Sample
Data Management Protocol

Provided by Elizabeth A. Heller, PhD, Assistant Professor of Systems Pharmacology and Translational Therapeutics

Responsible Conduct of Research (RCR)

DATA ACQUISITION AND MANAGEMENT

The acquisition and management of data are vital to the research record. The acquisition of data begins with the execution of a research plan, which in turn relies on a scientific premise and an experimental design, ideally one that considers variables, statistical power, and an authentication of key biological or chemical resources – in short, the elements of reproducibility.

The management of data requires a complete and accurate representation of the data, a full accounting of protocols and the logic underlying them, a means of authenticating results by co-workers and others seeking replication, and a protection of such information from loss and inappropriate intrusion.

https://www.med.upenn.edu/bgs-rcr-exdes/

EXPERIMENTAL DESIGN

The elements of reproducibility

- Variables
  - Treatment/manipulation condition(s)
  - Control condition(s)
- Statistical power
  - Power analysis
  - Empirical data
- Time course
- Protocol
  - Reagents
  - Equipment
  - Authentication

https://www.med.upenn.edu/bgs-rcr-exdes/

EXPERIMENTAL EXECUTION

Data acquisition

Data are acquired through observation and are recorded initially through hand-entered notations, instrument or computer readouts, and/or images. Records of this nature are referred to as 'primary' data. These data can be organized subsequently into formats amenable to analysis and presentation, or 'secondary' data.

- Primary data
  - hand-entered notations
  - Instrument/computer readouts
  - Images

- Secondary data
  - analysis and interpretation

https://www.med.upenn.edu/bgs-rcr-exdes/

DATA MANAGEMENT

The notebook provides a record of primary and secondary data. It can, and should, provide as well a record of collaboration, interpretation, and decisions. It allows authentication of work by outside parties and proves ownership in claims to discovery.

The exact format of record-keeping is left to the discretion of the principal investigator.

https://www.med.upenn.edu/bgs-rcr-exdes/

DATA MANAGEMENT (con't)

- Entries for any single experiment should include date, purpose, materials, protocol, results, discussion, and next steps.
- Entries must include primary, unedited data, and should include as well any derived data, tables, calculations, and graphs. With regard to primary data, it is imperative to:
- Document everything – you cannot remember it all.
- Document everything ASAP – acts and details kept 'in your head' are quickly lost.
- Document everything whether it's 'good' or 'bad', 'right' or 'wrong'. Omitting data is dishonest.
- If data are discarded in a subsequent analysis, clearly note the reason for it. Not infrequently this will require statistical validation.

https://www.med.upenn.edu/bgs-rcr-exdes/

Guidelines for computer-assisted / electronic record keeping:

- An official procedure for the lab's electronic record-keeping process should be defined and communicated by the principal investigator to all users.
- The location, organization, and nature of electronic records for each user should be clearly defined.
- The nature of entries with regard to content, how decisions are made, and how data are selected should conform to those recommended above for bound notebooks.
- Entries should be write-protected and time-stamped to ensure authenticity.
- The date and content of primary electronic records should never be altered. Any corrections, addenda, or correspondence relating to primary electronic records must be made separately from these records, again in a write-protected and time-stamped fashion.
- Access to the stored electronic data of researchers in the lab should be authorized by the principal investigator as needed, with full knowledge of all involved parties.

https://www.med.upenn.edu/bgs-rcr-exdes/

Guidelines for computer-assisted / electronic record keeping:

Regarding storage and protection:

- Regular (daily) backup of all records should be mandated, and the process and oversight of this should be clearly prescribed and regularly monitored for compliance.
- Data on laptops, portable hard drives, and other portable media should be encrypted.
- The notebook and other records should be retained for a sufficient period of time to allow analysis and repetition by others of published material resulting from those data. In general, five to seven years is specified as the minimum period for retention but this may vary under different circumstances.

https://www.med.upenn.edu/bgs-rcr-exdes/

HELLERLAB RECORD KEEPING GUIDELINES

Electronic data acquisition and management

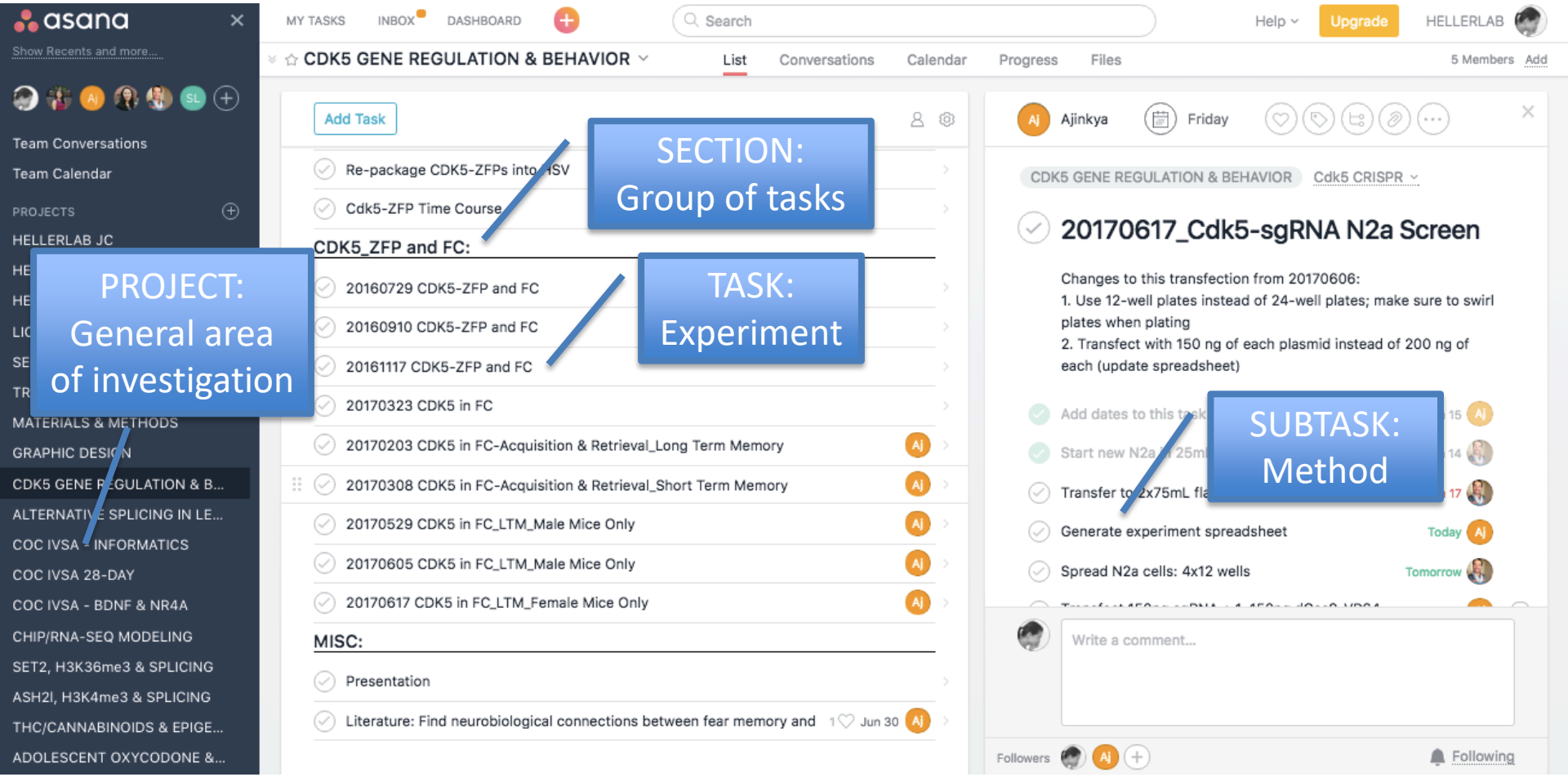
An experiment is defined by the BIOLOGICAL HYPOTHESIS, not by method.

Thus, each experiment will include more than one experimental method.

DATA ORGANIZATION: ASANA

- PROJECT: Global area of laboratory investigation, encompassing multiple trainees and manuscripts
- SECTION: Experiments organized towards a manuscript, one head trainee with collaborators
- TASK: Individual experiment, as defined above
- SUBTASK: Step of a protocol, defined by date, assignee

ASANA


asana
Show Recents and more...
Team Conversations
Team Calendar
PROJECTS
HELLERLAB JC
MATERIALS & METHODS
GRAPHIC DESIGN
CDK5 GENE REGULATION & B...
ALTERNATIVE SPLICING IN LE...
COC IVSA - INFORMATICS
COC IVSA 28-DAY
COC IVSA - BDNF & NR4A
CHIP/RNA-SEQ MODELING
SET2, H3K36me3 & SPLICING
ASH2l, H3K4me3 & SPLICING
THC/CANNABINOIDS & EPIGE...
ADOLESCENT OXYCODONE &...
MY TASKS
INBOX
DASHBOARD
Search
Help
Upgrade
HELLERLAB
CDK5 GENE REGULATION & BEHAVIOR
List
Conversations
Calendar
Progress
Files
5 Members
Add
Add Task
Re-package CDK5-ZFPs into HSV
Cdk5-ZFP Time Course
CDK5_ZFP and FC:
20160729 CDK5-ZFP and FC
20160910 CDK5-ZFP and FC
20161117 CDK5-ZFP and FC
20170323 CDK5 in FC
20170203 CDK5 in FC-Acquisition & Retrieval_Long Term Memory
20170308 CDK5 in FC-Acquisition & Retrieval_Short Term Memory
20170529 CDK5 in FC_LTM_Male Mice Only
20170605 CDK5 in FC_LTM_Male Mice Only
20170617 CDK5 in FC_LTM_Female Mice Only
MISC:
Presentation
Literature: Find neurobiological connections between fear memory and
Jun 30
SECTION: Group of tasks
PROJECT: General area of investigation
TASK: Experiment
SUBTASK: Method
Ajinkya
Friday
CDK5 GENE REGULATION & BEHAVIOR
Cdk5 CRISPR
20170617_Cdk5-sgRNA N2a Screen
Changes to this transfection from 20170606:
1. Use 12-well plates instead of 24-well plates; make sure to swirl plates when plating
2. Transfect with 150 ng of each plasmid instead of 200 ng of each (update spreadsheet)
Generate experiment spreadsheet
Today
Spread N2a cells: 4x12 wells
Tomorrow
Write a comment...
Followers
Following

HELLERLAB RECORD KEEPING GUIDELINES (con't)

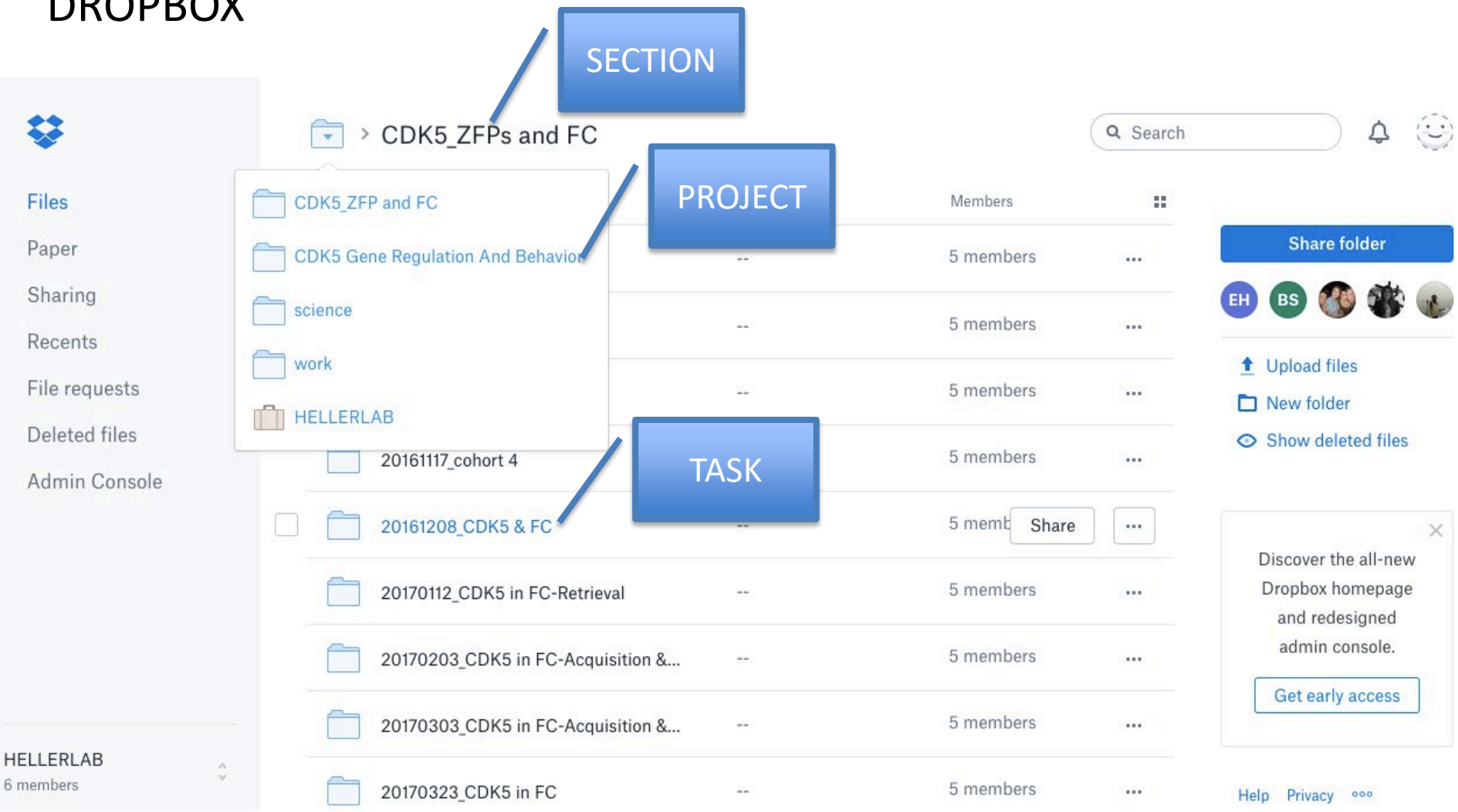
Electronic data acquisition and management

DATA STORAGE LOCATION: DROPBOX

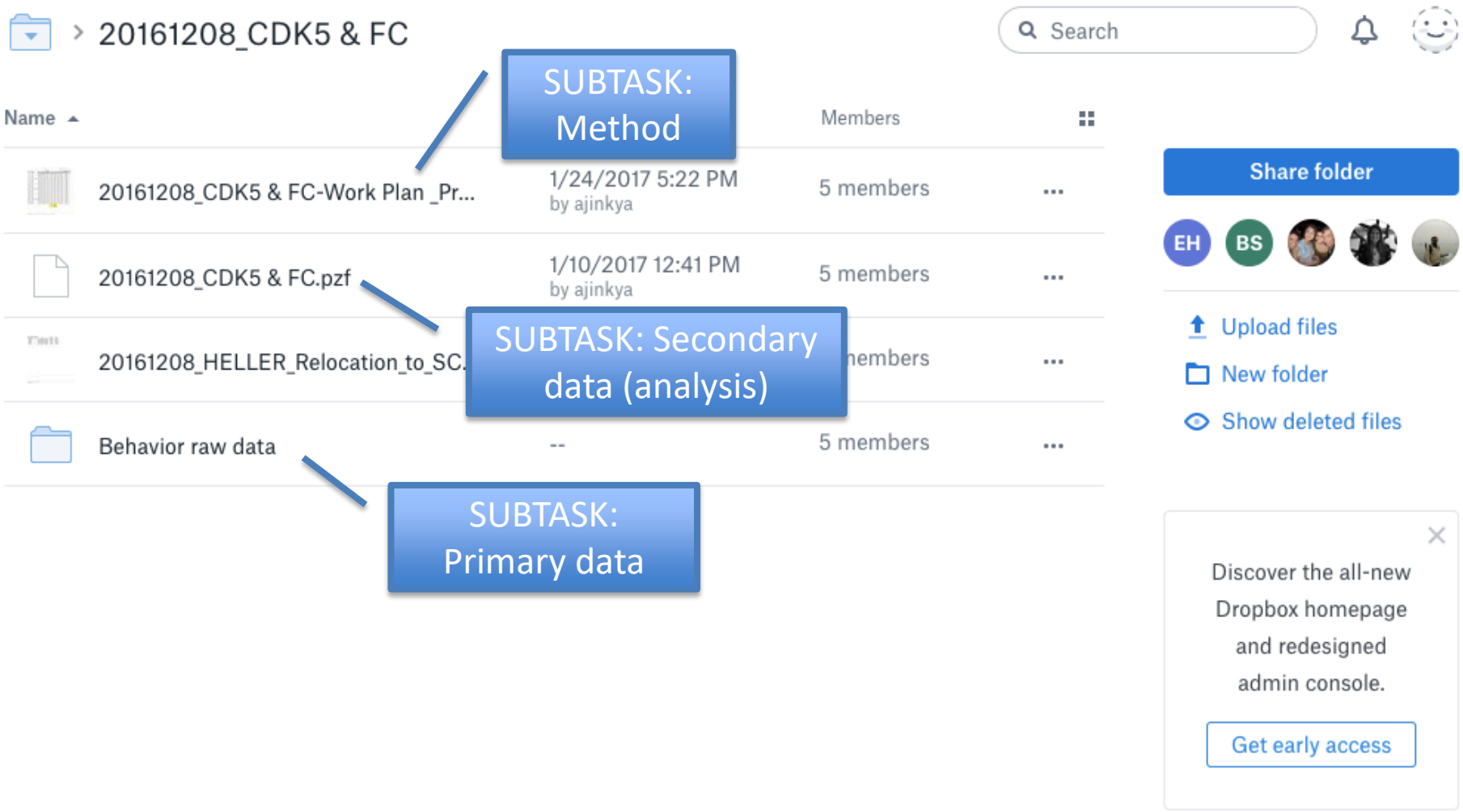
(File names and folder organization map to ASANA)

- Parent folder name = PROJECT
  - Project names maps to PROJECT in ASANA
- Sub-folder name = SECTION
  - Sub-folder name maps to SECTION in ASANA
  - Sub-folder contains excel workbook, primary data and secondary data (described below)
- File name = TASK
  - Each file is named as DATE_DESCRIPTION
  - Date format is YEAR-MO-DAY, e.g. 20170620
  - Each task maps to an experiment, consisting of multiple methods, as defined above and below

DROPBOX


SECTION
PROJECT
TASK
CDK5_ZFPs and FC
Search
Files
Paper
Sharing
Recents
File requests
Deleted files
Admin Console
CDK5_ZFP and FC
CDK5 Gene Regulation And Behavior
science
work
HELLERLAB
Members
5 members
20161117_cohort 4
20161208_CDK5 & FC
Share
20170112_CDK5 in FC-Retrieval
20170203_CDK5 in FC-Acquisition &...
20170303_CDK5 in FC-Acquisition &...
20170323_CDK5 in FC
Share folder
EH
BS
Upload files
New folder
Show deleted files
Discover the all-new Dropbox homepage and redesigned admin console.
Get early access
Help
Privacy
HELLERLAB
6 members

DROPBOX


20161208_CDK5 & FC
Search
SUBTASK: Method
SUBTASK: Secondary data (analysis)
SUBTASK: Primary data
Name
Members
20161208_CDK5 & FC-Work Plan _Pr...
1/24/2017 5:22 PM
by ajinkya
5 members
20161208_CDK5 & FC.pzf
1/10/2017 12:41 PM
by ajinkya
5 members
20161208_HELLER_Relocation_to_SC...
Behavior raw data
--
5 members
Share folder
EH
BS
Upload files
New folder
Show deleted files
Discover the all-new Dropbox homepage and redesigned admin console.
Get early access

HELLERLAB RECORD KEEPING GUIDELINES (con't)

Electronic data acquisition and management

- Format of electronic record
  - Microsoft excel WORKBOOK
    - File name is DATE_DESCRIPTION
  - Workbook is organized into WORKSHEETS
    1. Experimental design
       - Time course
       - Subjects or samples
         - origin/sex/age/species
       - Manipulation
       - Data collection method
       - Analysis method
    2. Protocol
       - Reagents (product, manufacturer, lot)
       - Equipment (product, manufacturer)
       - Notations on changes to protocol during execution

HELLERLAB RECORD KEEPING GUIDELINES (con't)

Electronic data acquisition and management

- Format of electronic record (con't)
    3. Primary data
        - Primary data is recorded in sub-folder mapped to TASK
            - worksheet in workbook (e.g. qPCR raw data)
            - sub-folders (e.g. images, scans)
        - Manually recorded data (e.g. behavior scoring, MedAssociates Output)
        - Electronically delivered data (e.g. MedAssociates, Bioanalyzer, Nanodrop)
        - Images
        - Videos
    4. Secondary data – analysis
        - Separate sheet for each analysis
        - Analysis accurately labeled and annotated

- Backup and storage
    - DROPBOX data is automatically cloud backed up hourly and time-stamped
    - DROPBOX data must also be stored on individual user's primary hard drive
    - Data backed up DAILY to individual user's external hard drive, using automatic backup management software such as WDCloud or TimeMachine

Sample Experimental Data: Microsoft excel workbook

20161208_CDK5 & FC-Work Plan _Protocol_and Observations.xlsx
Modified on January 24

EXPERIMENTAL DESIGN

D1

No Surgeries

Sac'd 6 hrs post FC-Test

			Handling						FC-training	FC-test	Disscetions - CA1
Sr. No.	Mouse ID		Day1	Day2	Day3	Day4	Day5	Day6			Punches (mm X no.)
			8-Dec	9-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	15-Dec
1	1-1	Home Cage	OK	OK	OK	OK	OK	OK	NA	NA	1.2x2
2	1-2		OK	OK	OK	OK	OK	OK	NA	NA	1.2x2
3	1-3		OK	OK	OK	OK					1.2x2
4	1-4		OK	OK	OK	OK					1.2x2
5	1-5		OK	OK	OK	OK					1.2x2
6	2-1		OK	OK	OK	OK	OK	OK	NA	NA	1.2x2
7	2-2		OK	OK	OK	OK	OK	OK	NA	NA	1.2x2
8	2-3		OK	OK	OK	OK	OK	OK	NA	NA	1.2x2
9	2-4		OK	OK	OK	OK	OK				1.2x2
10	2-5		OK	OK	OK	OK	OK				1.2x2
11	3-1	Context control	OK	OK	OK	OK	OK				1.2x2
12	3-2		OK	OK	OK	OK	OK				1.2x2
13	3-3		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
14	3-4		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
15	3-5		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
16	4-1		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
17	4-2		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
18	4-3		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2
19	4-4		OK	OK	OK	OK	OK	OK	OK	OK	1.2x2

PRIMARY DATA: Observations

PRIMARY DATA: Sample collection

Observations | FC protocol | FC results-30sec binned data | Trizol | cDNA | qPCR Sheet

Sample Experimental Data: Microsoft excel workbook

20161208_CDK5 & FC-Work Plan _Protocol_and Observations.xlsx
Modified on January 24

EXPERIMENTAL DESIGN

REFERENCE TO PRIMARY DATA

Training Day 0.4mAmp single shock at 148th sec of 180 sec trial

						Video File	
Box1	3-1		**Box2**	3-2	3-5	Cage 3	
	4-1			4-2	5-5	Cage 4	data bined with 30 sec interval
	5-1			5-2		Cage 5	
	6-1			6-2		Cage 6	
Box3	3-3		**Box4**	3-4	4-5		
	4-3			4-4	6-5		
	5-3			5-4			
	6-3			6-4			

Test Day No Shock 300 sec trial

C20

						Video File	
Box1	3-1		**Box2**	3-2	3-5	Cage 3	
	4-1			4-2	5-5	Cage 4	data bined with 30 sec interval
	5-1			5-2		Cage 5	
	6-1			6-2		Cage 6	

Observations | FC protocol | FC results-30sec binned data | Trizol | cDNA | qPCR Sheet

Sample Experimental Data: Microsoft excel workbook

20161208_CDK5 & FC-Work Plan _Protocol_and Observations.xlsx
Modified on January 24

30 sec binned data

Sr. No.	Mouse ID	training Freezing %	24hrs test Freezing %
1	3-1	3.72	17.35
2	3-2	1.18	6.36
3	3-3	4.12	23.59
4	3-4	12.86	16.11
5	3-5	6.72	7.31
6	4-1	2.12	6.46
7	4-2	3.24	15.55
8	4-3	16.92	15.93
9	4-4	10.06	17.60
10	4-5	6.70	26.03
11	5-1	4.66	31.07
12	5-2	6.62	40.40
13	5-3	4.38	35.77
14	5-4	16.14	47.32
15	5-5	8.38	66.07
16	6-1	3.08	81.90
17	6-2	6.80	58.10
18	6-3	8.00	41.70

PRIMARY DATA

Observations | FC protocol | FC results-30sec binned data | Trizol | cDNA | qPCR Sheet

Sample Experimental Data: Microsoft excel workbook

20161208_CDK5 & FC-Work Plan _Protocol_and Observations.xlsx
Modified on January 24

PROTOCOL

Date		Species	Experiment		Tissue	Elution Volume		
	VILO KIT	Mus	11172016_CDK5-ZFP1-p65&G9a-FC		HIP	30 uL		
	Sample		Brain Regio	RNA ng/uL	Desired ng	Volume RNA (= Desired / Sample)	Volume Water (=14 µL-volume RNA)	
Tube								Tube

Component	Quantity
5X VILO Reaction Mix	4 µL
10X SuperScriptTM Enzyme Mix	2 µL
RNA (up to 2.5 µg)**Only 2µL for <100 ng total RNA	x µL

C12

1. Gently mix tube contents and incubate at 25°C for 10 minutes.

2. Incubate tube at 42°C for 60 minutes.

Incubate up to 120 minutes @42°C for increased yields; use water bath

Use thermomixer, gently mixing at ~400 rpm

3. Terminate the reaction at 85°C at 5 minutes.

4. Use diluted or undiluted cDNA in qPCR (see "qPCR using fluorescent primers or probes" on page 2 and "qPCR using SYBRTM Green or SYBRTM GreenERTM reagent" on page 3), or store at –20°C until use.

Observations | FC protocol | FC results–30sec binned data | Trizol | cDNA | qPCR Sheet

20160729_cohort 2

Search

Name	Modified	Members
20160729_CDK5-ZFP1_FC_Behavior_...	--	5 members
20160729_CDK5-ZFP1_FC-Work Plan...	11/30/2016 3:45 PM by ajinkya	7 memb Share
20160729_CDK5-ZFP_FC.pzf	9/28/2016 4:03 PM by ajinkya	5 members
20160729_HELLER_CDK5-ZFP FC C...	8/19/2016 3:03 PM by ajinkya	5 members
20160729_HELLER_Relocation_to_SC...	7/29/2016 1:06 PM by ajinkya	5 members

Sample Experimental Data: Microsoft excel workbook

EXPERIMENTAL DESIGN

20160729_CDK5-ZFP1_FC-Work Plan _Protocol_and Observations.xlsx
Modified on November 30, 2016

Share | Open | ...

								GFP	25% diluted				M1					
								ZFP1-p65	undiluted									
		Handling						Surgery			PostSurgery & Handling			FC-training	FC-test	GFP expression	
Sr. No.	Mouse ID	Day1	Day2	Day3	Day4	Day5	Day6	Rig	Virus	Notes	Day1	Day2	Day3			Left	Righ
		29-Jul	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug	4-Aug			5-Aug	6-Aug	7-Aug	8-Aug	9-Aug		
1	1-1	ok	ok	ok	ok	ok	ok	1	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	No	No
2	1-2	ok	ok	ok	ok	ok	ok	2	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	No
3	1-3	ok	ok	ok	ok	ok	ok	3	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Faint	Fain
4	1-4	ok	ok	ok	ok	ok	ok	died after anesthesia									
5	2-1	ok	ok	ok	ok	ok	ok	3	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
6	2-2	ok	ok	ok	ok	ok	ok	2	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
7	2-3	ok	ok	ok	ok	ok	ok	died after anesthesia									
8	2-4	ok	ok	ok	ok	ok	ok	2	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
9	3-1	ok	ok	ok	ok	ok	ok	3	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	No	No
10	3-2	ok	ok	ok	ok	ok	ok	1	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
11	3-3	ok	ok	ok	ok	ok	ok	1	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
12	3-4	ok	ok	ok	ok	ok	ok	2	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
13	4-1	ok	ok	ok	ok	ok	ok	3	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
14	4-2	ok	ok	ok	ok	ok	ok	1	HSV-cdk5-ZFP1-p65	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
15	4-3	ok	ok	ok	ok	ok	ok	2	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
16	4-4	ok	ok	ok	ok	ok	ok	3	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	Stror
17	5-1	ok	ok	ok	ok	ok	ok	1	HSV-GFP	ok	A, D, G	A, D, G	A, D, G	A, D, G	A, D, G	Strong	No
18	5-2	ok	ok	ok	ok	ok	ok	2	HSV-cdk5-ZFP1-p65	ok	A, D, G minor suture release	A, D, G minor suture release recovering	A, D, G minor suture release recovering	A, D, G minor suture release recovering	A, D, G minor suture release recovered	Strong	Stror

Surgeries & Dissection | Surgery Protocol | FC protocol | FC results-30sec binned data | 2-FC results-30 sec binned data | normalized by post-pre freezing | re-analysis with freezing tim

Multiple methods; each in separate sheet

Sample Experimental Data: Microsoft excel workbook

PROTOCOL

20160729_CDK5-ZFP1_FC-Work Plan _Protocol_and Observations.xlsx
Modified on November 30, 2016

Share | Open | ...

		Steps in Steriotactic Injections	Notes
1		needle cleaning with acetone	Ensure that the DV bar is alighned to Zero and both needles are at equal height.
2		needle cleaning with Mili Q-water	
3		needle filled with water - ready for next surgery	
4		Ketamine (100 mg/kgbody weight)	1 mL of Ketasol stock + 160 uL of xylazine stock, make up to 10 mL with saline. IP Injected 0.1 mL/ 10 g body wight.
5		Xylazine (16/ kg gm body weight)	
6		Pain management Buprenex stock (0.3 mg/mL) Meloxicam stock (5mg/mL)	Buprenex stock (0.05mg/kg body weight) + Meloxicam stock (5mg/kg body wieght) IP given
7		mice head fixing on to the frame	Insert the ear bars in ear canal close to post glenoid formen, just behind the Zygomatic arch. Fix one side ear bar and then work on the other side. Firmly fixed, straight alighnment
8		Surgery	
	a	betadine swab C13	wipe head fur with beatdine
	b	incision	make a AP incision up to end of skull, clean up any blood to make visible bregma and lambda
	c	needle positioning	Check the angle is correct. Lower both needle and match their tips at the bregma
	d	bregma readings	Note the AP, ML and DV readings in the Surgery log sheet along with animal details
			Angle: 7, AP: -1.9 , ML: +1.5, DV: -1.5
	e	co-ordinate calucations	Calucalte Injection Co-ordinates (adding/substracting)
	f	needle repostioning	Move up the needles & reposition them using calculated AP and ML cor-ordiantes. Lower the needles to touch the skull top.
	g	drill	Move up the needles and driil exactly where the needles touche dth skull top. Wipe out excess blood.
	h	virus filling in needle	Push out water up to 2.5 mark on the needle. Wipe out the water drop with a swab. Fill up the Virus just above the 3.5 mark. Take care not to fill up bubbles
	i	Dorsal CA1 injection	Lower the needles to touch the exposed brain at drilled site. Slowly move the needle DV to calcualted co-ordinates. Inject 0.5 µl at the rate of 0.1 µl/min (3.5 mark to 3.0 mark)
	j	3 min break	Wait for three minutes
	m	needle pull out	Pull up the needles slowly. And tr them inwards.

Surgeries & Dissection | Surgery Protocol | FC protocol | FC results-30sec binned data | 2-FC results-30 sec binned data | normalized by post-pre freezing | re-analysis with freezing tir

Sample Experimental Data: Microsoft excel workbook

20160729_CDK5-ZFP1_FC-Work Plan _Protocol_and Observations.xlsx
Modified on November 30, 2016

A1

30 sec binned data

PRIMARY DATA

Sr. No.	Mouse ID		FC training Day Freezing %	24hrs test Freezing %	first 3 mi
1	1-1	GFP	18.20	70.7	82.32
2	1-2	cdk5-ZFP1-p65	11.88	39.20	45.83
3	1-3	HSV-GFP	13.86	15.13	18.33
4	1-4				
5	2-1	HSV-cdk5-ZFP1-p65	6.54	43.33	47.07
6	2-2	HSV-GFP	7.00	34.51	37.33
7	2-3				
8	2-4	HSV-cdk5-ZFP1-p65	12.08	56.55	60.62
9	3-1	HSV-GFP	3.78	35.87	45.17
10	3-2	HSV-cdk5-ZFP1-p65	10.66	30.51	35.97
11	3-3	HSV-GFP	3.66	43.17	47.20
12	3-4	HSV-cdk5-ZFP1-p65	4.26	24.14	23.82
13	4-1	HSV-cdk5-ZFP1-p65	8.50	61.69	72.43
14	4-2	HSV-cdk5-ZFP1-p65	4.68	46.50	58.95
15	4-3	HSV-GFP	8.92	22.69	25.65
16	4-4	HSV-GFP	4.98	28.55	38.50
17	5-1	HSV-GFP	11.16	55.54	65.23

targeted/ unlearned
nals marked yellow

Sr. No.	Mouse ID	Virus	FC training Day Freezing %	24hrs test Freezing %	first 3
1	1-1	GFP	18.20	70.7	82.32
3	1-3	HSV-GFP	13.86	15.13	18.33
6	2-2	HSV-GFP	7.00	34.51	37.33
9	3-1	HSV-GFP	3.78	35.87	45.17
11	3-3	HSV-GFP	3.66	43.17	47.20
15	4-3	HSV-GFP	8.92	22.69	25.65
16	4-4	HSV-GFP	4.98	28.55	38.50
17	5-1	HSV-GFP	11.16	55.54	65.23
20	5-4	HSV-GFP	6.58	58.71	66.88
		Mean	8.68	40.54	
		SD	4.64	17.12	
		SEM	1.64	6.05	
10	3-2	HSV-cdk5-ZFP1-p65	10.66	30.51	35.97

SECONDARY DATA: ANALYSIS
New sheet for each analysis

ol | FC results-30sec binned data | 2-FC results-30 sec binned data | normalized by post-pre freezing | re-analysis with freezing time

Summary: Data Acquisition and Management

Rigorous data acquisition and management are requirements of all members of the laboratory.

The guidelines in this presentation are to be used as a resource, but are not comprehensive.

It is the responsibility of each member of the laboratory to adhere strictly to these guidelines, and to seek additional information as needed from the PI and/or other lab members.

Failure to comply with the standards of data acquisition and management constitutes research misconduct, and will result in a suspension of experimental work until compliance is attained.

https://www.med.upenn.edu/bgs-rcr-exdes/