Supplementary Figures and Tables Legends:

Figure S1: Transcriptional profiles of BAF subunits in the tissues of adult animals. The quantitative mRNA expression pattern of Baf47, 53a, 57, 60b, 155, 180, 200, 250a/b, Brg1 & Brm was each higher in ovary compare to brain, heart and kidney. Baf60c was highly expressed in brain compared to ovary, heart and kidney. Baf170 expression is similar in ovary & brain and elevated than heart and kidney at the age of 2 –months old animal.

Figure S2: Summary of numbers of for common and tissue specific proteins that co-purified with Brg1 in primitive heart, head and trunk of E8.5 mouse embryo. Schematic shows affinity purification of BRG1 complex and mass spectrometry analysis. Distinct cardiac enriched SWI/SNF complexes exist in the developing heart at E8.5 mouse embryo.

Figure S3: Baf250a is required for heart development. Spatial-temporal expression analysis shows distribution of BAF250a during early development. (**A, C-G**) Baf250a mRNA and **(B)** protein expression were obtained from whole mount RNA *in-situ* hybridization and immunostaining at indicated developmental stages. (**A, B**) Strong Baf250a expression in cardiac crescent at the late gastrula stage E7.5, (**C**) diffuse expression in E8.0 heart and head and (d-g) Intense Baf250a staining in the heart and head of E8.5-E9.5 embryos; frontal and lateral view. (**H-K**)**,** Serial sections of BAF250a anti-sense mRNA probe stained embryos; Magnifications: 40X (H, I), 20X (J, K). Baf250a RNA staining occurred in endocardial cells (EC), cardiac jelly (CJ), neural ectoderm,

somites, dorsal aorta, vetelline vein (VV), cephalic mesenchyme (CM), myocardium (M), fore gut (FG)

Figure S4: Spatial localization of BAF subunits in the E8.5 mouse embryo. (**A, D, G, J, M**) (**A**), BAF250a (**B**), BRG1 (**E**), BAF155 (**H**), BAF170 (**K**) BAF53a and (**N**) BAF47 immunostaining occurred in nuclei of heart, dorsal aorta, neural ectoderm, optical vesicle and head mesenchyme. (**C**) Merged images of BRG1 and BAF250a show co-localization in whole embryo; neural ectoderm, head mesenchyme, gut, somites and heart; myocardial cells, endocardial tube, dorsal aorta. (**F, I**) BAF155 and BAF170 co-localized with BAF250a in nuclei of dorsal aorta and vetelline vein. (**L, O**) BAF53a, and BAF47 co-localized with BAF250a in head mesenchyme, optical vesicle and somite of early embryo. Magnification: 2X. 1: future brain, 2: dorsal aorta, 3: optic vesicle, 4: atria, 5: endocardial tube, 6: future spinal cord, 7: somite, 8: gut, 9: head mesenchyme, 10: cardiac jelly, 11: ventricle

Figure S5: Co-immunostaining of BAF250a and cardiac specific proteins was analyzed in frontal sections of E8.5 wild type (WT) mouse embryo. Immunostaining and co-localization analysis of the BAF250a (green) and Myocardin (red) was detected in E7.5 embryos. (**A**) At E7.5, BAF250a expressed in whole embryo with distinct pattern. (**B)** Immunostaining of myocardin occurred in cardiac crescent and notochord in E7.5 embryos. (**C**) BAF250a and Myocardin were co-localized in cardiac crescent. (**D, E**) At E8.5, BAF250a and Myocardin expression appeared at the myocardium, endocardium, dorsal aorta and mesenchymal tissues. **F,** BAF250a and Myocardin were co-localized in

myocardium. (**H, K**) cTnT and Myl3 expression restricted to the myocardium. (**I, L**) BAF250a, cTnT & Myl3 were co-localized in the myocardium.

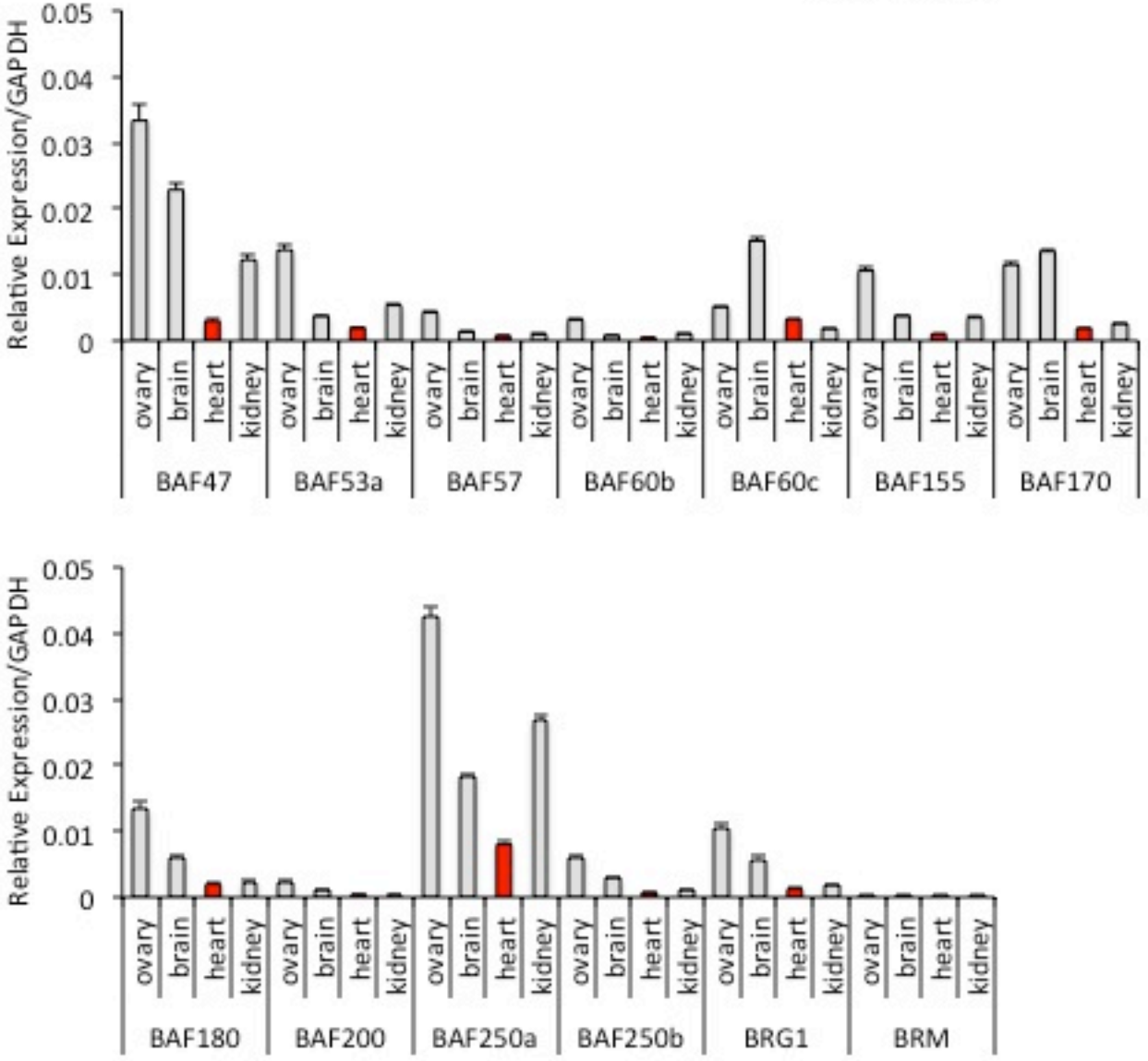
Figure S6: BAF subunits associate with BAF250a in P19 cells and in developing heart. Immunoprecipitation using antibodies against BAF250a or IgG in P19 cells and E9.5 hearts followed by probing with the BAFs antibodies indicated on the left.

Figure S7: Protein knockdown assessment of BAF subunits in P19 cells. Western blot analysis evaluated the extent of protein knockdown of BAF subunits upon introduction of (**A**) BAF250a, (**B**) BRG1, (**C**) BAF155 (**D**) BAF53a and CHD4 siRNA. Antibodies specific for indicated BAF proteins and CHD4 determined their relative levels of expression.

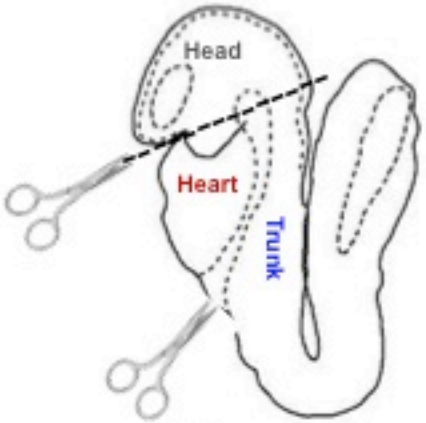
Figure S8: Evaluation of BAF250a inhibition in DMSO induced differentiated cardiomyocytes transfected with Baf250a & non-target control siRNA. Western blot analysis using antibodies specific for indicated BAF protein subunits determined their relative levels. Protein levels were normalized to β-Actin.

Supplementary Table 1: Endogenous Brg1 associated subunits in P19 cell; an embryonal carcinoma cell line. Summary of BRG1 associated factors (BAF) peptides co-purified with Brg1 & Baf250a in P19 cells identified by mass spectrometry.

Singh_Fig S1


Relative Expression/GAPDH
0.05
0.04
0.03
0.02
0.01
0
ovary
brain
heart
kidney
BAF47
BAF53a
BAF57
BAF60b
BAF60c
BAF155
BAF170
BAF180
BAF200
BAF250a
BAF250b
BRG1
BRM

Singh_Fig S2



E8.5 mouse embryo

Affinity Purification of Brg1 Complex With Anti-Brg1 Antibody (0.3M NaCl; 0.1% SDS)

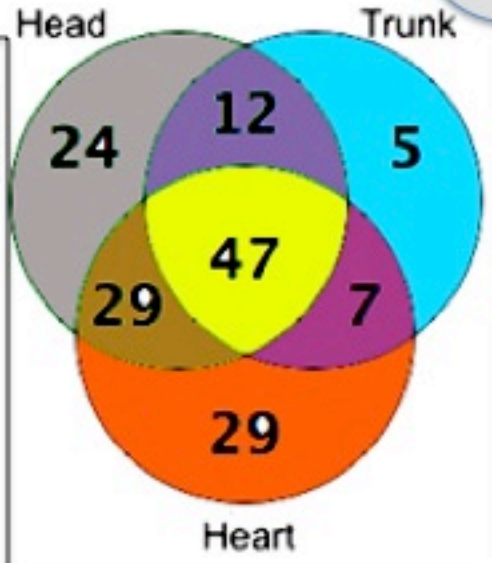
Nuclear Extract From Heart, Head and Trunk Of E8.5 Mouse Embryos

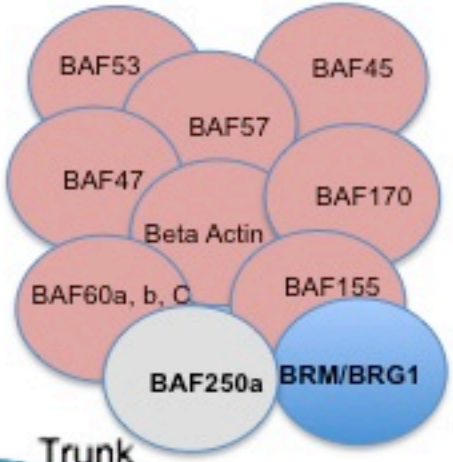
Proteolyze

Strong Cationic Exchange-Fraction

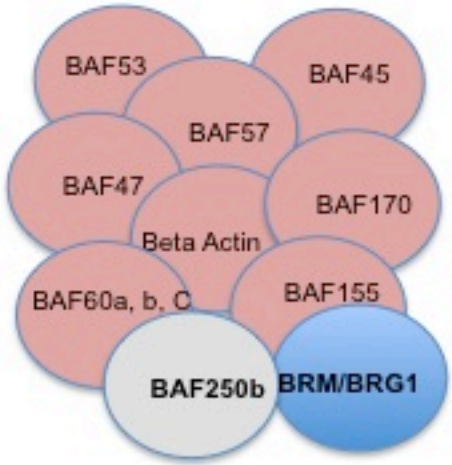
ESI-MS/MS (QIT)

Identify Proteins (Trans Proteomic Pipe)

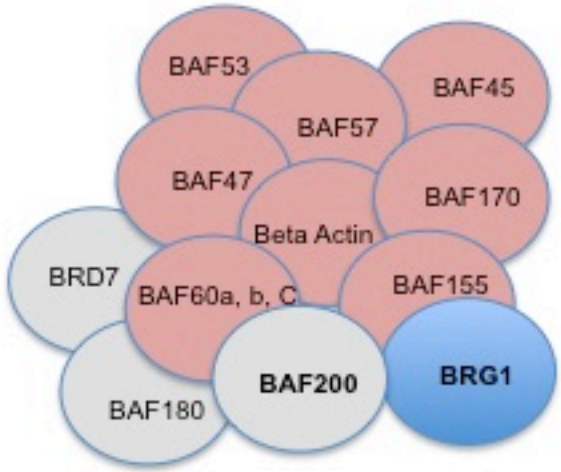




BAF-A



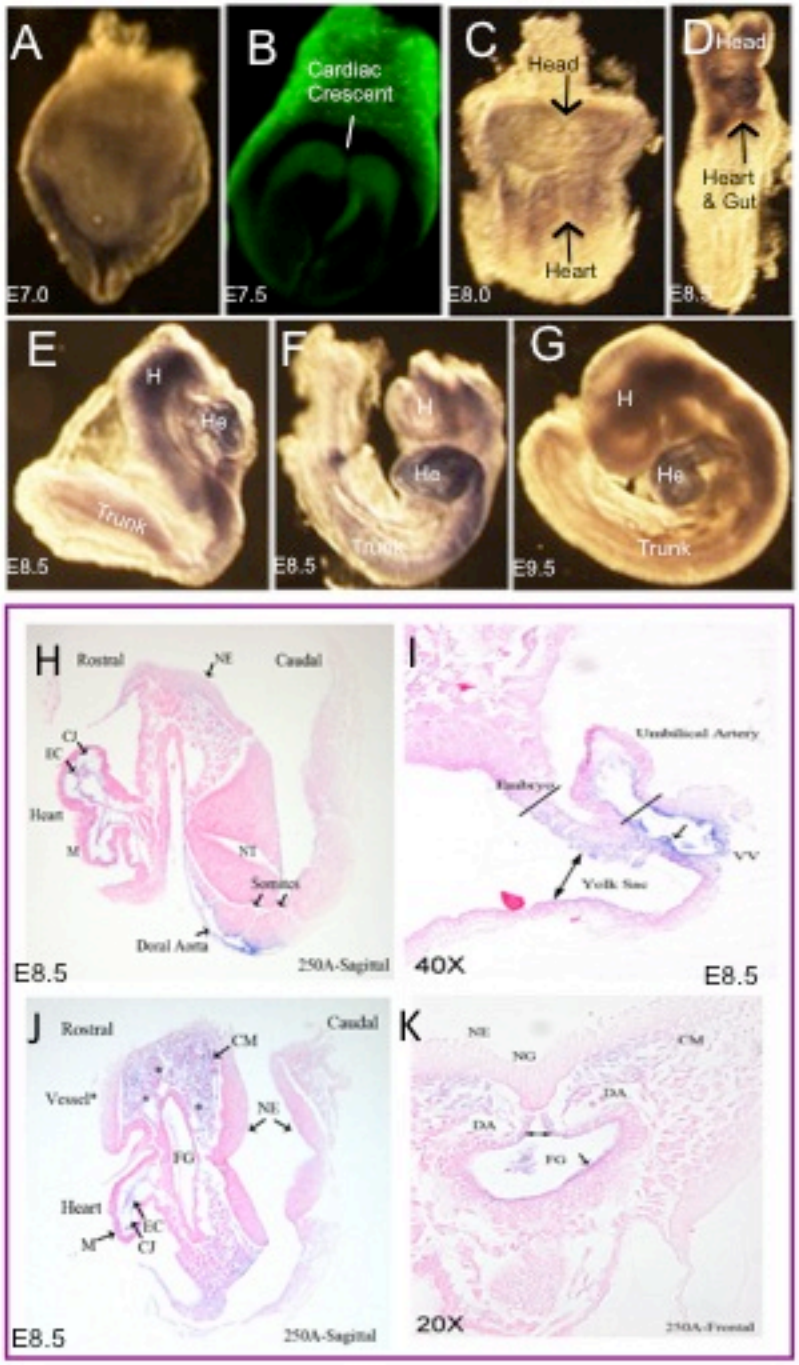
BAF-B



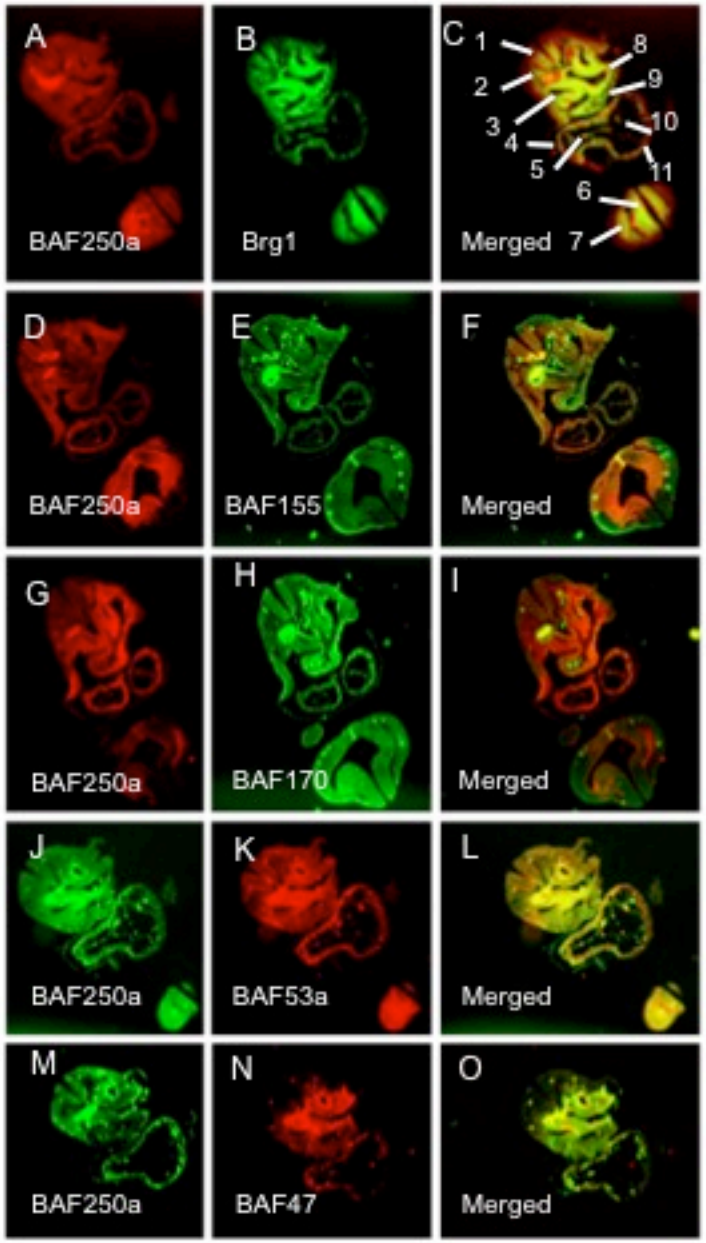
PBAF

Distinct Cardiac enriched SWI/SNF-like complexes exist in the developing heart at E8.5 mouse embryos.

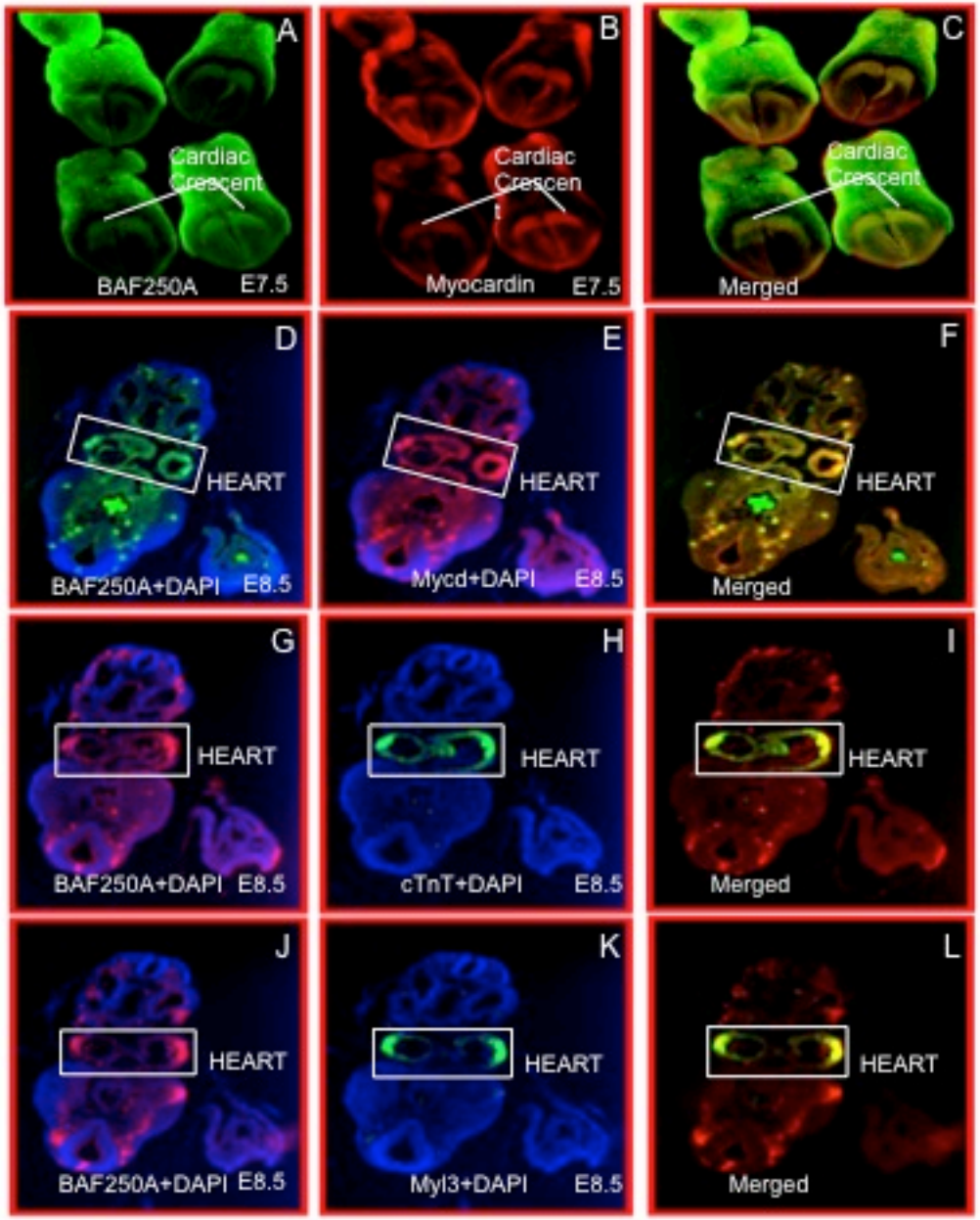
Singh_Fig S3


A
E7.0
B
Cardiac Crescent
E7.5
C
Head
Heart
E8.0
D
Head
Heart & Gut
E8.5
E
H
He
Trunk
E8.5
F
H
He
Trunk
E8.5
G
H
He
Trunk
E8.5
H
Rostral
NE
Caudal
CJ
EC
Heart
M
NT
Somites
Dorsal Aorta
E8.5
250A-Sagittal
I
Umbilical Artery
Vitelline Vessels
VV
Yolk Sac
40X
E8.5
J
Rostral
CM
Caudal
Vessel*
NE
FG
Heart
EC
M
CJ
E8.5
250A-Sagittal
K
NE
NG
CM
DA
DA
FG
20X
250A-Frontal

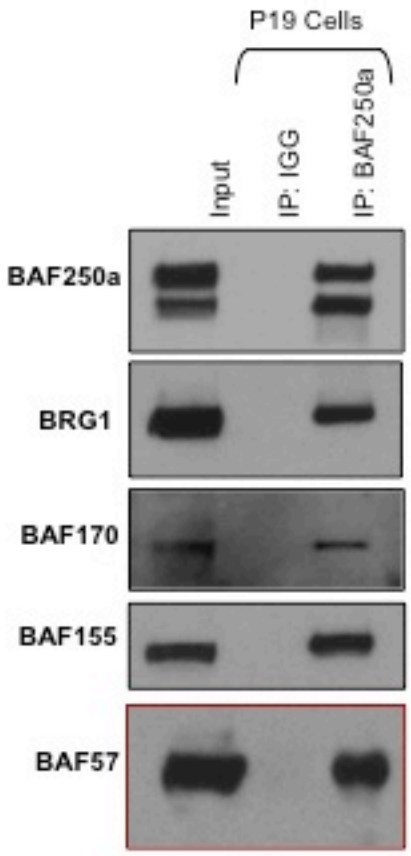
Singh_Fig S4

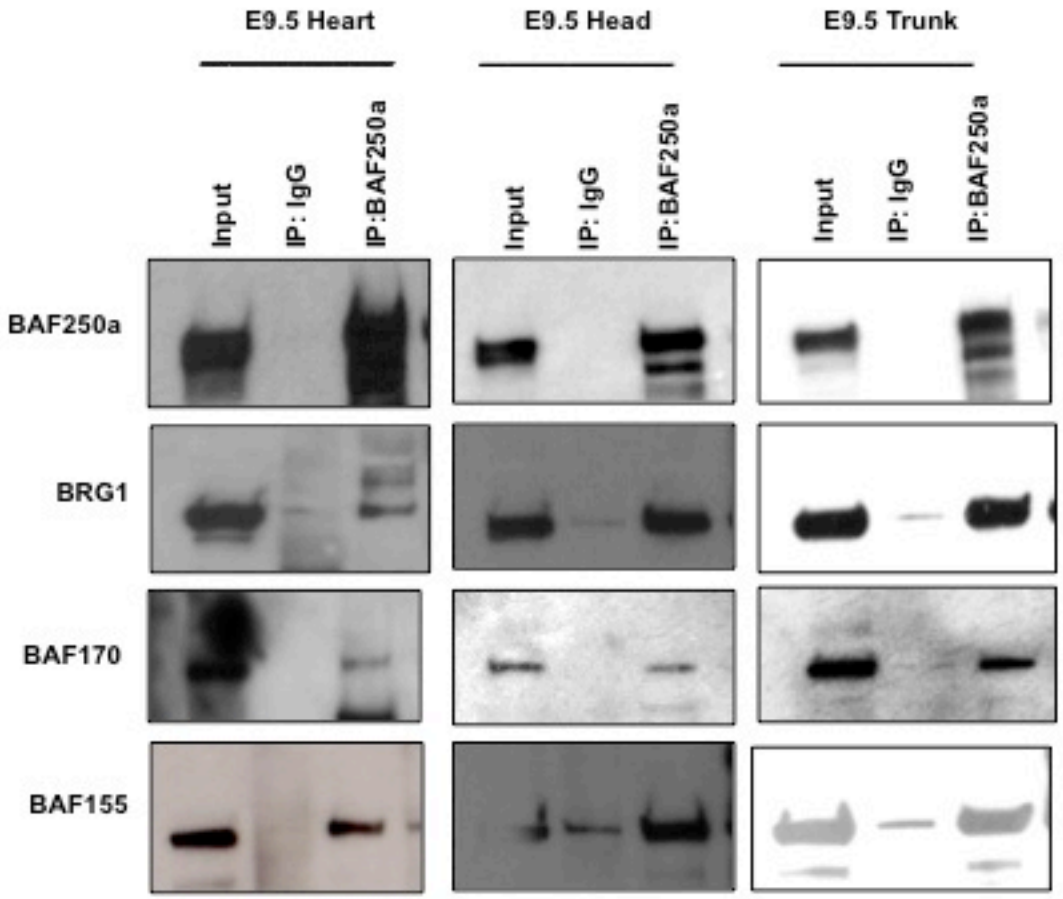

A
BAF250a
B
Brg1
C
1
2
3
4
5
6
7
8
9
10
11
Merged
D
BAF250a
E
BAF155
F
Merged
G
BAF250a
H
BAF170
I
Merged
J
BAF250a
K
BAF53a
L
Merged
M
BAF250a
N
BAF47
O
Merged

Singh_Fig S5

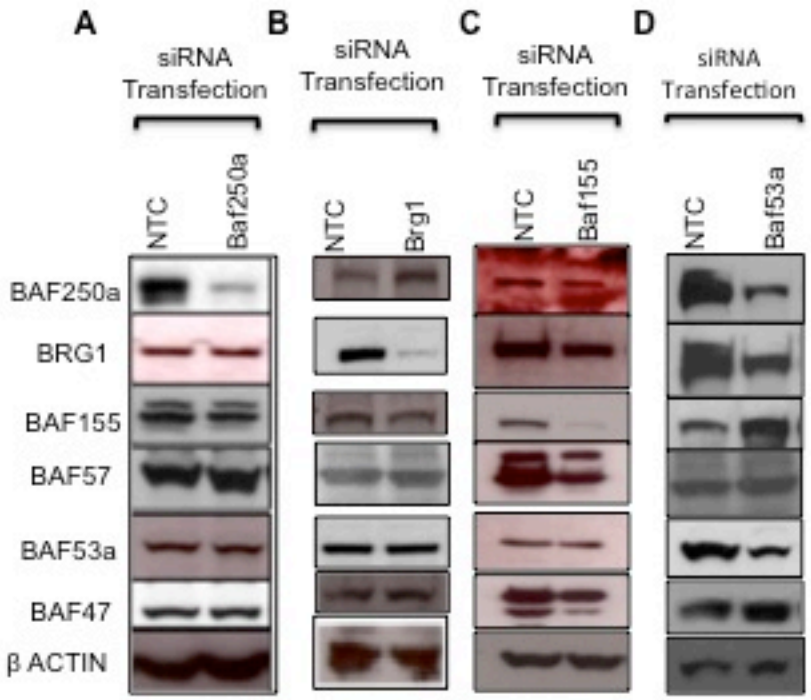

A
Cardiac Crescent
BAF250A E7.5
B
Cardiac Crescen t
Myocardin E7.5
C
Cardiac Crescent
Merged
D
HEART
BAF250A+DAPI E8.5
E
HEART
Mycd+DAPI E8.5
F
HEART
Merged
G
HEART
BAF250A+DAPI E8.5
H
HEART
cTnT+DAPI E8.5
I
HEART
Merged
J
HEART
BAF250A+DAPI E8.5
K
HEART
Myl3+DAPI E8.5
L
HEART
Merged

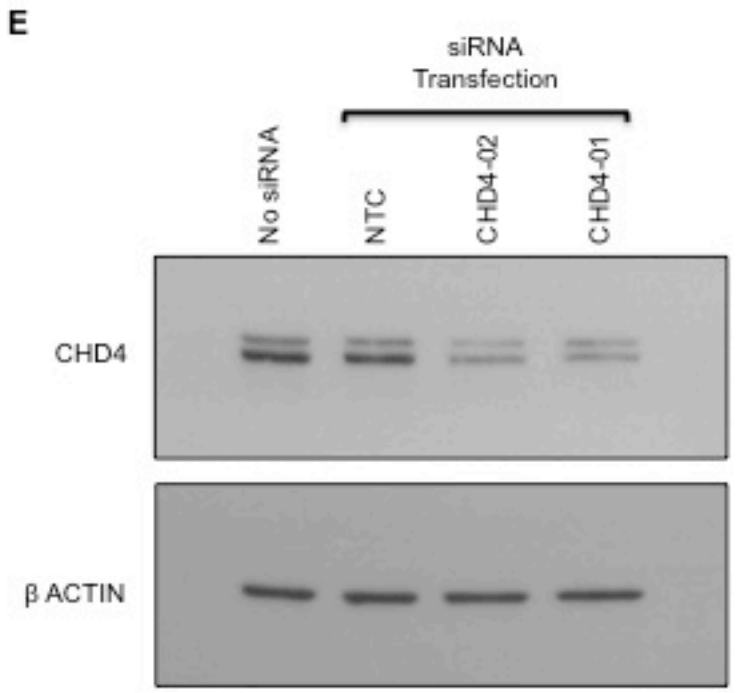
Singh_Fig S6


P19 Cells
Input
IP: IGG
IP: BAF250a
BAF250a
BRG1
BAF170
BAF155
BAF57

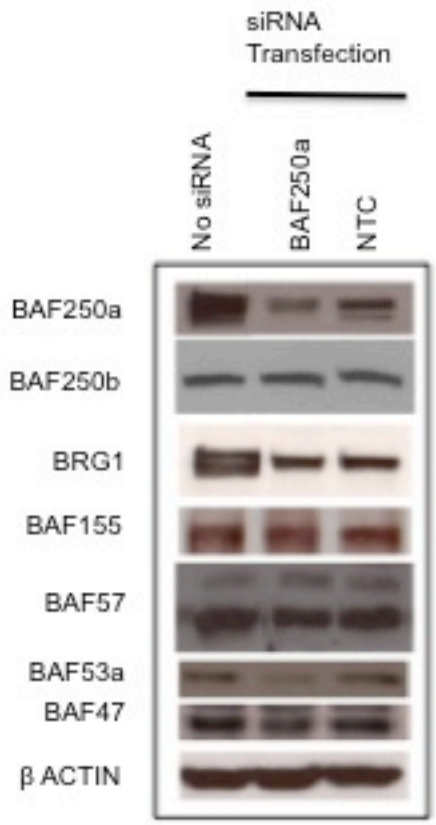

E9.5 Heart
E9.5 Head
E9.5 Trunk
Input
IP: IgG
IP:BAF250a
BAF250a
BRG1
BAF170
BAF155

Singh_Fig S7


A
siRNA Transfection
NTC
Baf250a
BAF250a
BRG1
BAF155
BAF57
BAF53a
BAF47
β ACTIN
B
siRNA Transfection
NTC
Brg1
C
siRNA Transfection
NTC
Baf155
D
siRNA Transfection
NTC
Baf53a


E
siRNA Transfection
No siRNA
NTC
CHD4-02
CHD4-01
CHD4
β ACTIN

Singh_Fig S8


siRNA
Transfection
No siRNA
BAF250a
NTC
BAF250a
BAF250b
BRG1
BAF155
BAF57
BAF53a
BAF47
β ACTIN

Endogenous Brg1 associated subunits in P19 cell

Brg1 Associated BAF Subunits in P19 Cell	# of Spectra In Naïve P19 cell	% AA Coverage	# of Distinct Peptides	MS/MS Score
BRG1(SMARCA4)	16	9	14	167.07
ACTG1(β ACTIN)	14	23	8	111.55
BAF155(SMARCC1)	12	10	8	97.99
BAF47(SMARCB1)	8	19	5	59.35
BAF45D(DPF2D4)	5	11	3	52.37
BAF53A(ACTL6A)	5	11	4	50.64
BAF60A(SMARCD1)	5	6	3	46.27
BAF170(SMARCC2)	5	2	3	37.63
BAF250A(ARID1A)	2	1	2	22.09
Baf250a Associated Brg1 Subunits in P19 Cell	**# of Spectra in Naive P19 cell**	**% of AA Coverage**	**# of Distinct Peptides**	**MS/MS Score**
BAF250A(Arid1a)	51	8	13	190.38
ACTG1 (β ACTIN)	21	16	6	88.78
BRG1(Smarca4)	**8**	**4**	**6**	**77.49**
BAF53A(Actl6a)	5	13	5	67
BAF170(Smarcc2)	5	6	5	56.13
BAF155(Smarcc1)	7	4	4	54.97
BRM(Smarca2)	**6**	**2**	**4**	**52.35**
BAF45D(Dpf2)	4	11	3	41.38
BAF250B(Arid1b)	6	0	2	30.03
BAF47(Smarcb1)	1	4	1	15.47
BAF250A Associated Repressive complex Proteins In P19 Cell	**# of Spectra in Naive P19 cell**	**% of AA Coverage**	**# of Distinct Peptides**	**MS/MS Score**
Dnmt1	1	2	3	34.29
HDAC2	2	5	2	22.66
CHD3	2	6	2	21.61
HDAC1	2	4	2	20.85