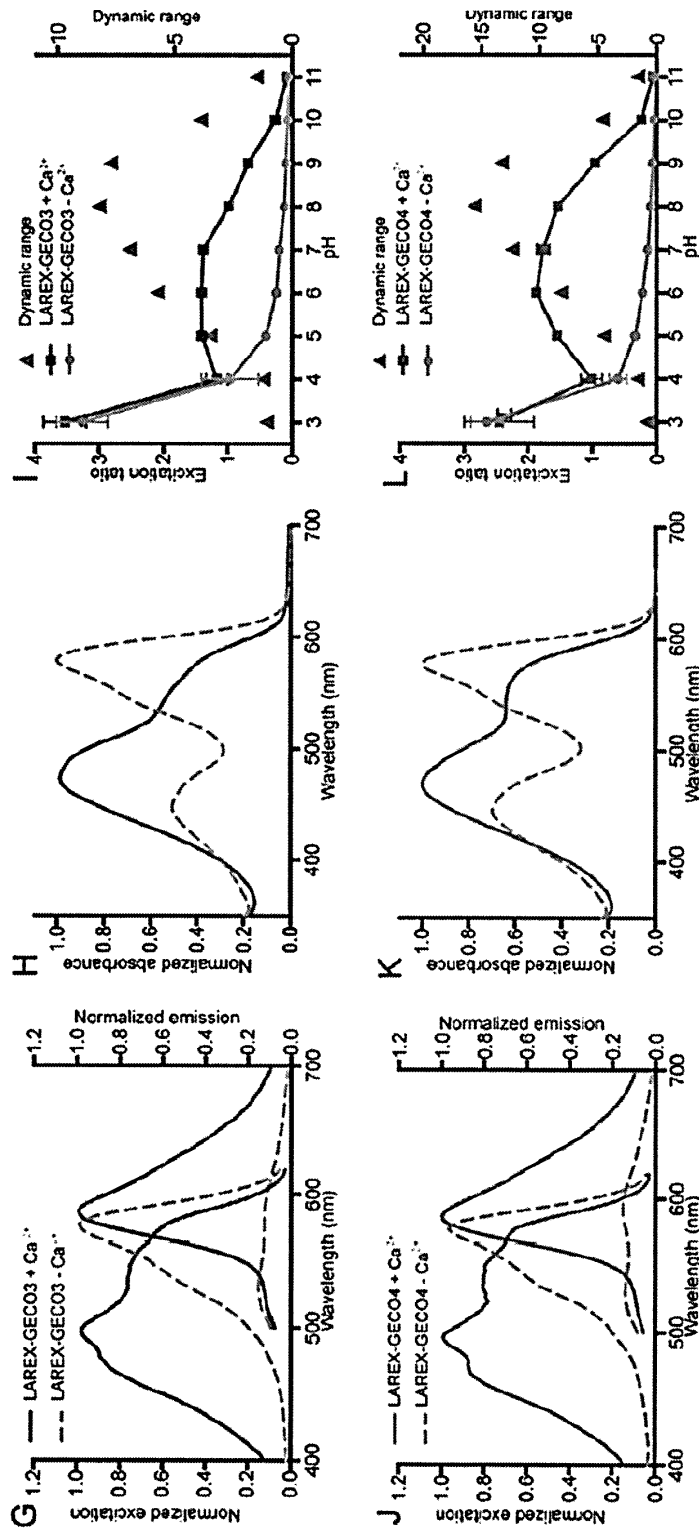


Figure 6 (continued)

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LAREX-GE04
histamine

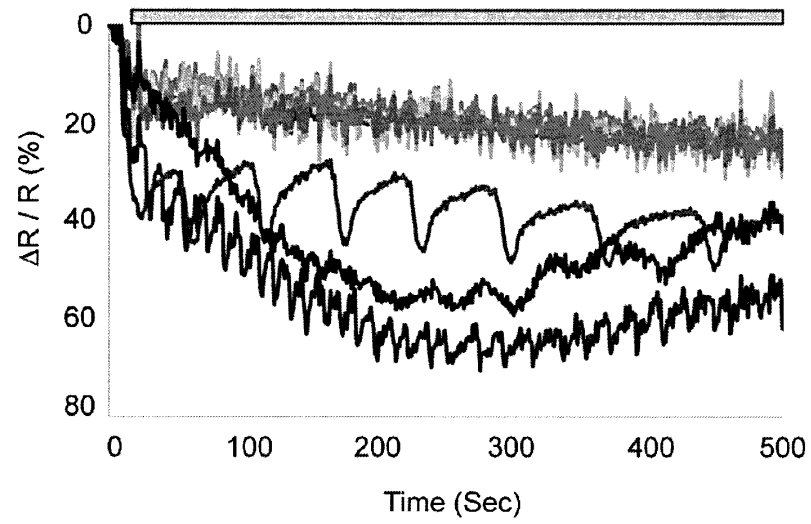


Figure 7

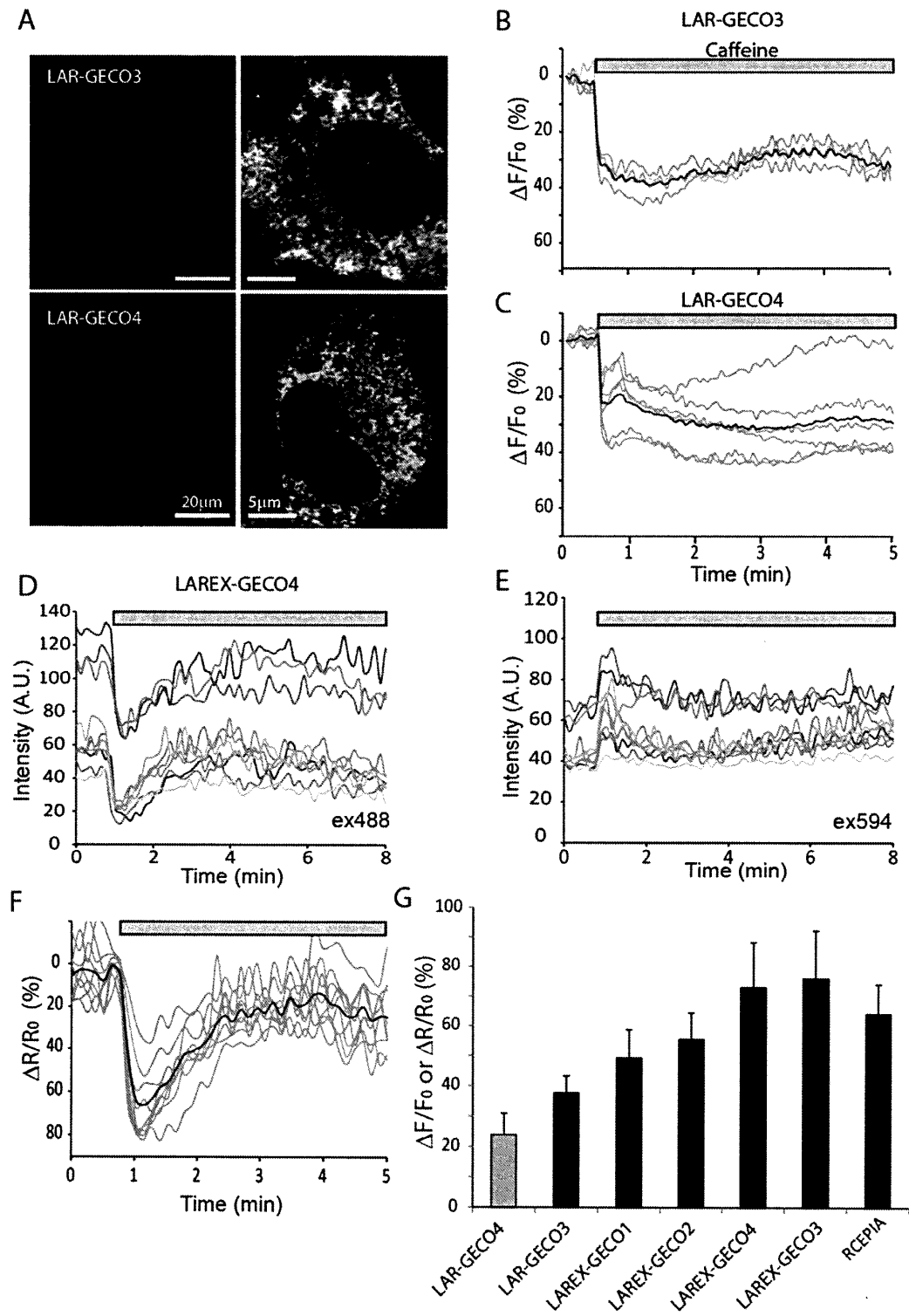


Figure 8

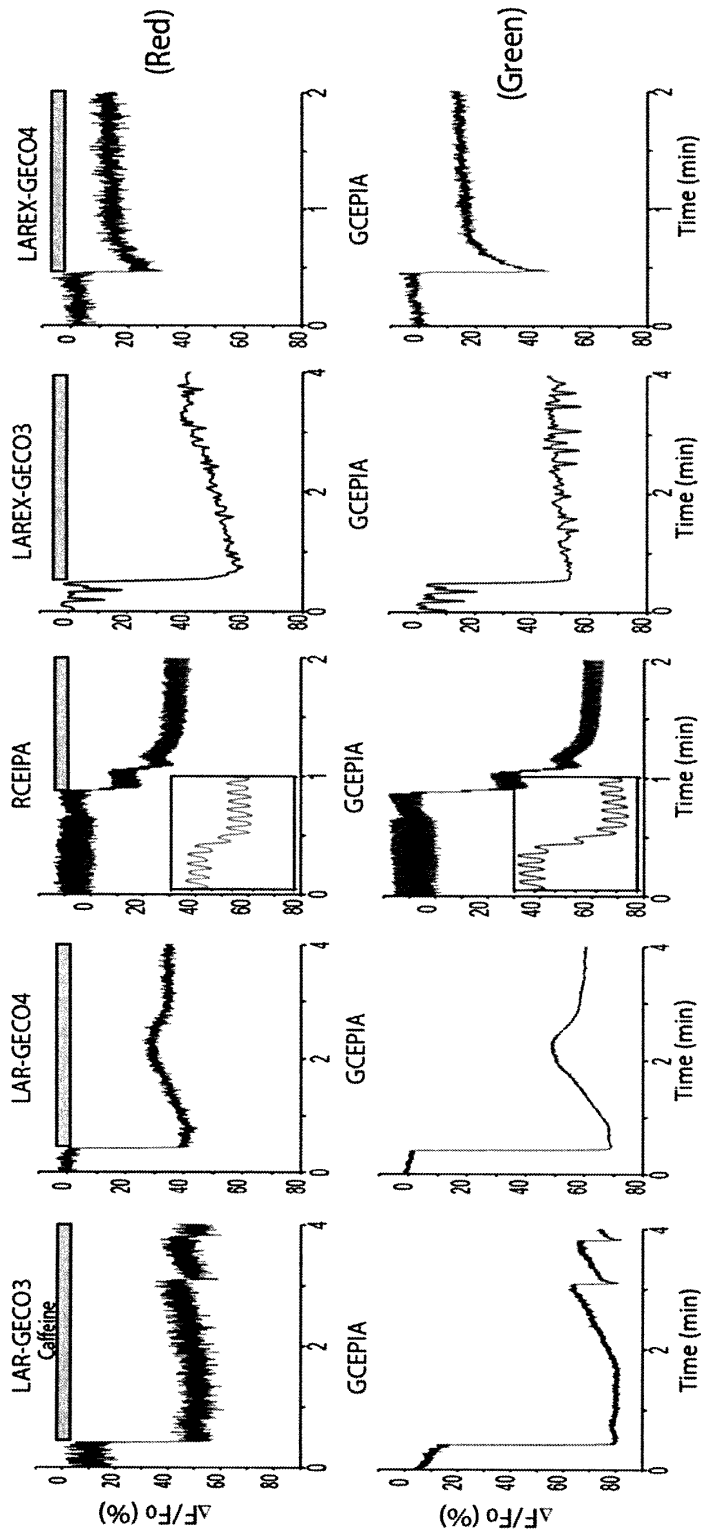
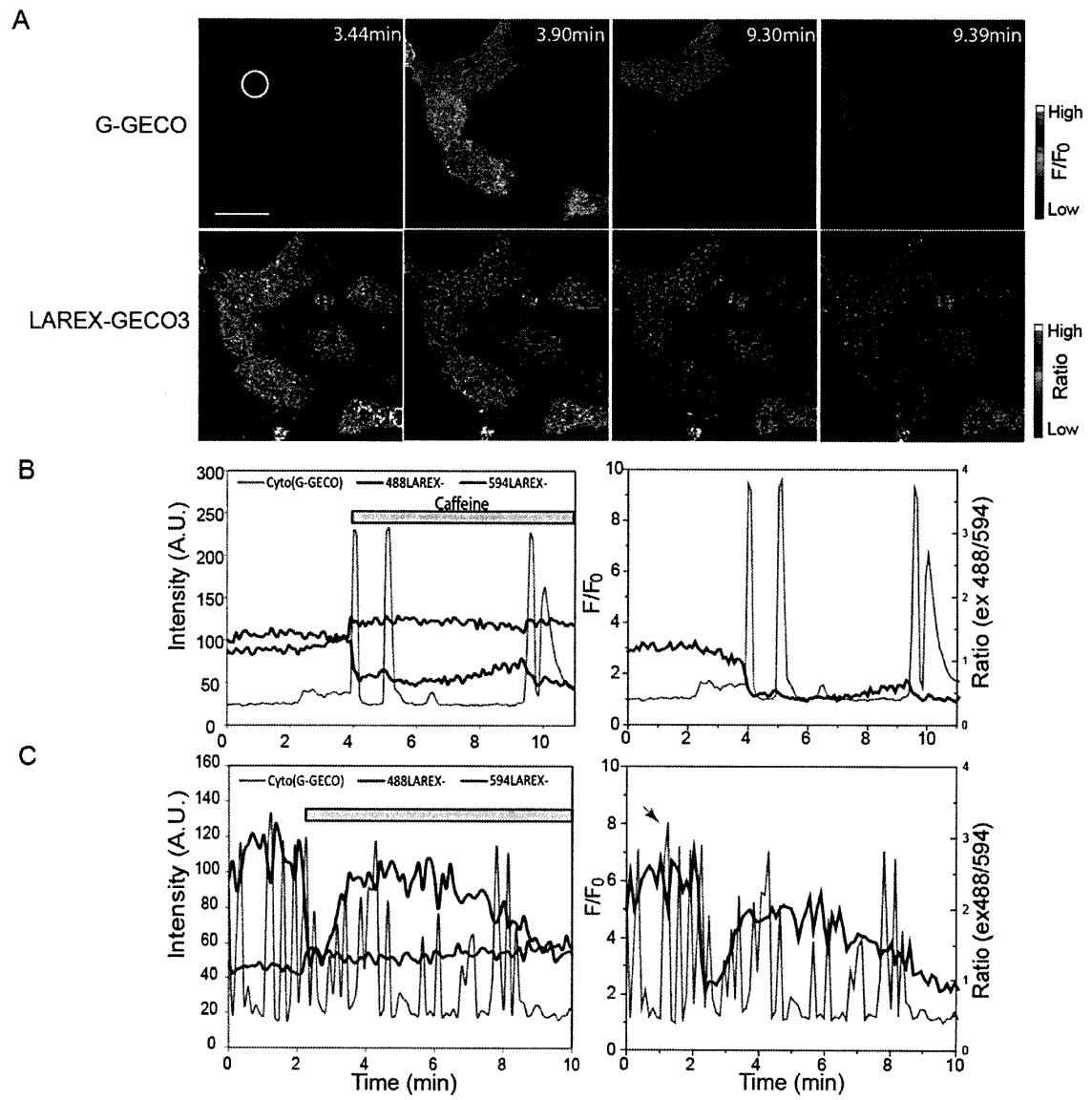


Figure 9

**Figure 10**

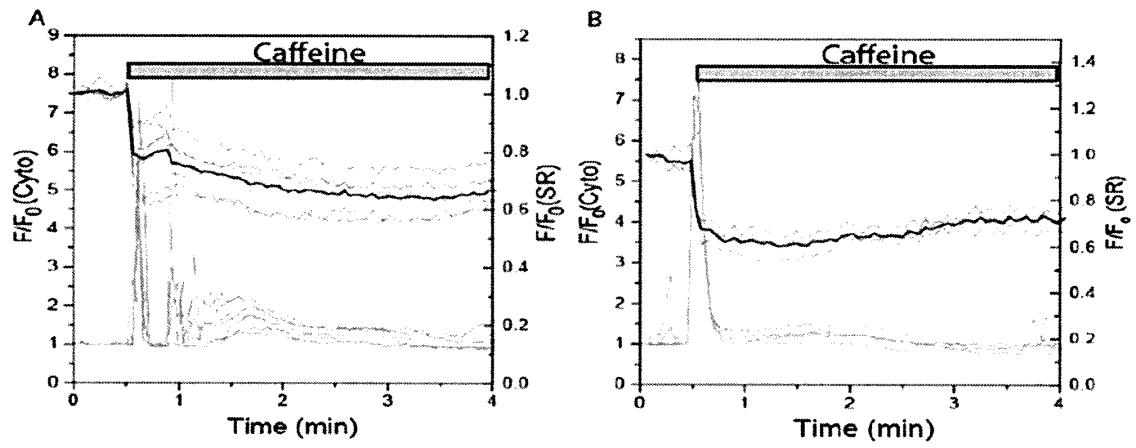


Figure 11

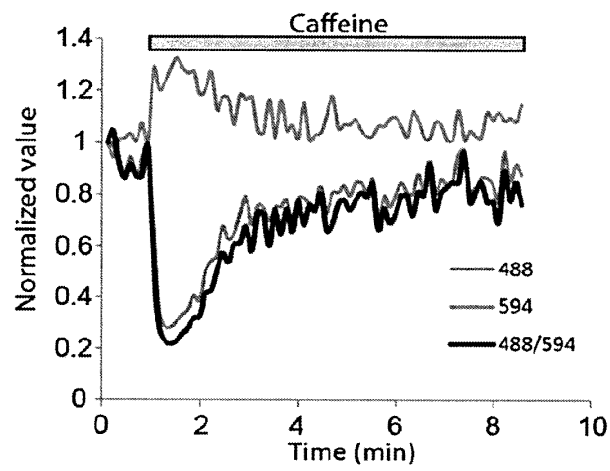


Figure 12

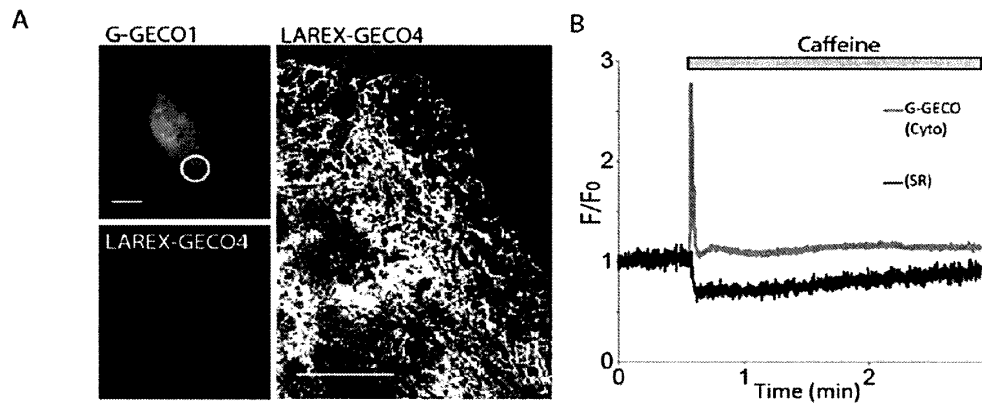


Figure 13

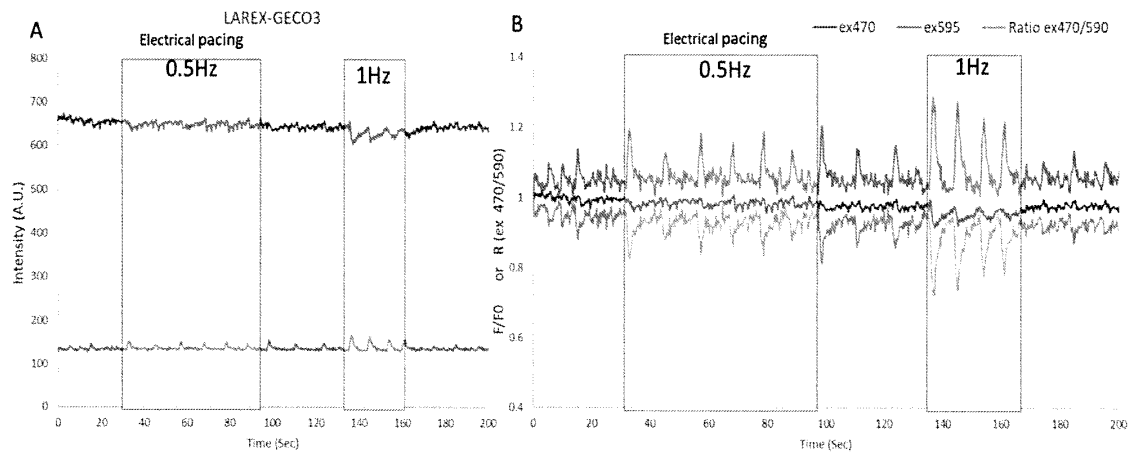


Figure 14

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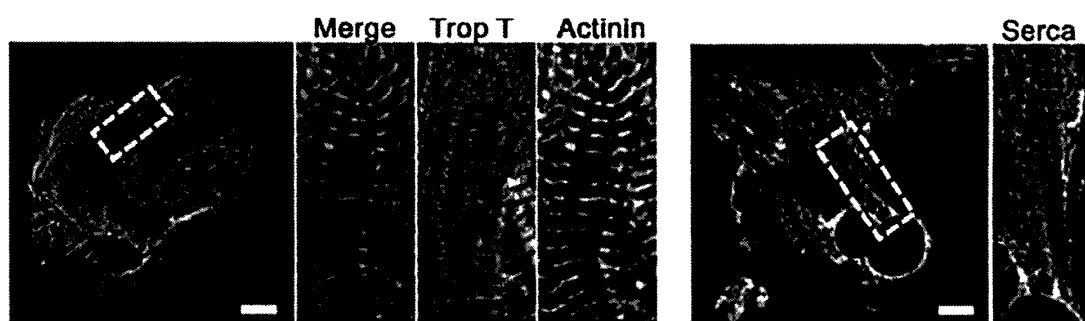


Figure 15

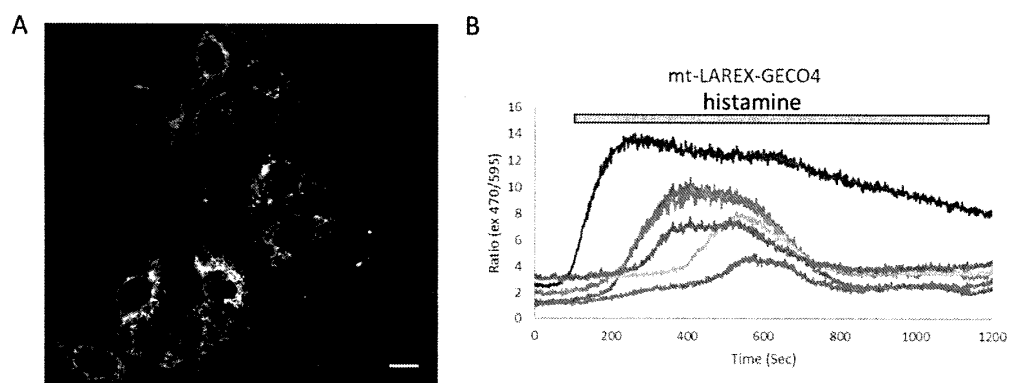


Figure 16