Supplemental Material 1

Manuscript Title: Intracranial Pressure Dysfunction Following Severe Intracerebral Hemorrhage in Middle-Aged Rats

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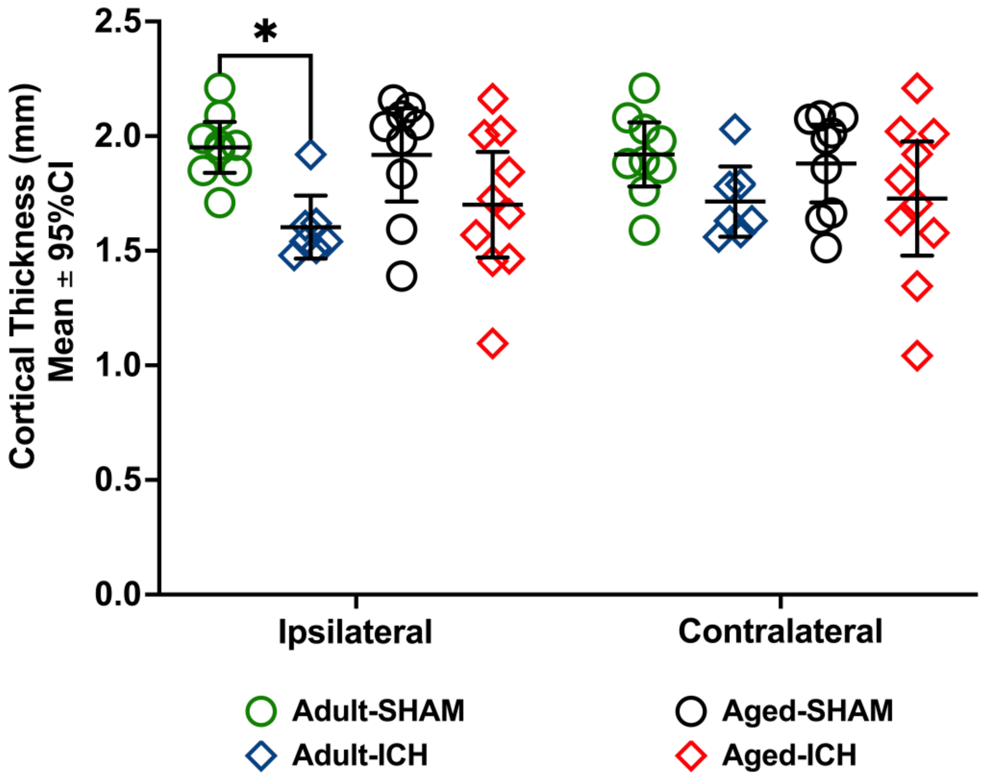

Supplementary Material 1, Figure 1. Cortical thickness of each hemisphere (ipsilateral-left, contralateral-right) across young adult and aged animals. Only Adult-ICH animals demonstrated a significantly lower cortical thickness ipsilaterally vs. Adult-SHAMs. *p<0.05 vs. Adult-SHAMs.

Table 1. DIICP and RICP events, event timing and duration, along with average and maximum ICP over each event across Aged-ICH and Aged-SHAM groups.

Animal/Group	**DIICP Event (s)?**	**Event Timing + Duration**	**Avg. & Max ICP over DIICP Event**	**RICP Events (?)**	**Event Timing + Duration**	**Avg. & Max ICP over RICP Event**
Animal C (Aged-SHAM)	DIICP Event #1	Minute 1254 for 4 minutes	Avg. ICP of 23.31 mmHg Peak ICP of 24.92 mmHg	N/A	N/A	N/A
Animal D (Aged-ICH)	DIICP Event #1	Minute 1164 for 5 minutes	Avg. ICP of 28.03 mmHg Peak ICP of 29.05 mmHg	RICP Event #1	Minute 1053 for 47 minutes	Avg. ICP of 24.88 mmHg Peak ICP of 31.36 mmHg
	DIICP Event #2	Minute 1307 for 7 minutes	Avg. ICP of 30.71 mmHg Peak ICP of 35.48 mmHg			
	DIICP Event #3	Minute 1365 for 5 minutes	Avg. ICP of 23.57 mmHg Peak ICP of 24.75 mmHg	RICP Event #2	Minute 1183 for 69 minutes	Avg. ICP of 26.91 mmHg

	DIICP Event #4	Minute 1403 for 5 minutes	Avg. ICP of 22.37 mmHg Peak ICP of 23.20 mmHg			Peak ICP of 29.58 mmHg
Animal G (Aged-ICH)	N/A	N/A	N/A	RICP Event #1	Minute 1276 for 16 minutes	Avg. ICP of 23.12 mmHg Peak ICP of 29.82 mmHg
				RICP Event #2	Minute 1294 for 13 minutes	Avg. ICP of 21.57 mmHg Peak ICP of 22.83
				RICP Event #3	Minute 1319 for 6 minutes	Avg. ICP of 21.37 mmHg Peak ICP of 22.82 mmHg
				RICP Event #4	Minute 1337 for 19 minutes	Avg. ICP of 20.89 mmHg Peak ICP of 25.09 mmHg

				RICP Event #5	Minute 1350 for 10 minutes	Avg. ICP of 22.22 mmHg Peak ICP of 26.11 mmHg
				RICP Event #6	Minute 1380 for 5 minutes	Avg. ICP of 22.14 mmHg Peak ICP of 24.45 mmHg
				RICP Event #7	Minute 1389 for 17 minutes	Avg. ICP of 21.91 mmHg Peak ICP of 27.43 mmHg
				RICP Event #8	Minute 1401 for 14 minutes	Avg. ICP of 21.26 mmHg Peak ICP of 23.10 mmHg
				RICP Event #9	Minute 1422 for 3 minutes	Avg. ICP of 20.72 mmHg

						Peak ICP of 21.10 mmHg
Animal H (Aged-SHAM)	DIICP Event #1	Minute 406 for 4 minutes	Avg. ICP of 15.52 mmHg Peak ICP of 15.95 mmHg	N/A	N/A	N/A
Animal I (Aged-ICH)	DIICP Event #1	Minute 148 for 3 minutes	Avg. ICP of 33.62 mmHg Peak ICP of 35.86 mmHg	N/A	N/A	N/A
	DIICP Event #2	Minute 261 for 3 minutes	Avg. ICP of 46.7 mmHg Peak ICP of 49.33 mmHg			
	DIICP Event #3	Minute 315 for 3 minutes	Avg. ICP of 61.70 mmHg Peak ICP of 65.84			
Animal O (Aged-ICH)	N/A	N/A	N/A	RICP Event #1	Minute 1188 for 49 minutes	Avg. ICP of 21.93 mmHg Peak ICP of 23.31 mmHg

	N/A	N/A	N/A	RICP Event #2	Minute 1245 for 67 minutes	Avg. ICP of 21.36 mmHg Peak ICP of 22.53 mmHg
	N/A	N/A	N/A	RICP Event #3	Minute 1313 for 25 minutes	Avg. ICP of 21.71 mmHg Peak ICP of 22.92 mmHg
Animal S (Aged-ICH)	DIICP Event #1	Minute 158 for 3 minutes	Avg. ICP of 20.97 mmHg Peak ICP of 21.41 mmHg	RICP Event #1	Minute 234 for 120 minutes	Avg. ICP of 28.61 mmHg Peak ICP of 33.84 mmHg
	N/A	N/A	N/A	RICP Event #2	Minute 355 for 6 minutes	Avg. ICP of 24.27 mmHg Peak ICP of 32.19 mmHg

Supplementary Material 1.3. Experiment 2 DIICP/RICP Code

```
import pandas as pd
import xlwt
from xlwt import Workbook
import numpy as np

#THIS PROGRAM OUTPUTS DIICP EVENTS

#LOAD IN DATAFILE
print("Before you start, make sure you have this file saved in the same
folder as the data/excel file you'd like to work with. Otherwise it won't
work.")
print("Next, load in the datafile. If it is an excel file (.xlsx) make
sure you save as a .csv file, then input that filename when prompted.")
file_name = input("What is the filename (include .csv at end): ")
data = pd.read_csv(file_name)

###  CHECKS  ###
# ## if you remove the # from the below checks, you can check if the data
is all there (rows and columns)
# print(data)
# row1 = pd.DataFrame(data)
# print(row1)

#This function returns a list of all of the rat letters: type <str> [list]
def letters_in_list(N):
    rat_letter_list = []
    for col in data.columns[1:N+1]:
        rat_letter_list.append(col)
    return rat_letter_list


#This function takes in the rat letter and returns all of the datapoints
for that rat in a list
def ind_rat_1440(rat_letter):
    temp = pd.Series(data[rat_letter])
    list_1440 = list(temp)
    return list_1440

#This function combines all of the individual rat_1440 lists into a list
of lists
def all_rat_1440(rat_letter_list):
    list_1440 = []
    for rat in rat_letter_list:
        ind_list = ind_rat_1440(rat)
        list_1440.append(ind_list)
    return list_1440

#This function returns a list of the average magnitude of ICP spikes above
22mmHg across animals
def avg_above_20(rat):
    points = ind_rat_1440(rat)
    total = 0
    small = True
    size = len(points)
    used_size = 0
    for i in range(0, size):
        if pd.isna(points[i]) == True:
            i += 1
            continue
        if points[i] >= 20.0:
            small = False
            used_size += 1
            total += points[i]
    if small == False:
        avg = (total/used_size)
    elif small == True:
        avg = 'non-existent'

    return avg


#This function takes in the 1440 data for one rat and returns a list of
corresponding moving averages
def moving_average(rat_data, n):
    movavg_list = []
    copy_data = []    #copy_data is so that the raw data isn't altered
    for d in rat_data:
        copy_data.append(d)
    max = 60
    for i in range(0, n):
        if i == 0:
            mov_avg = copy_data[0]
            movavg_list.append(mov_avg)
            i += 1
        elif pd.isna(copy_data[i]) == True:
            copy_data[i] = mov_avg
            movavg_list.append(mov_avg)
            i += 1
        elif i <= max:
            current_window = copy_data[0:i]
            mov_avg = sum(current_window)/i
            movavg_list.append(mov_avg)
            i += 1
        elif i > max:
            current_window = copy_data[i-max:i]
            mov_avg = sum(current_window)/max
            movavg_list.append(mov_avg)
            i += 1
    return movavg_list

#This function combines all of the individual moving average lists into a
list of lists
def all_moving_avg(major_1440_list, n):
    move_1440 = []
    for data in major_1440_list:
        ind_list = moving_average(data, n)
        move_1440.append(ind_list)
    return move_1440



#This function takes in a rat's current ICP data and mov avg data, and
totalvalues given for 1 list (n) and compares it
    #returns: a list with number of events (int), length of each event
(int list), and start time for each event (int list)
def diicp_per_rat(cur_ICP, mov_avg, n):
    diicp_event = False
    length_event = 0
    event_nums = 0
    length_event_list = []
    flag_list = []
    for i in range(0, n-1):
        if pd.isna(cur_ICP[i]) == True:
            continue
        else:
            if cur_ICP[i] >= (mov_avg[i] + 10.0): #conditions for event
are met
                if diicp_event == False: #set up like this because when
diicp_event is still false in this loop, we're at the start of a new
diicp_event
                    flag = i+1 #minute DIICP occurred
                    diicp_event = True
                if diicp_event == True:
                    length_event += 1
                i += 1

            elif pd.isna(cur_ICP[i]) == True:
               if length_event > 3:
                   event_nums += 1
                   flag_list.append(flag)
                   length_event_list.append(length_event)
               length_event = 0
               diicp_event = False

            else: #conditions for event not met
                if length_event >= 3:
                    event_nums += 1
                    flag_list.append(flag)
                    length_event_list.append(length_event)
                length_event = 0
                diicp_event = False
                i += 1

    #this block of code combines 2 events if they are 3 minutes or less
apart
    base_nums = event_nums
    for j in range(0, event_nums-3):
        if (j+1 >= len(flag_list)):
            break
        else:
            start = (flag_list[j] + length_event_list[j])
            stop = (flag_list[j+1])
            difference = start - stop
            if abs(difference) <= 3:
                event_nums -= 1
                length_event_list[j] += length_event_list[j+1]
                delete = flag_list[j+1]
                flag_list.remove(delete)
                length_event_list.remove(length_event_list[j+1])
    return[event_nums, length_event_list, flag_list]



#this function is basically our output. It returns a list of all of the
lines that will be read into a text file in another function
def all_diicp_data(major_1440, major_move, N, n, rat_letter_list):
    line_list = []
    count = 0
    for rat in rat_letter_list:
        num = rat_letter_list.index(rat)
        avg = str(avg_above_20(rat))
        if (avg[0] != 'n'):
            avg += 'mmHg'
        data = diicp_per_rat(major_1440[num], major_move[num], n)
        if data[0] == 0:
            data = "No DIICP events occurred for this animal"
            datadata = str(rat+': '+data+'. The avg ICP above 20mmHg is
'+avg)
            line_list.append(datadata)
        else:
            datadata = str(rat)+': '+str(data[0])+' event(s) occurred. The
avg ICP above 20mmHg is '+avg
            line_list.append(datadata)
            for i in range(data[0]):
                count += 1
                datadata = '     Sheet #'+str(count)+': Ocurred at minute
'+str(data[2][i])+' for '+str(data[1][i])+'mins.'
                line_list.append(datadata)
    return line_list

#This function returns the event information for each rat that had diicp
events in a list
def data_for_sheets(major_1440, major_move, N, n, rat_letter_list):
    sheets_list = []
    for rat in rat_letter_list:
        num = rat_letter_list.index(rat)
        data = diicp_per_rat(major_1440[num], major_move[num], n)
        if data[0] != 0:
            sheets_list.append([rat,data])
    return sheets_list
```

```
#This function takes in the list computed in the previous function and
turns it into a dictionary with rat_letter: [diicp outputs] pairs
def data_to_dictionary(sheets_data):
    animal_letters = []
    animal_list = []
    for animal in sheets_data:
        animal_letters.append(animal[0])
        animal_list.append(animal[1])
    animal_dictionary = dict(zip(animal_letters, animal_list))
    return animal_dictionary

#This function takes in the letters of all the rats that had diicp events
and the dictionary made in the function above
    #it returns a list of length all events, with each element being a
list of the previous 60 data points for each event in alphabetical and
then temporal order
def all_previous_60(sheet_letters, sheets_dictionary):
    export_list = []
    data = ind_rat_1440(sheet_letters)
    info = sheets_dictionary[sheet_letters]
    for i in range(info[0]):
        start = info[2][i]
        if start >= 60:
            export = data[(start-60):start]
        else:
            export = data[0:start]
        export_list.append(export)
    return export_list

#This function takes in the letters of all the rats that had diicp events
as well as the dictionary containing all of the event information.
    #it returns an int value of the total number of diicp events found in
the dataset.
def number_of_events(sheet_letters, sheets_dictionary):
    count = 0
    for letter in sheet_letters:
        data = sheets_dictionary[letter]
        event_num = data[0]
        count += event_num
    return count

#This function takes in the list of all of the sets of 60 datapoints and
creates an excel file for each of them
    #This excel file will be saved to the location that you have
python_diicp.py(this file) and the excel file you inputted at the
beginning (they must be saved in the same folder)
def sheet_exports(sheet_letters, sheets_dictionary):
    wb = xlwt.Workbook()
    maxx = 60
    for letter in sheet_letters:
        ws = wb.add_sheet(letter)
        ws.write(0, 0, 'TIME')
        start_stats = 62
        ws.write(start_stats, 0, "no. of events")
        ws.write(start_stats+1, 0, 'start(MIN)')
        ws.write(start_stats+2, 0, 'duration(MIN)')
        for t in range(maxx):
            ws.write(t+1, 0, str(t+1)+' MIN')
        row = 1
        name = letter
        data = sheets_dictionary[letter]
        event_nums = data[0]   #int
        flag_list = data[2]  #list
        length_list = data[1]  #list
        previous_60 = all_previous_60(letter, sheets_dictionary)
#listoflist
        ws.write(start_stats, 1, event_nums)
        for i in range(event_nums):
            ws.write(start_stats+1, row, flag_list[i])
            ws.write(start_stats+2, row, length_list[i])
            ws.write(0, row, (str(name)+' '+str(i+1)))
            size = len(previous_60[i])
            if size < maxx:
                missing = (maxx - size)
                for m in range(0, missing):
                    ws.write(m+1, row, np.nan)
                for n in range(missing, 60):
                    ws.write(n+1, row, float(previous_60[i][n-missing]))
            else:
                for j in range(60):
                    ws.write(j+1, row, float(previous_60[i][j]))
            row += 1
        wb.save('diicp_'+str(letter)+'.xls')

#This function takes in our output from all_diicp_data() and creates a
text file with our output that will also be saved in the same location
that you have this file saved
def text_exports(all_data):
    new_data = []
    for line in all_data:
        if line[0] == 'm':
            line = '   '+line
        new_data.append(line)
    with open('diicp_outputs.txt', 'w') as f:
        for line in new_data:
            f.write(line)
            f.write('\n')
    f.close()


def main():
    N = len(data.columns)-1  #should be 20 if there are 20 rats
    n = len(data)  #should be 1440 for 1440 minutes
    #print(N); print(n)

    rat_letter_list = letters_in_list(N) #this of all the rat letters. Ex)
'A'
```

```
    major_1440_list = all_rat_1440(rat_letter_list)  #list of all of the
current_ICP data for each rat

    major_move_list = all_moving_avg(major_1440_list, n)  #list of all of
the associated moving average/baseline data for each rat

    all_data = all_diicp_data(major_1440_list, major_move_list, N, n,
rat_letter_list)  #this is a list of the data for all diicp events that
occurred

    sheets_data = data_for_sheets(major_1440_list, major_move_list, N, n,
rat_letter_list)  #this is the data in list form for each diicp event

    sheets_dictionary = data_to_dictionary(sheets_data)  #this is the
dictionary form of sheets_data in rat:data key value pairs

    #This block of code creates a list called sheet_letters of all the
rats that had diicp events occur in alphabetical order
    sheet_letters = []
    sheet_letters_temp = sheets_dictionary.keys()
    for i in sheet_letters_temp:
        sheet_letters.append(i)

    total_events = number_of_events(sheet_letters, sheets_dictionary)
    print(str(total_events)+' diicp events found.')
    sheet_exports(sheet_letters, sheets_dictionary)  #creates a
spreadsheet for each diicp event

    text_exports(all_data) #creates a textfile with information about the
data's diicp events

    print("Success, go check the folder this file is saved in to find the
event spreadsheets and output text file.")
main()
```

```
import pandas as pd
import xlwt
from xlwt import Workbook
import numpy as np

#THIS PROGRAM OUTPUTS RICP EVENTS

#LOAD IN DATAFILE
print("Before you start, make sure you have this file saved in the same
folder as the data/excel file you'd like to work with. Otherwise it won't
work.")
print("Next, load in the datafile. If it is an excel file (.xlsx) make
sure you save as a .csv file, then input that filename when prompted.")
file_name = input("What is the filename (include .csv at end): ")
data = pd.read_csv(file_name)

###  CHECKS  ###
# ## if you remove the # from the below checks, you can check if the data
is all there (rows and columns)
# print(data)
# row1 = pd.DataFrame(data)
# print(row1)
# ##check: correctly has 1440 rows and 21 columns


#This function returns a list of all of the rat letters: type <str> [list]
def letters_in_list(N):
    rat_letter_list = []
    for col in data.columns[1:N+1]:
        rat_letter_list.append(col)
    return rat_letter_list


#This function takes in the rat letter and returns all of the datapoints
for that rat in a list
def ind_rat_1440(rat_letter):
    temp = pd.Series(data[rat_letter])
    list_1440 = list(temp)
    return list_1440

#This function combines all of the individual rat_1440 lists into a list
of lists
def all_rat_1440(rat_letter_list):
    list_1440 = []
    for rat in rat_letter_list:
        ind_list = ind_rat_1440(rat)
        list_1440.append(ind_list)
    return list_1440

#This function returns a list of the average magnitude of ICP spikes above
22mmHg across animals
def avg_above_20(rat):
    points = ind_rat_1440(rat)
    total = 0
    small = True
    size = len(points)
    used_size = 0
    for i in range(0, size):
        if pd.isna(points[i]) == True:
            i += 1
            continue
        if points[i] >= 20.0:
            small = False
            used_size += 1
            total += points[i]
    if small == False:
        avg = (total/used_size)
    elif small == True:
        avg = 'non-existent'

    return avg


#This function takes in the 1440 data for one rat and returns a list of
corresponding moving averages
def moving_average(rat_data, n):
    movavg_list = []
    copy_data = []    #copy_data is so that the raw data isn't altered
    for d in rat_data:
        copy_data.append(d)
    max = 60
    for i in range(0, n):
        if i == 0:
            mov_avg = copy_data[0]
            movavg_list.append(mov_avg)
            i += 1
        elif pd.isna(copy_data[i]) == True:
            copy_data[i] = mov_avg
            movavg_list.append(mov_avg)
            i += 1
        elif i <= max:
            current_window = copy_data[0:i]
            mov_avg = sum(current_window)/i
            movavg_list.append(mov_avg)
            i += 1
        elif i > max:
            current_window = copy_data[i-max:i]
            mov_avg = sum(current_window)/max
            movavg_list.append(mov_avg)
            i += 1
    return movavg_list

#This function combines all of the individual moving average lists into a
list of lists
def all_moving_avg(major_1440_list, n):
    move_1440 = []
    for data in major_1440_list:
        ind_list = moving_average(data, n)
        move_1440.append(ind_list)
    return move_1440


#This function takes in a rat's current ICP data and mov avg data and
compares it
    #returns: a list with number of events (int), length of each event
(int list), and start time for each event (int list)
def diicp_per_rat(cur_ICP, mov_avg, n):
    diicp_event = False
    length_event = 0
    event_nums = 0
    length_event_list = []
    flag_list = []
    for i in range(0, n-1):
        if pd.isna(cur_ICP[i]) == True:
            i += 1
            continue
        else:
            if (cur_ICP[i] > 20.0) and (mov_avg[i] >= 20.0): #conditions
for event are met
                if diicp_event == False: #set up like this because when
diicp_event is still false in this loop, we're at the start of a new
diicp_event
                    flag = (i+1) #minute DIICP occurred
                    diicp_event = True
                if diicp_event == True:
                    length_event += 1
                i += 1

            elif pd.isna(cur_ICP[i]) == True: #handles events ending on a
null value and adds event to events_list and sets diicp_event to False
                if length_event > 3:
                    event_nums += 1
                    flag_list.append(flag)
                    length_event_list.append(length_event)
                length_event = 0
                diicp_event = False

            else: #conditions for event not met, ends event and sets
diicp_event to False
                if length_event >= 3:
                    event_nums += 1
                    flag_list.append(flag)
                    length_event_list.append(length_event)
                length_event = 0
                diicp_event = False
                i += 1

    #this block of code combines 2 events if they are 3 minutes or less
apart
    base_nums = event_nums
    for j in range(0, base_nums-3):
        if (j+1 >= len(flag_list)):
            break
        else:
            start = (flag_list[j] + length_event_list[j])
            stop = (flag_list[j+1])
            difference = start - stop
            if abs(difference) <= 3:
                event_nums -= 1
                length_event_list[j] += length_event_list[j+1]
                delete = flag_list[j+1]
                flag_list.remove(delete)
                length_event_list.remove(length_event_list[j+1])
    return[event_nums, length_event_list, flag_list]


#this function is basically our output. It returns a list of all of the
lines that will be read into a text file in another function
def all_diicp_data(major_1440, major_move, N, n, rat_letter_list):
    line_list = []
    count = 0
    for rat in rat_letter_list:
        num = rat_letter_list.index(rat)
        avg = str(avg_above_20(rat))
        if (avg[0] != 'n'):
            avg += 'mmHg'
        data = diicp_per_rat(major_1440[num], major_move[num], n)
        if data[0] == 0:
            data = "No DIICP events occurred for this animal"
            datadata = str(rat+': '+data+'. The avg ICP above 20mmHg is
'+avg)
            line_list.append(datadata)
        else:
            datadata = str(rat)+': '+str(data[0])+' event(s) occurred. The
avg ICP above 20mmHg is '+avg
            line_list.append(datadata)
            for i in range(data[0]):
                count += 1
                datadata = '     Sheet #'+str(count)+': Ocurred at minute
'+str(data[2][i])+' for '+str(data[1][i])+'mins.'
                line_list.append(datadata)
    return line_list

#This function returns the event information for each rat that had diicp
events in a list
def data_for_sheets(major_1440, major_move, N, n, rat_letter_list):
    sheets_list = []
    for rat in rat_letter_list:
        num = rat_letter_list.index(rat)
        data = diicp_per_rat(major_1440[num], major_move[num], n)
        if data[0] != 0:
            sheets_list.append([rat,data])
    return sheets_list

#This function takes in the list computed in the previous function and
turns it into a dictionary with rat_letter: [diicp outputs] pairs
```

```
def data_to_dictionary(sheets_data):
    animal_letters = []
    animal_list = []
    for animal in sheets_data:
        animal_letters.append(animal[0])
        animal_list.append(animal[1])
    animal_dictionary = dict(zip(animal_letters, animal_list))
    return animal_dictionary

#This function takes in the letters of all the rats that had diicp events
and the dictionary made in the function above
    #it returns a list of length all events, with each element being a
list of the previous 60 data points for each event in alphabetical and
then temporal order
def all_previous_60(sheet_letters, sheets_dictionary):
    export_list = []
    data = ind_rat_1440(sheet_letters)
    info = sheets_dictionary[sheet_letters]
    for i in range(info[0]):
        start = info[2][i]
        if start >= 60:
            export = data[(start-60):start]
        else:
            export = data[0:start]
        export_list.append(export)
    return export_list

#This function takes in the letters of all the rats that had diicp events
as well as the dictionary containing all of the event information.
    #it returns an int value of the total number of diicp events found in
the dataset.
def number_of_events(sheet_letters, sheets_dictionary):
    count = 0
    for letter in sheet_letters:
        data = sheets_dictionary[letter]
        event_num = data[0]
        count += event_num
    return count

#This function takes in the list of all of the sets of 60 datapoints and
creates an excel file for each of them
    #This excel file will be saved to the location that you have
python_diicp.py(this file) and the excel file you inputted at the
beginning (they must be saved in the same folder)
def sheet_exports(sheet_letters, sheets_dictionary):
    wb = xlwt.Workbook()
    maxx = 60
    for letter in sheet_letters:
        ws = wb.add_sheet(letter)
        ws.write(0, 0, 'TIME')
        start_stats = 62
        ws.write(start_stats, 0, "no. of events")
        ws.write(start_stats+1, 0, 'start(MIN)')
        ws.write(start_stats+2, 0, 'duration(MIN)')
        for t in range(maxx):
            ws.write(t+1, 0, str(t+1)+' MIN')
        row = 1
        name = letter
        data = sheets_dictionary[letter]
        event_nums = data[0]   #int
        flag_list = data[2]  #list
        length_list = data[1]  #list
        previous_60 = all_previous_60(letter, sheets_dictionary)
#listoflist
        ws.write(start_stats, 1, event_nums)
        for i in range(event_nums):
            ws.write(start_stats+1, row, flag_list[i])
            ws.write(start_stats+2, row, length_list[i])
            ws.write(0, row, (str(name)+' '+str(i+1)))
            size = len(previous_60[i])
            if size < maxx:
                missing = (maxx - size)
                for m in range(0, missing):
                    ws.write(m+1, row, np.nan)
                for n in range(missing, 60):
                    ws.write(n+1, row, float(previous_60[i][n-missing]))
            else:
                for j in range(60):
                    ws.write(j+1, row, float(previous_60[i][j]))
            row += 1
        wb.save('ricp_'+str(letter)+'.xls')

#This function takes in our output from all_diicp_data() and creates a
text file with our output that will also be saved in the same location
that you have this file saved
def text_exports(all_data):
    new_data = []
    for line in all_data:
        if line[0] == 'm':
            line = '   '+line
        new_data.append(line)
    with open('ricp_outputs.txt', 'w') as f:
        for line in new_data:
            f.write(line)
            f.write('\n')
    f.close()


def main():
    N = len(data.columns)-1  #should be 20 if there are 20 rats
    n = len(data)  #should be 1440 for 1440 minutes
    #print(N); print(n)

    rat_letter_list = letters_in_list(N) #this of all the rat letters. Ex)
'A'

    major_1440_list = all_rat_1440(rat_letter_list)  #list of all of the
current_ICP data for each rat
```

```
    major_move_list = all_moving_avg(major_1440_list, n)  #list of all of
the associated moving average/baseline data for each rat


    all_data = all_diicp_data(major_1440_list, major_move_list, N, n,
rat_letter_list)  #this is a list of the data for all diicp events that
occurred

    sheets_data = data_for_sheets(major_1440_list, major_move_list, N, n,
rat_letter_list)  #this is the data in list form for each diicp event

    sheets_dictionary = data_to_dictionary(sheets_data)  #this is the
dictionary form of sheets_data in rat:data key value pairs

    #This block of code creates a list called sheet_letters of all the
rats that had diicp events occur in alphabetical order
    sheet_letters = []
    sheet_letters_temp = sheets_dictionary.keys()
    for i in sheet_letters_temp:
        sheet_letters.append(i)

    total_events = number_of_events(sheet_letters, sheets_dictionary)
    print(str(total_events)+' diicp events found.')
    sheet_exports(sheet_letters, sheets_dictionary)  #creates a
spreadsheet for each diicp event

    text_exports(all_data) #creates a textfile with information about the
data's diicp events

    print("Success, go check the folder this file is saved in to find the
event spreadsheets and output text file.")
main()
```