BIOINFORMATIC WORKFLOW TO ANALYZE BEHAVIORAL VIDEO RECORDINGS

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INTRODUCTION

LABORATORY WORK

- The study of animal behavior has been widely used to evaluate the effect of drugs, depression, learning, instinct, among others.
- Routinely, we record seizures in an animal model of audiogenic epilepsy at different stages and conditions. That produces a lot of video recordings
- Afterwards, we evaluate and compare the behavioral patterns graphically in ethograms

INTRODUCTION

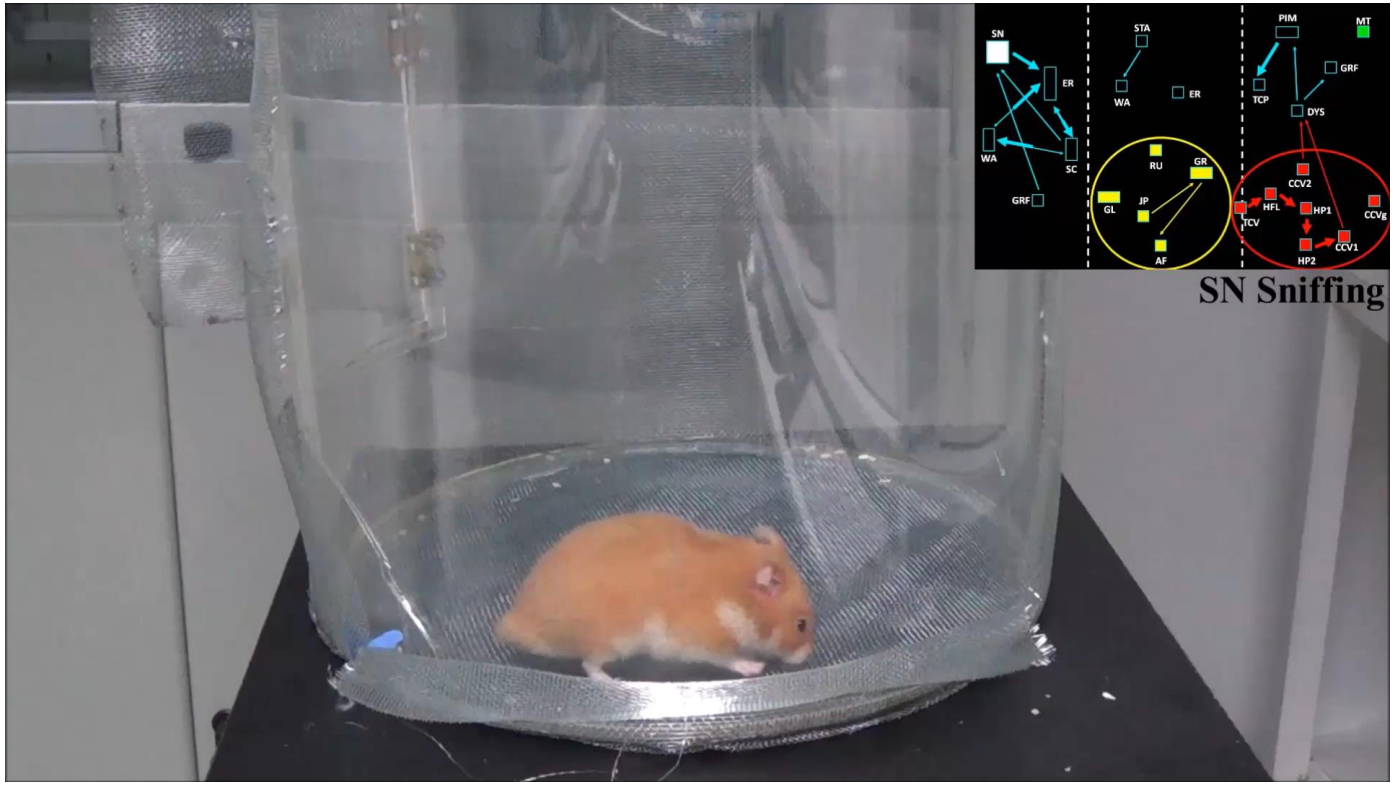
WHAT IS AN ETHOGRAM?

- GRAPHIC REPRESENTATION OF ALL BEHAVIORS OF INTEREST OBSERVED IN THE STUDY SPECIES (FREQUENCY, INTENSITY AND BEHAVIOR RELATIONSHIP)
- EACH OF THESE BEHAVIORS MUST BE DISTINCT AND INDEPENDENT FROM ONE ANOTHER IN ORDER COLLECT DATA ACCURATELY. FOR THAT REASON, IT´S VERY IMPORTANT TO HAVE THESE BEHAVIORS DEFINED IN A LIST
- MANY WAYS TO REPRESENT AN ETHOGRAM
- WE HAVE USED THE ONE DESIGNED BY (GARCIA-CAIRASCO ET AL, 1992)

	Description	Categorization
In nest		
licking/grooming	dam touches the pup's body with her tongue, dam handles the pup's body with her forepaws or nose	caring behavior
active nursing	dam presents an upright dorsal arch posture with the depressed head posture over the pups which are attached to the nipples	caring behavior
passive nursing	dam lies immobile on pups and has her eyes open or closed	caring behavior
nest building	dam collects and/or handles nesting material around the pups with mouth or forepaws	caring behavior

AIM OF THE BIOINFORMATIC WORKFLOW

- Process semi-automatically video recordings
- Generate ethograms automatically from acquired data
- Speed up and ease the analyze of multiple recordings
- Widely useful for analyzing behaviors in multiple laboratory species. That allows us to compare seizures between different models and to evaluate the severity of that seizures in the same animal



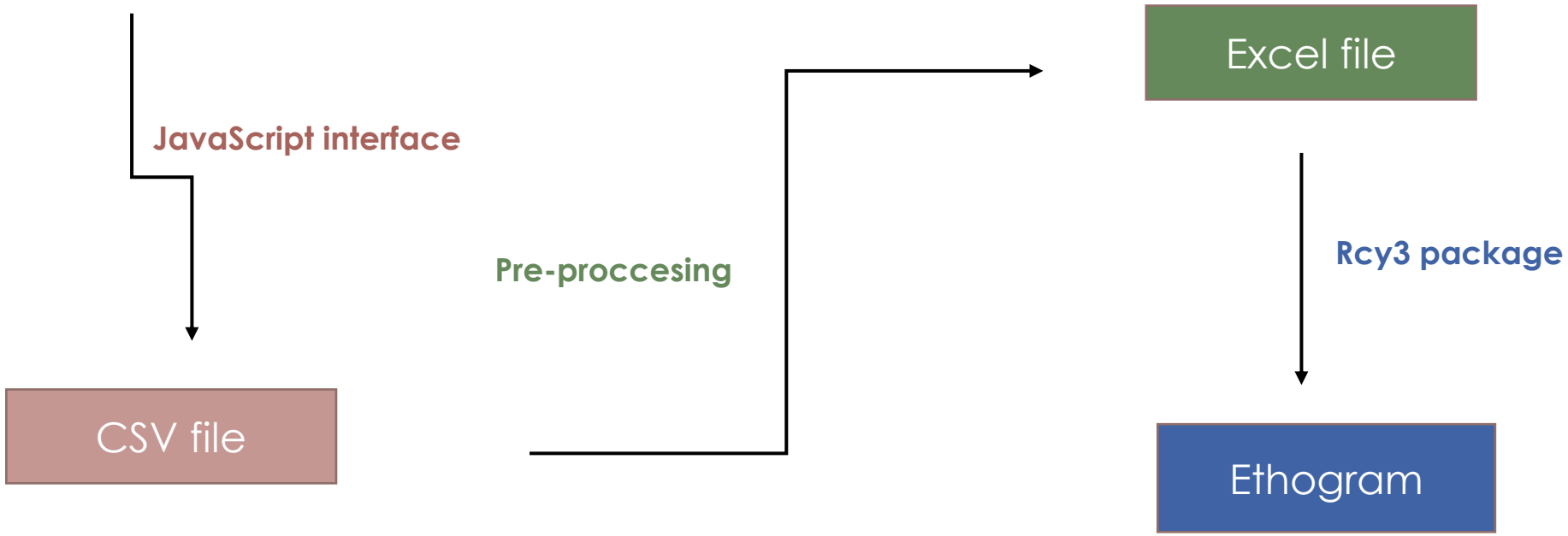
BIOINFORMATIC METHODOLOGY AND RESULTS

DATA ACQUISITION

ETHOMATIC: JAVASCRIPT PROGRAM

PRE-PROCCESING AND GRAPH PLOTING

R SCRIPT: RCY3 PACKAGE (CYTOSCAPE)



BIOINFORMATIC METHODOLOGY AND RESULTS

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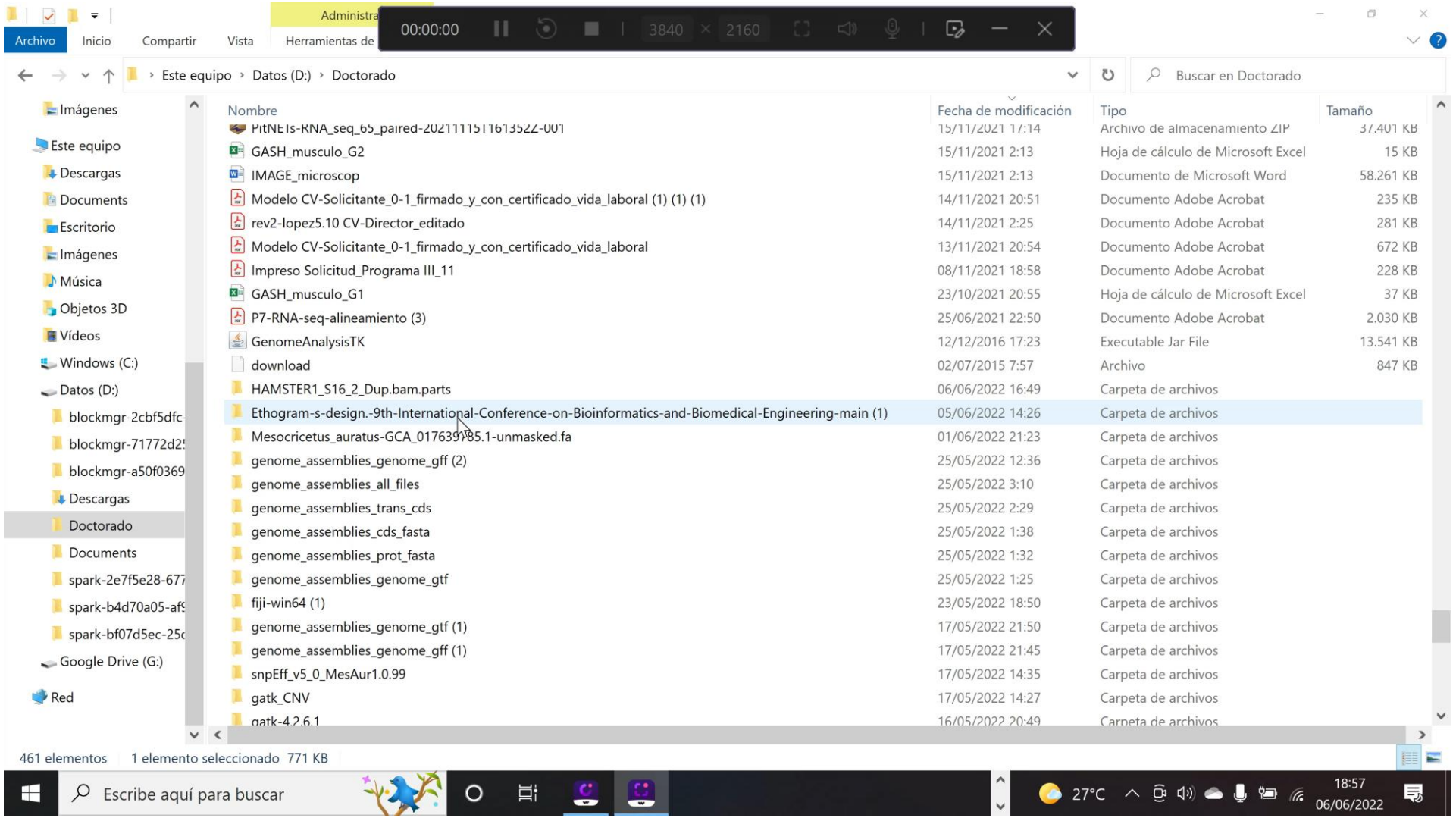
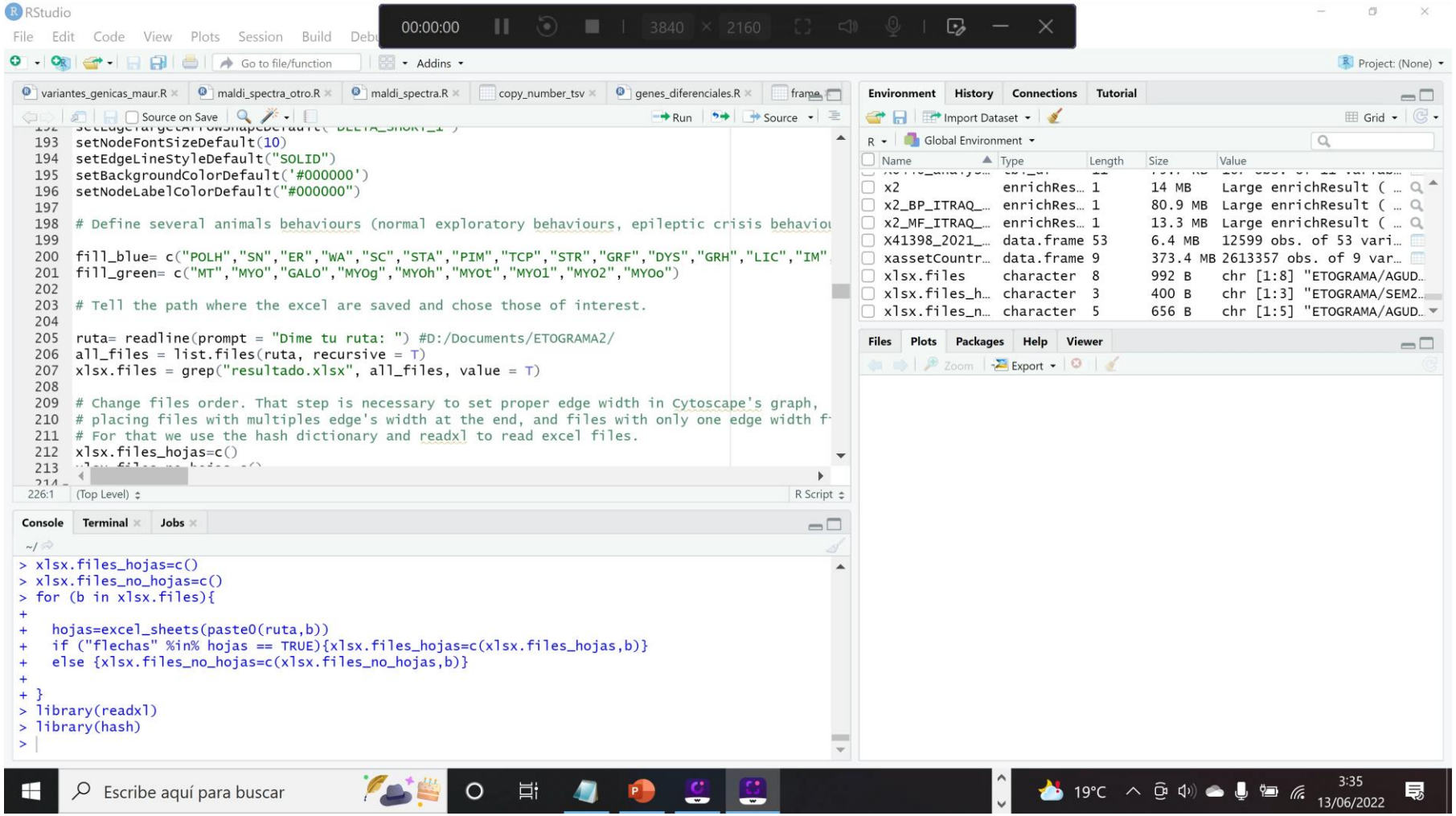


BIOINFORMATIC METHODOLOGY AND RESULTS

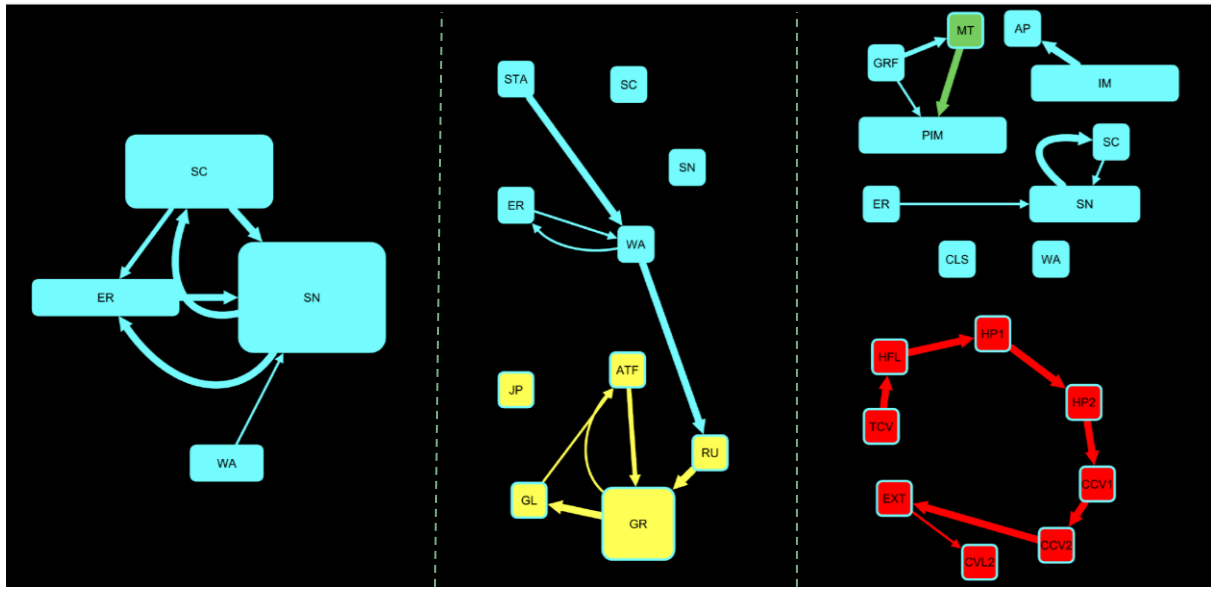
GRAPH PLOTING



ETHOGRAM COMPARISION EXAMPLE

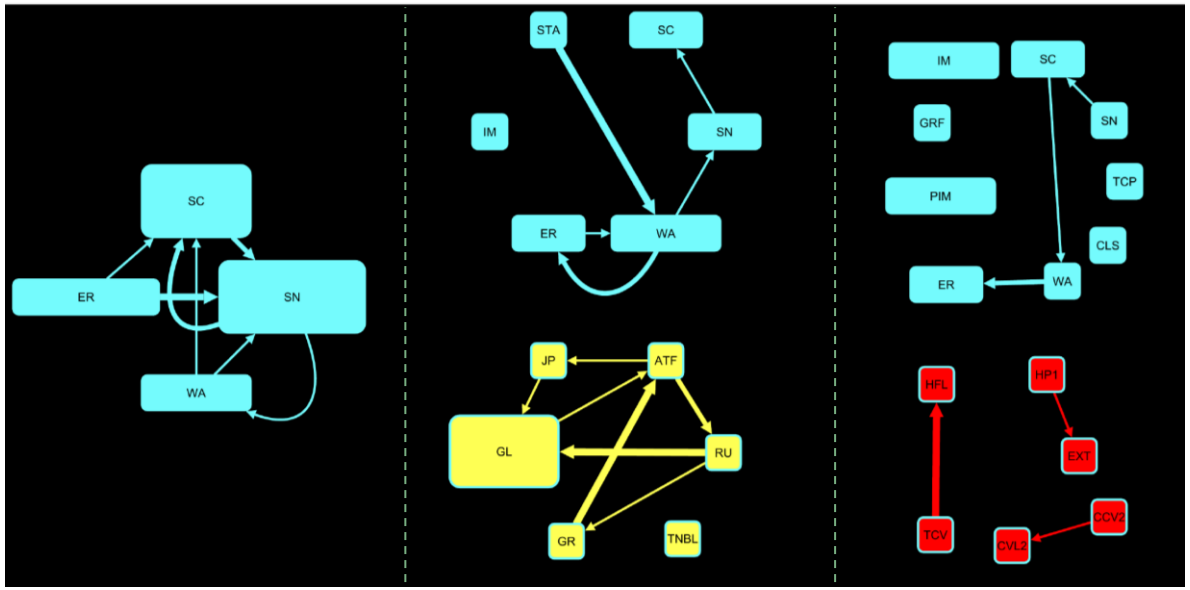
ACUTE TREATMENT

PRE-SOUND | SOUND | POST-SOUND



CHRONIC TREATMENT

PRE-SOUND | SOUND | POST-SOUND



DISCUSSION

ETHOMATIC VS MATCHING LEARNING METHODs: ADVANTAGES AND DISAVANTAGES OF OUR PROGRAM

- More time consuming: must select behaviors while watching recordings

- 100% accuracy: based on your personal experience assessing animal behaviors

BIBLIOGRAPHY

N. Garcia-Cairasco; M.C. Doretto; R.P. Prado; B.P.D. Jorge; V.C. Terra; J.A.C. Oliveira (1992). ***New insights into behavioral evaluation of audiogenic seizures. A comparison of two ethological methods. , 48(1), 49–56.*** **doi:10.1016/s0166-4328(05)80138-x**

THANK YOU SO MUCH FOR YOUR ATTENTION