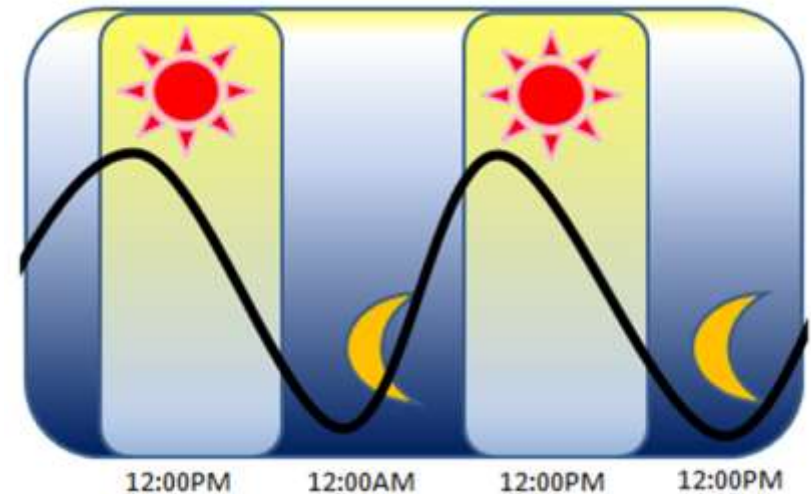




Els ritmes circadiaris al llarg de la vida

Trinitat Cambras
Departament de Fisiologia.
Facultat de Farmàcia

cambras@ub.edu



UNIVERSITAT DE
BARCELONA

Els ritmes interns



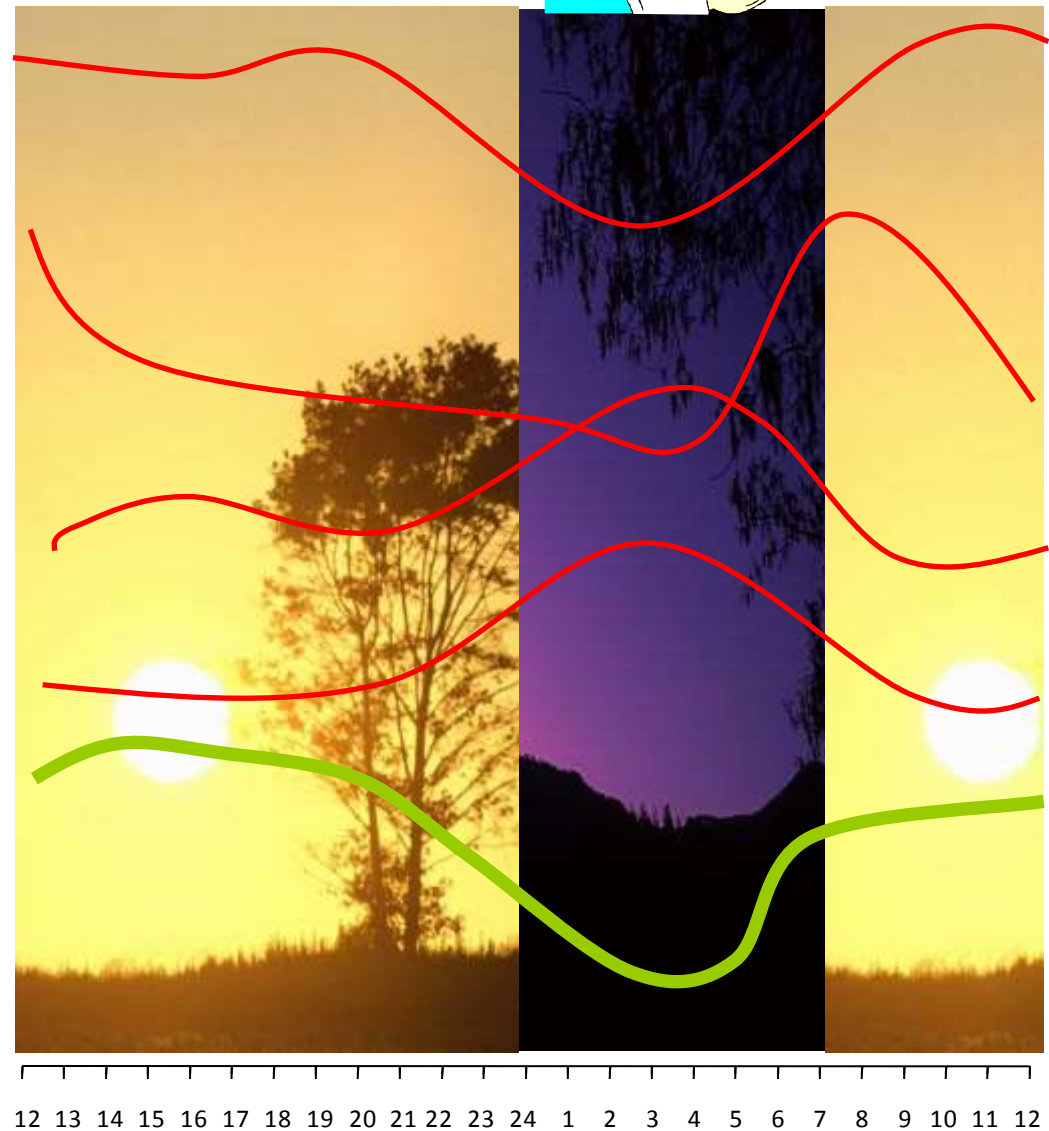
TEMPERATURA

CORTISOL

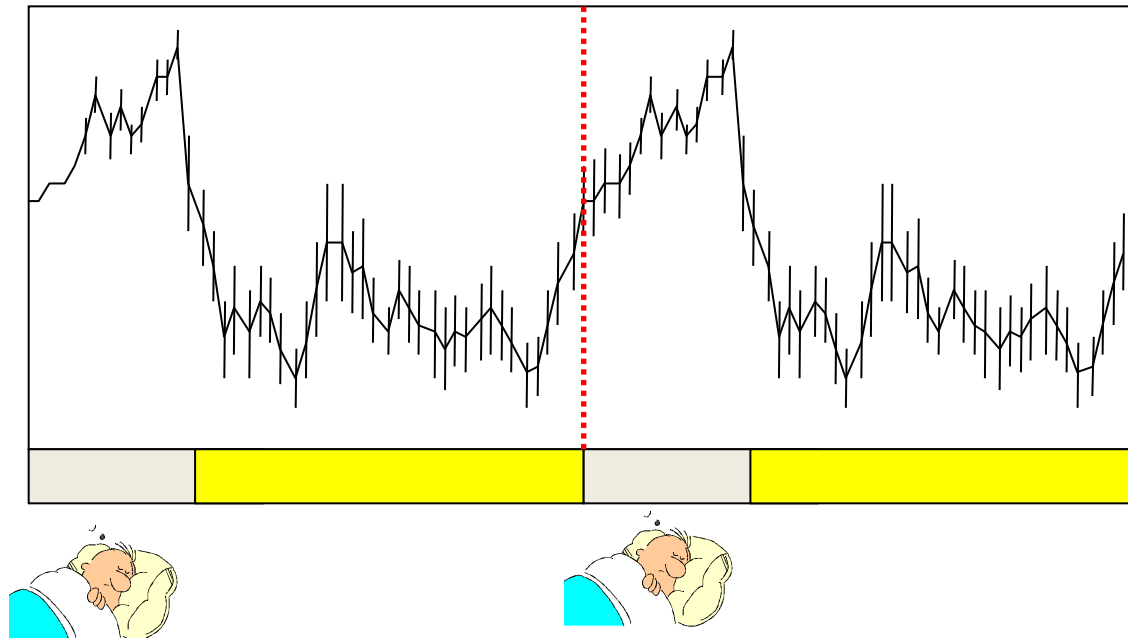
TRIGLICÈRIDS

MELATONINA

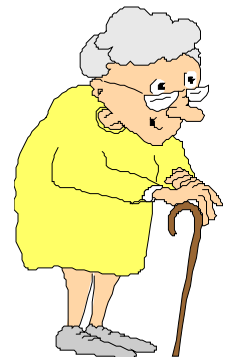
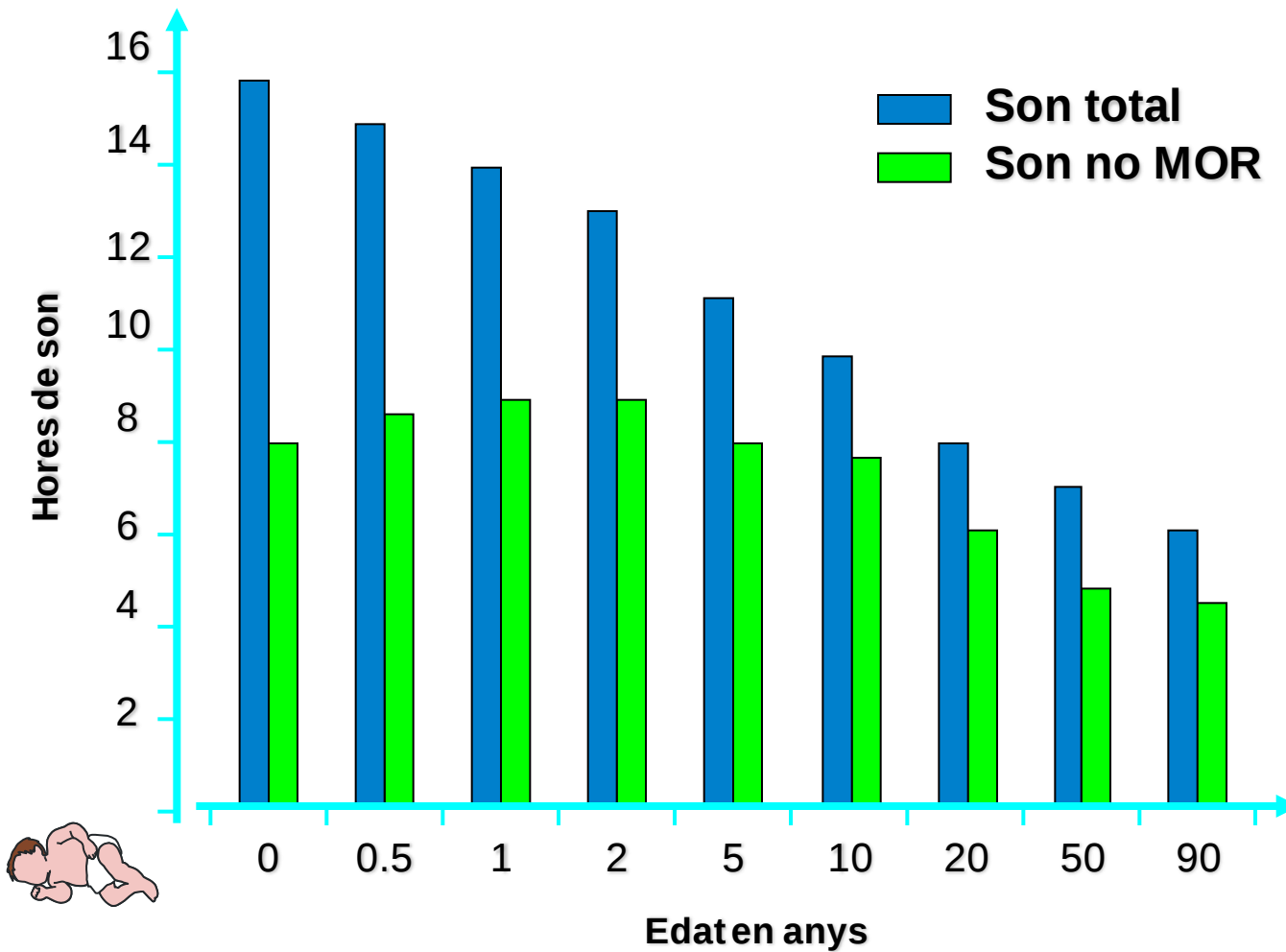
ALERTA I RENDIMENT



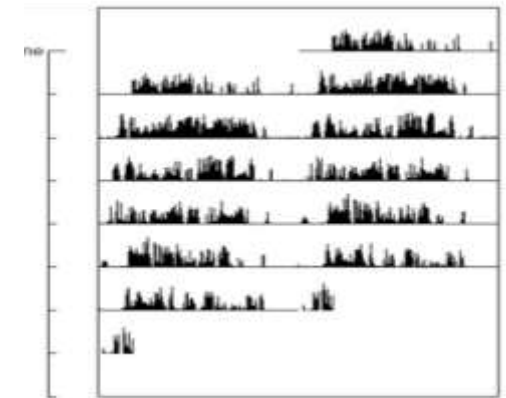
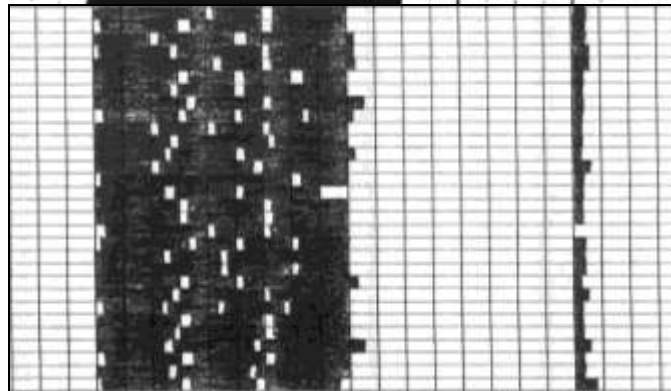
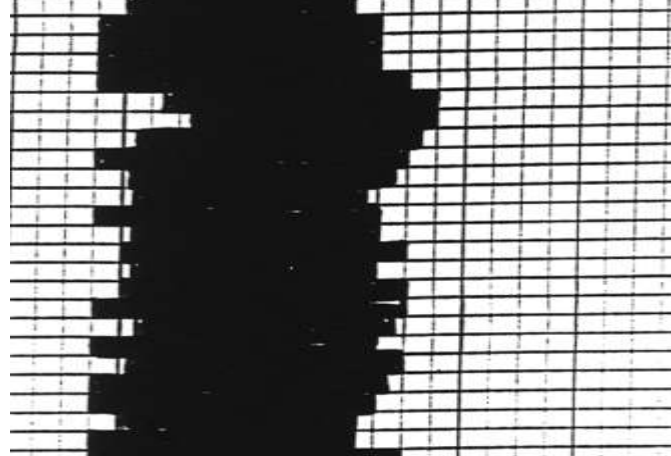
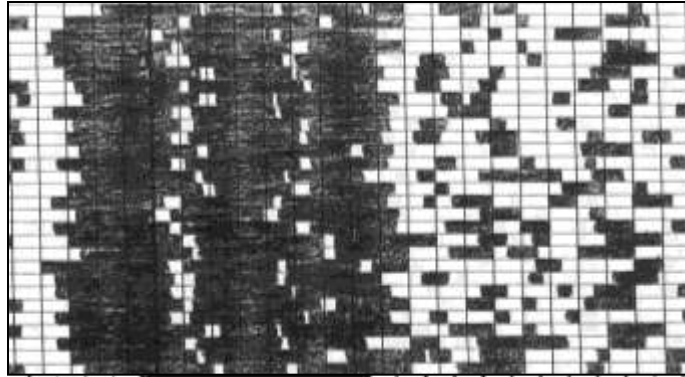
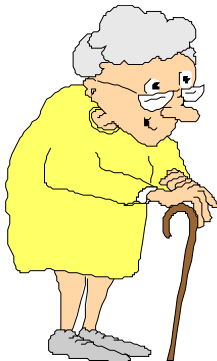
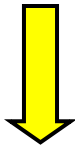
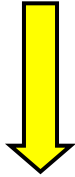
Ritme circadiani de temperatura perifèrica



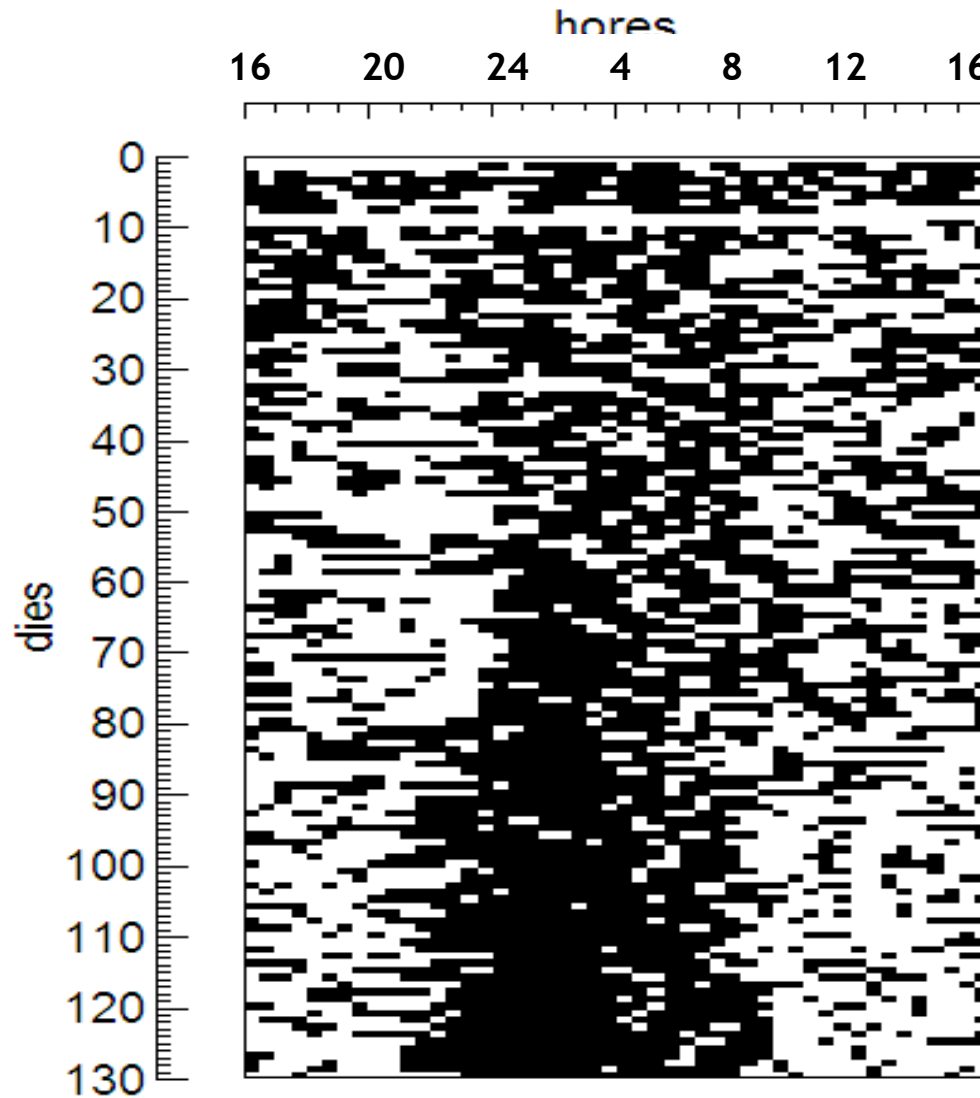
Evolució hores de son



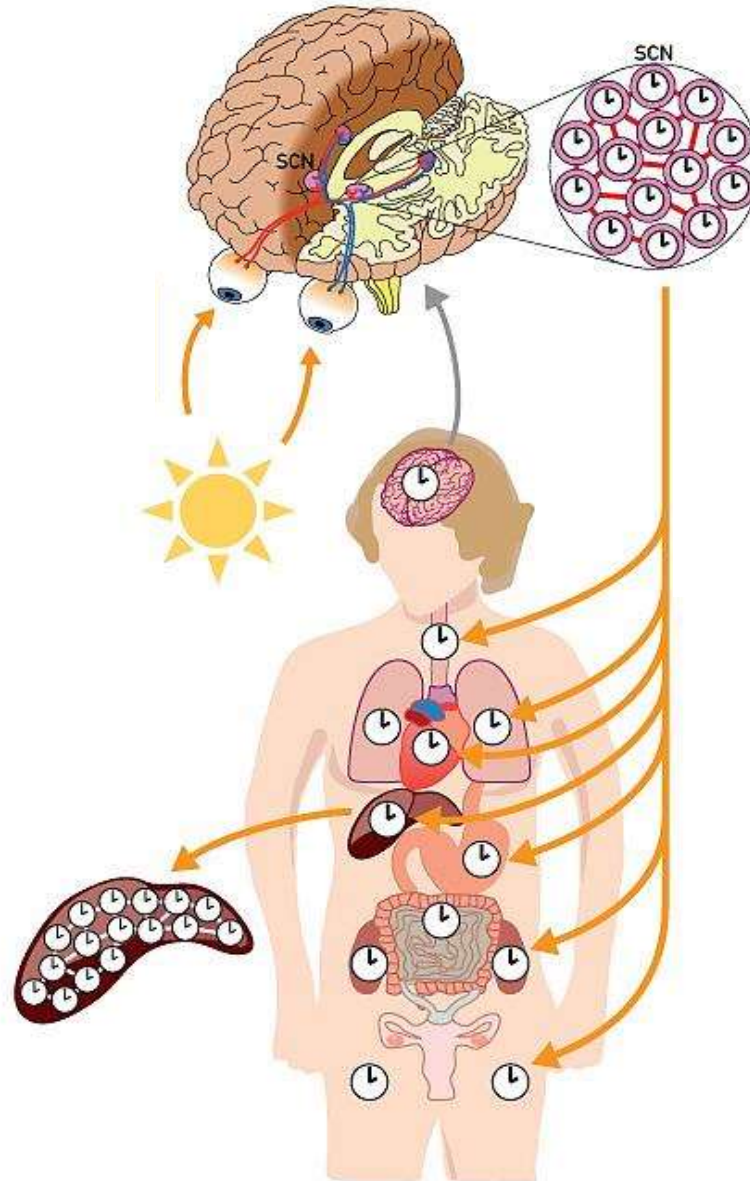
Evolució del ritme de son



Nadons: Fragmentació (Ritmes ultradiaris)

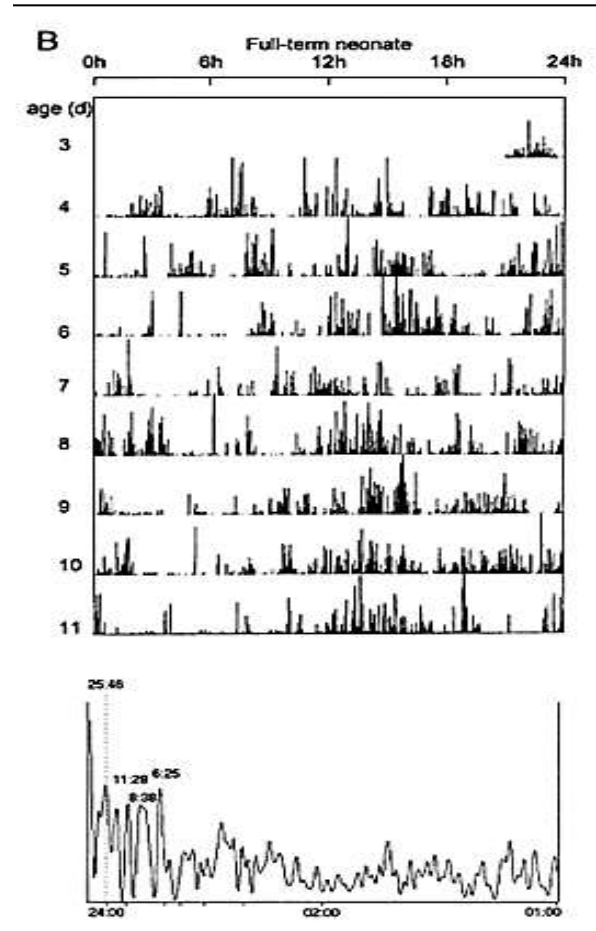


Sistema circadiari: rellotges central i perifèrics



Ritmes <> Maduració

A TERME



Nens: (1-6 Anys):



**Ritme de 24 hores estable
(retirada de la migdiada)**

9-12 mesos d'edat: 2 migdiades/dia

15-24 mesos: 1migdiada/dia

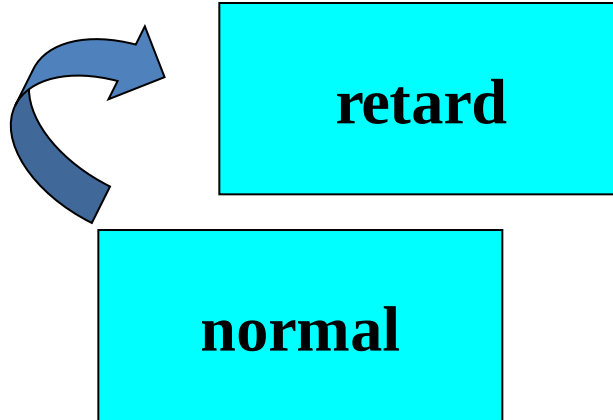
2 -6 anys: 1migdiada/dia (2 hores)

4 anys: gairebé tots

5 anys: la meitat

6 anys: un terç

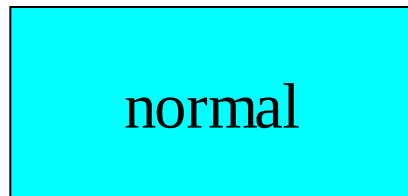
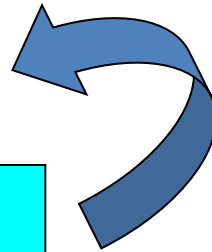
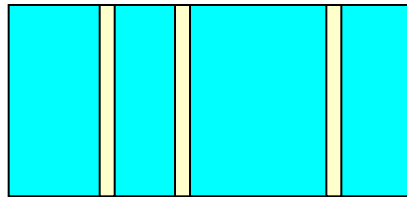
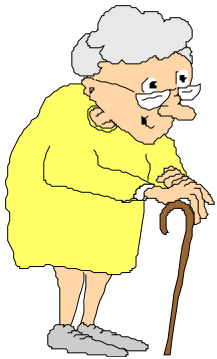
Adolescents: Retard de fase



20	21	22	23	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
----	----	----	----	----	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----

Envelliment

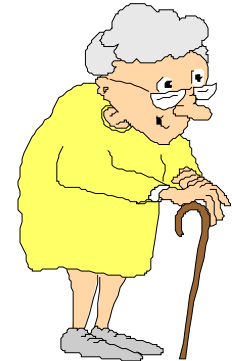
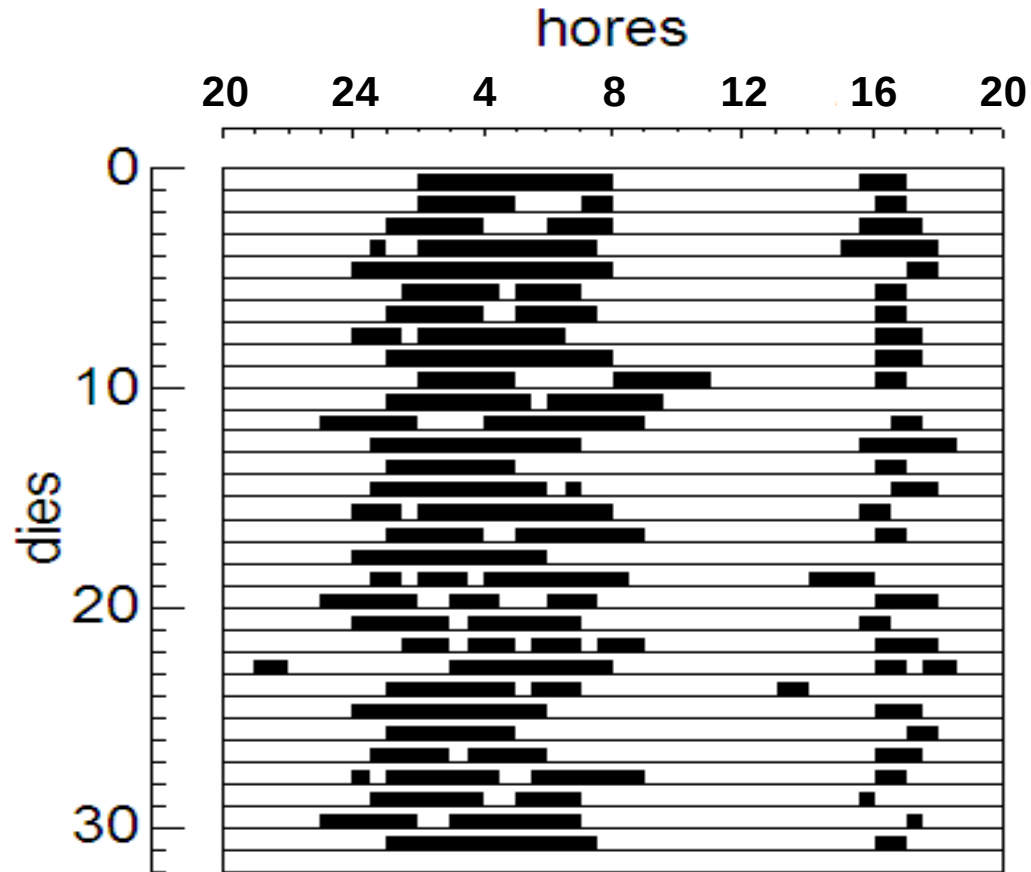
Avanç de fase
Fragmentació



20	21	22	23	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
----	----	----	----	----	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----	----

Variabilitat interindividual

Fragmentació



Fragmentació i inestabilitat

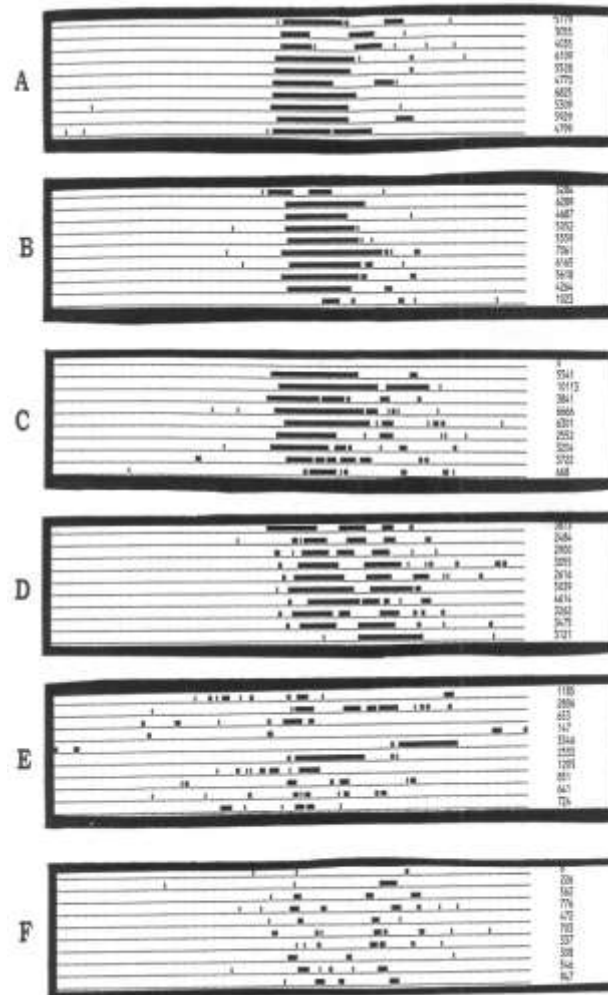
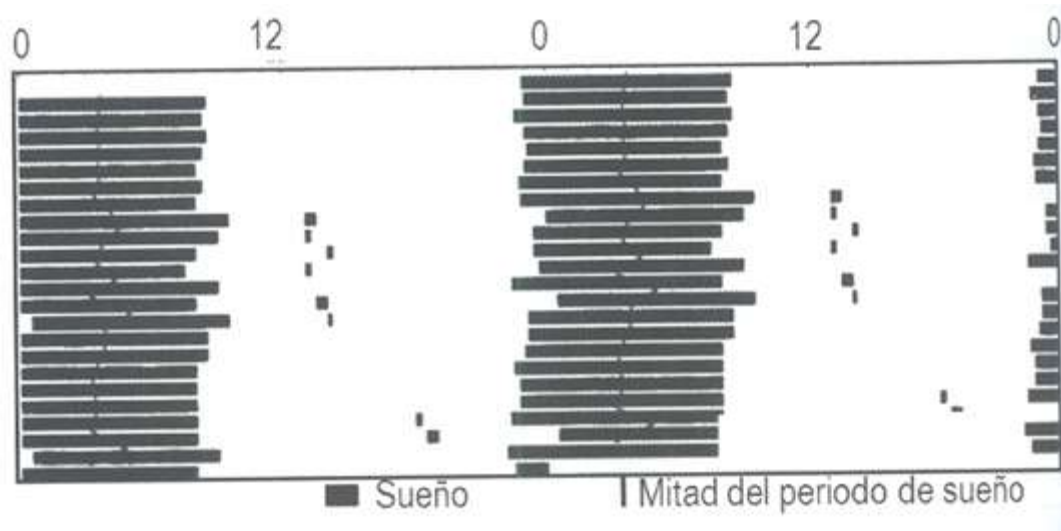
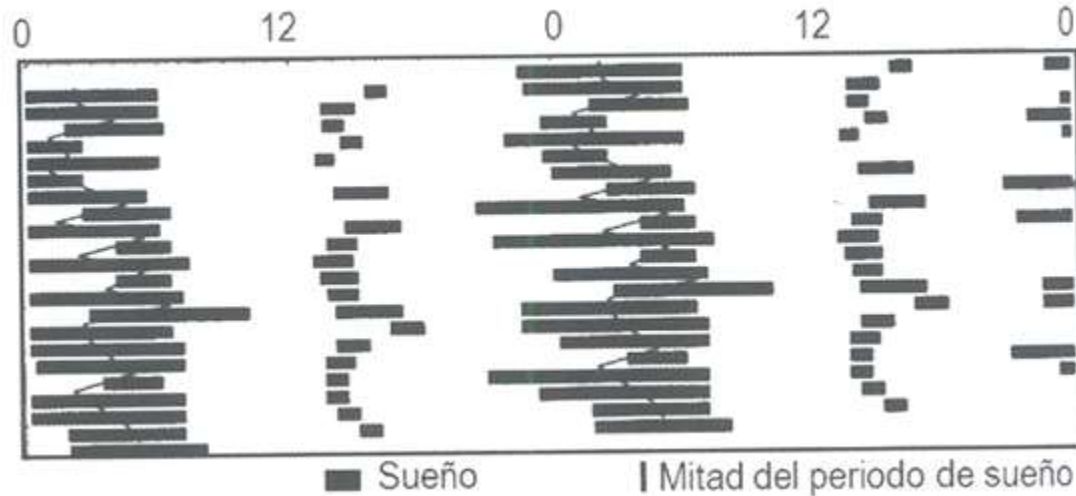


Fig. 3. Continuum of wheel-running records illustrating a gradual, age-induced breakdown of circadian locomotion rhythm.

Qui té més anys?



76

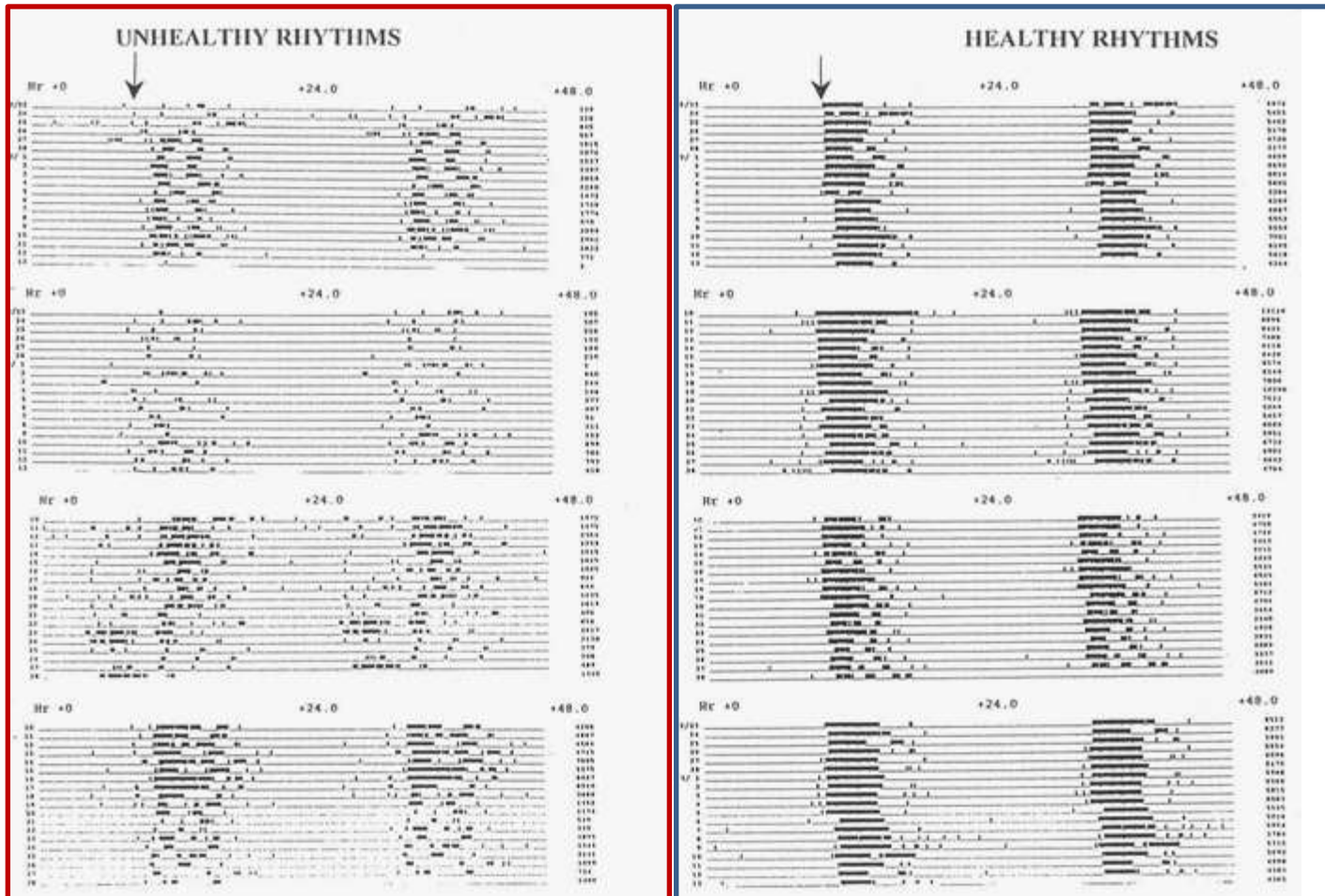


72

Alteracions del son i baix estat físic i mental

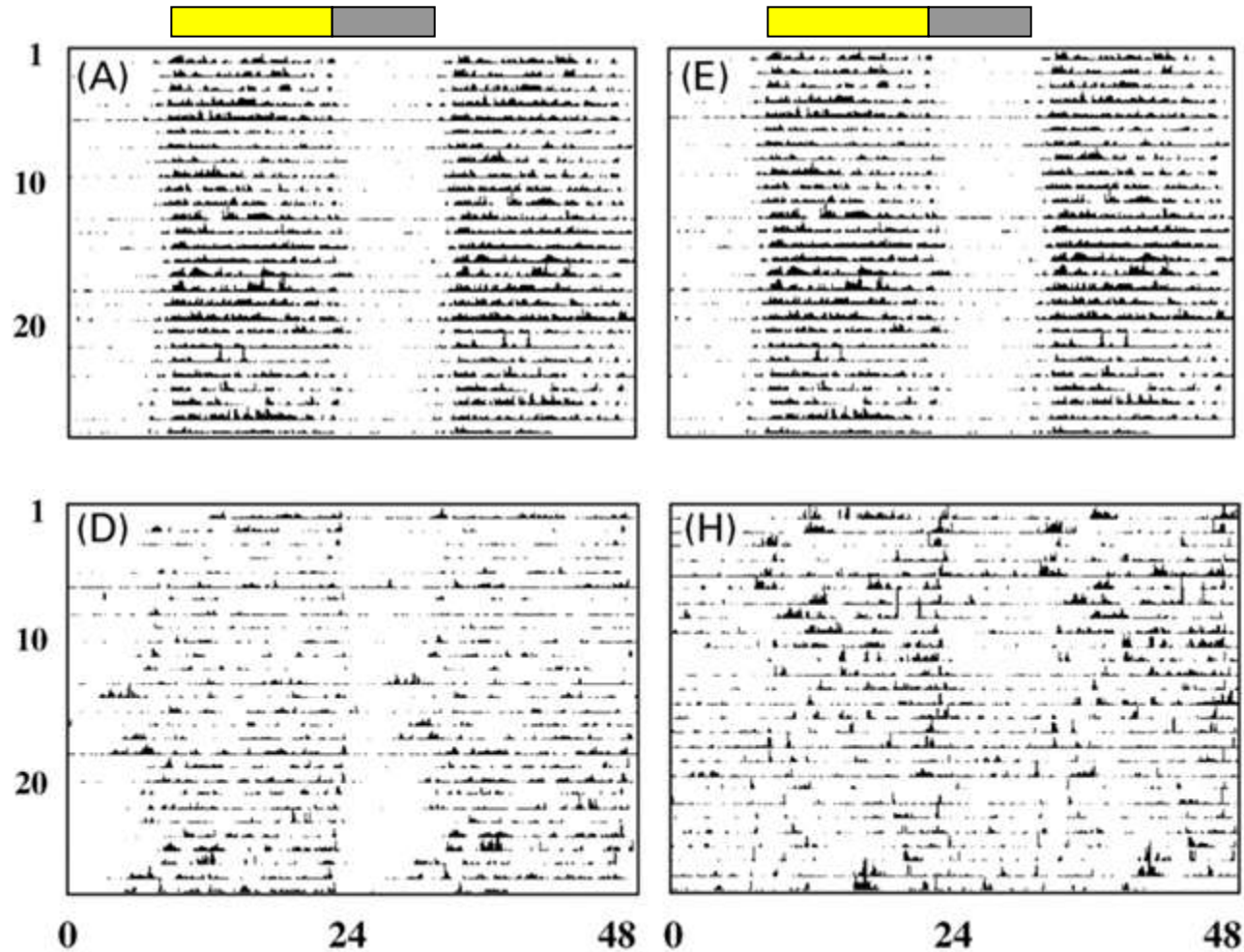


12 meses



Menor condicionament, alteracions de la memòria

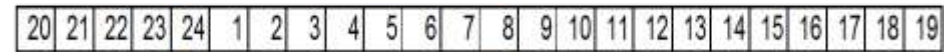
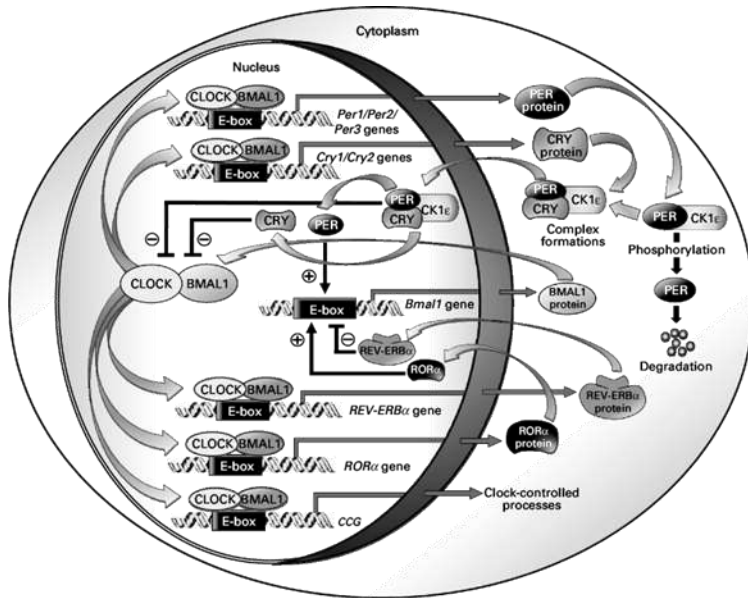
Alteracions en malalts amb Alzheimer



Demència

Diferències individuals

Gens rellotge



“normal”

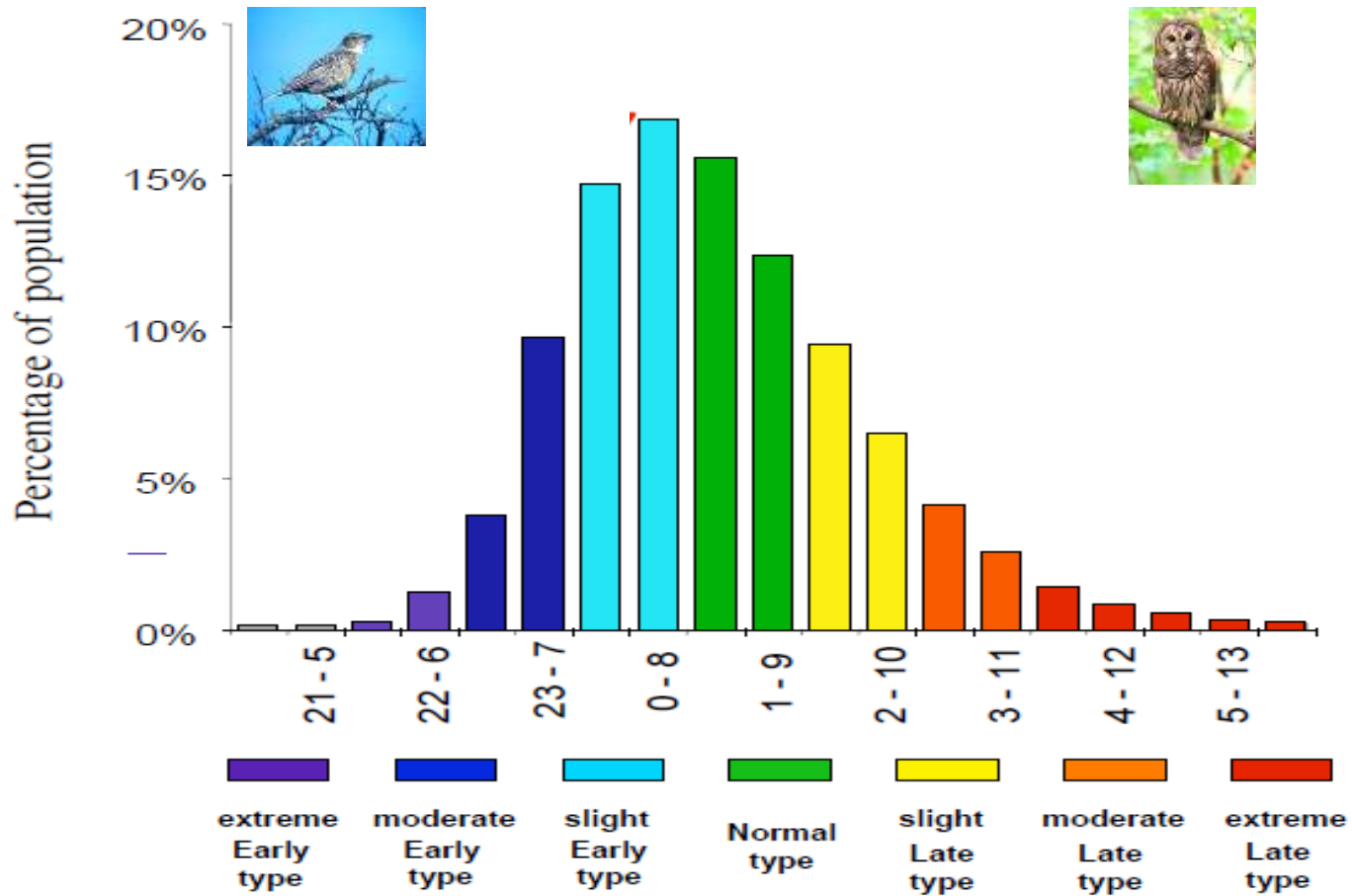
matutins

vespertins

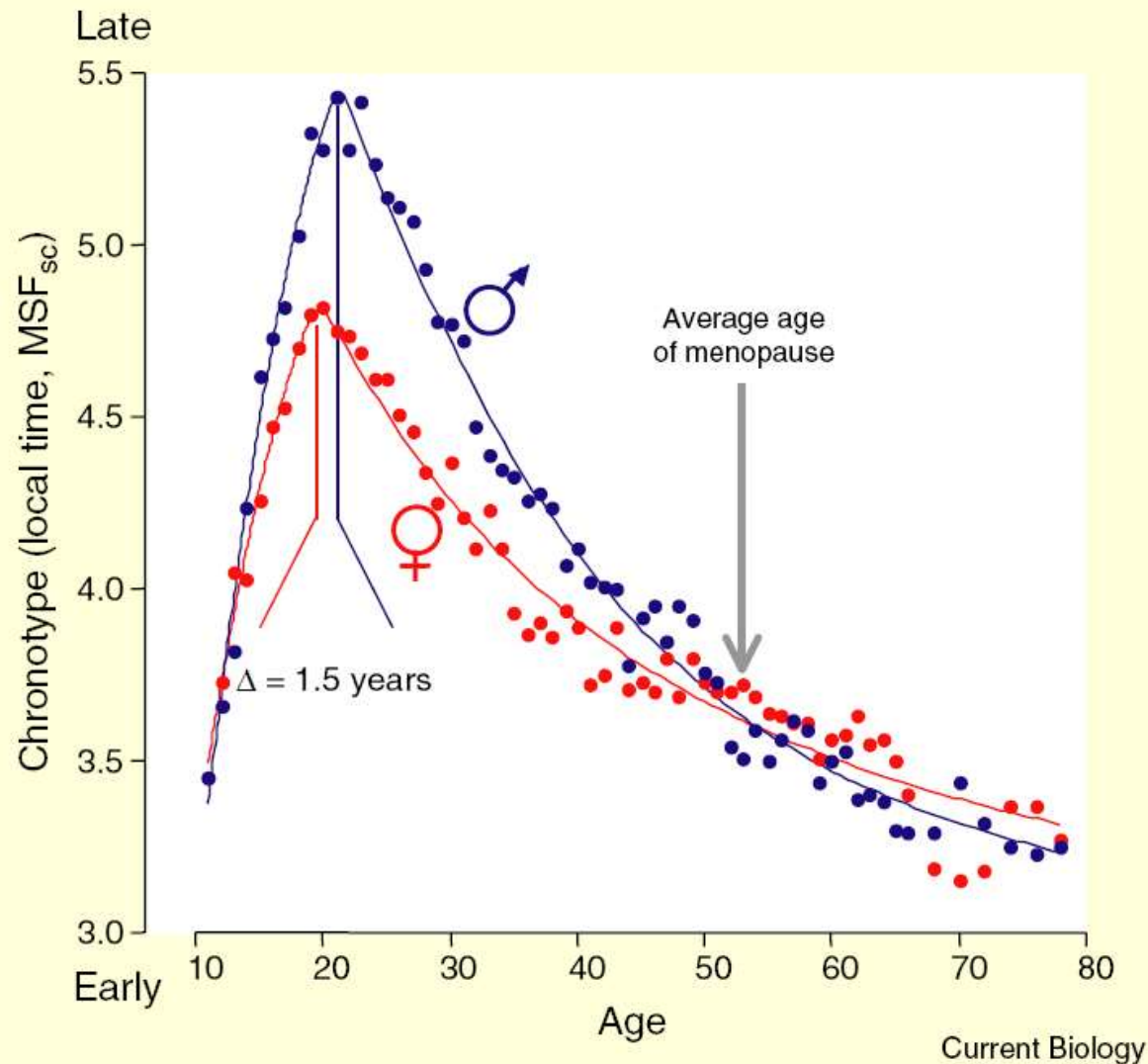
Fase avançada

Fase retardada

Cronotip *(Munich Chronotype Questionnaire)*

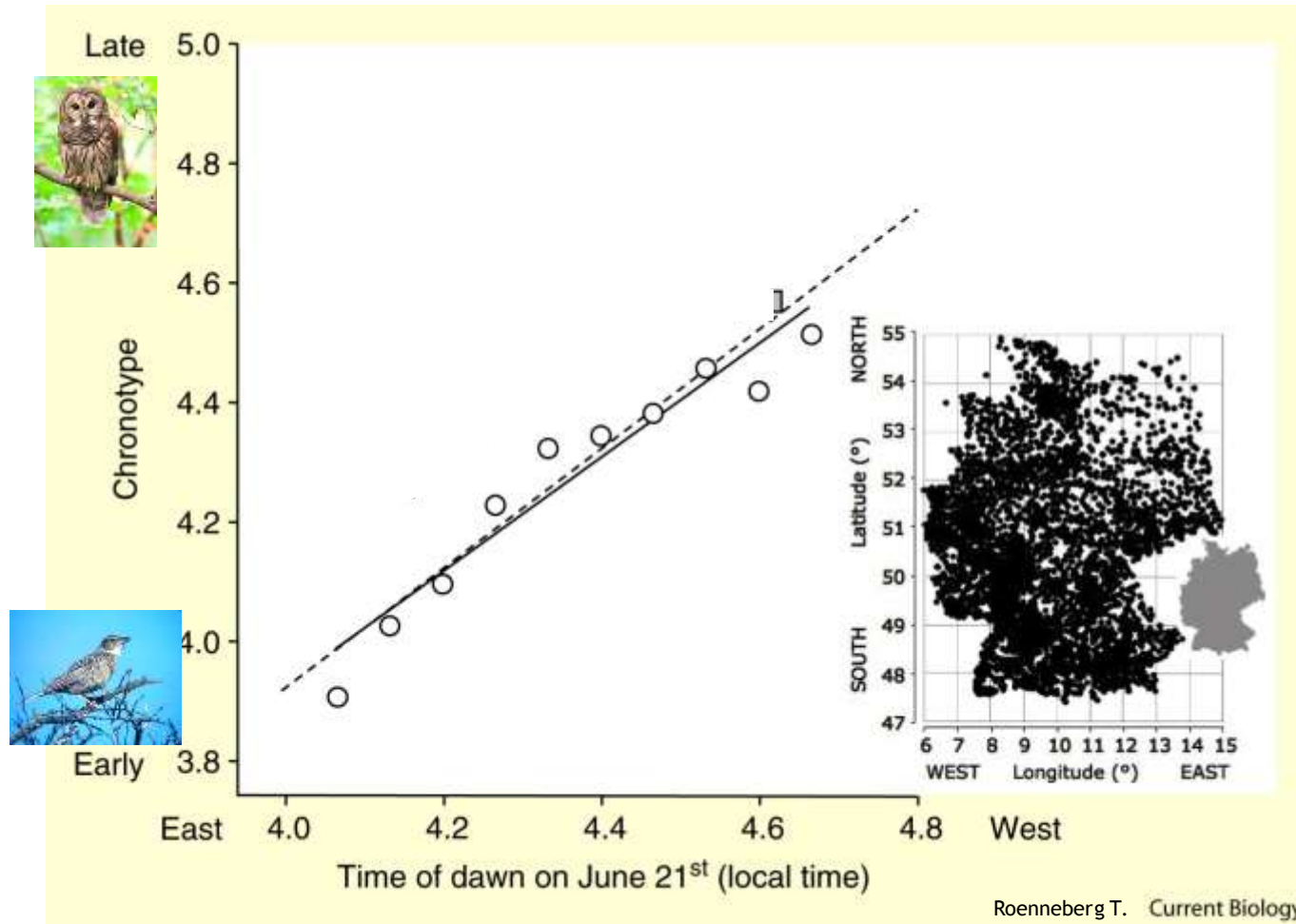


Evolució del cronotip

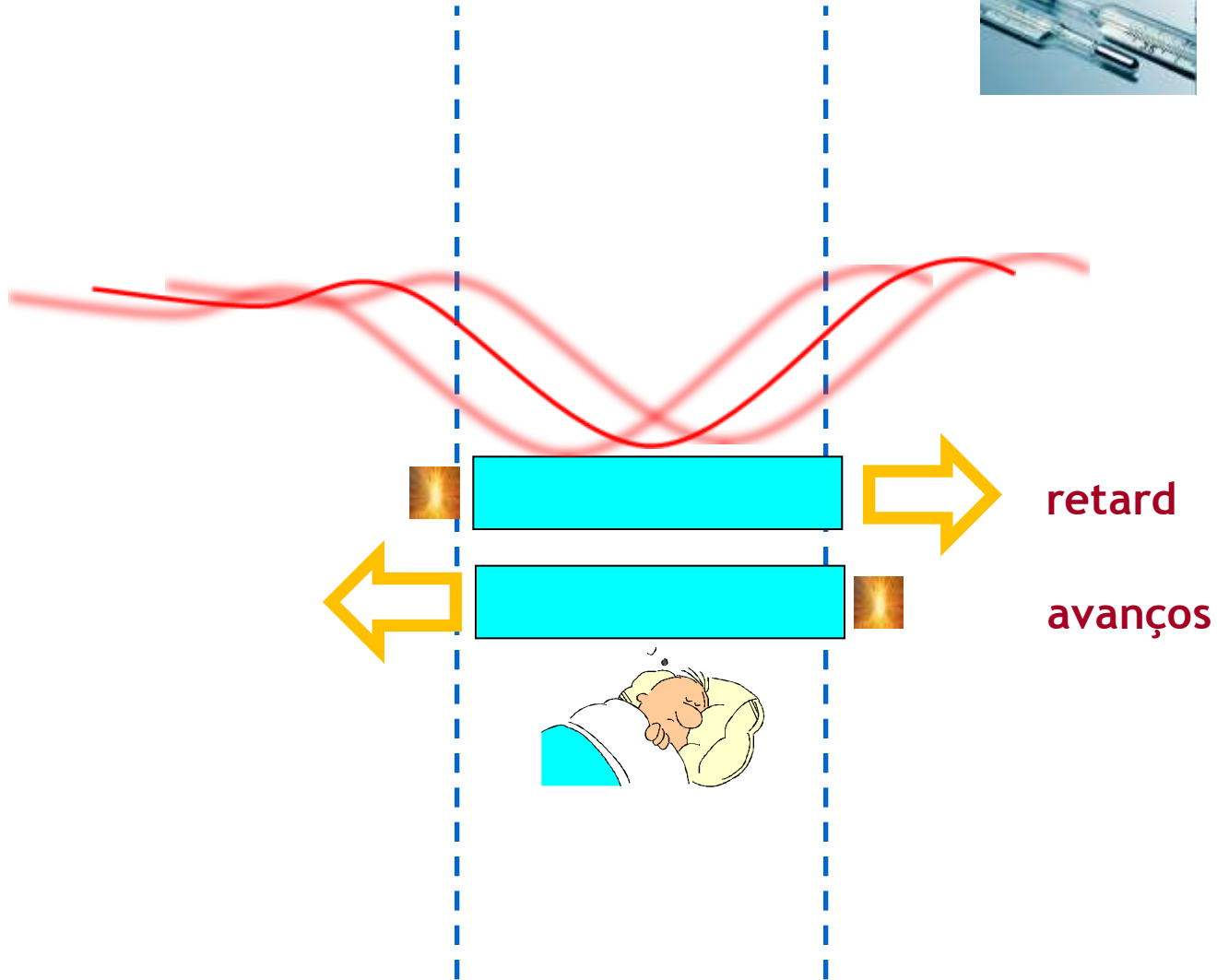


El cronotip depèn de la llum

- Circles areas with up to 300,000 inhabitants
- Grey: cities with up to half a million inhabitants
- Triangles: larger cities

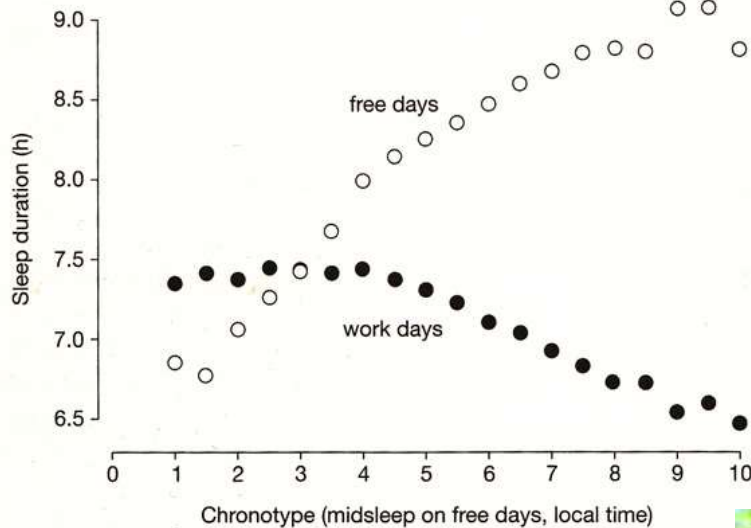


Llum puntual: canvis de fase

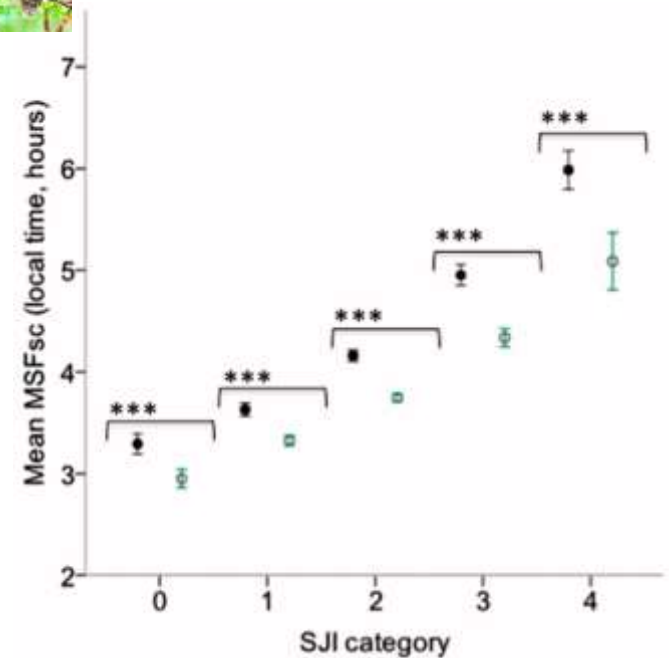


Cronotip: durada del son i jet lag social

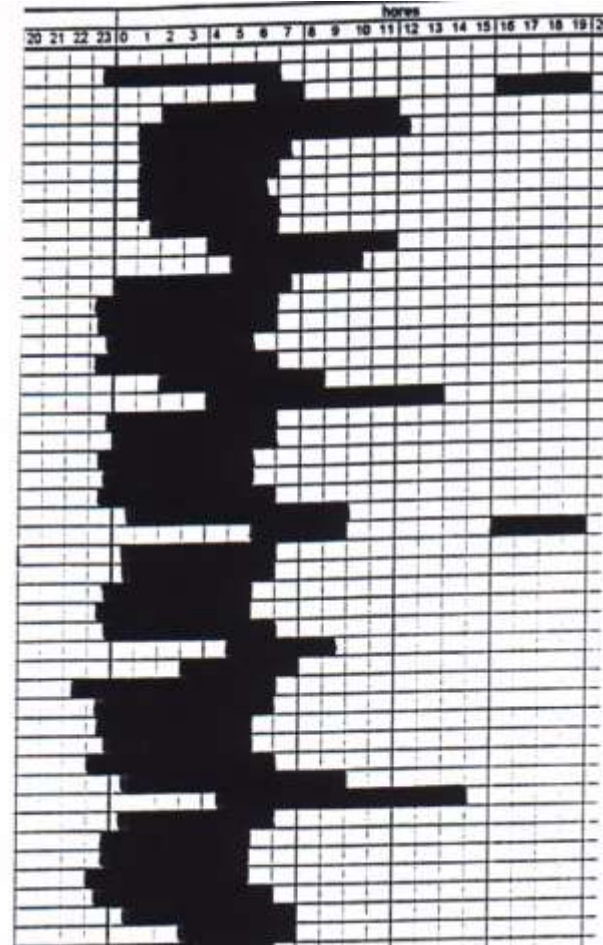
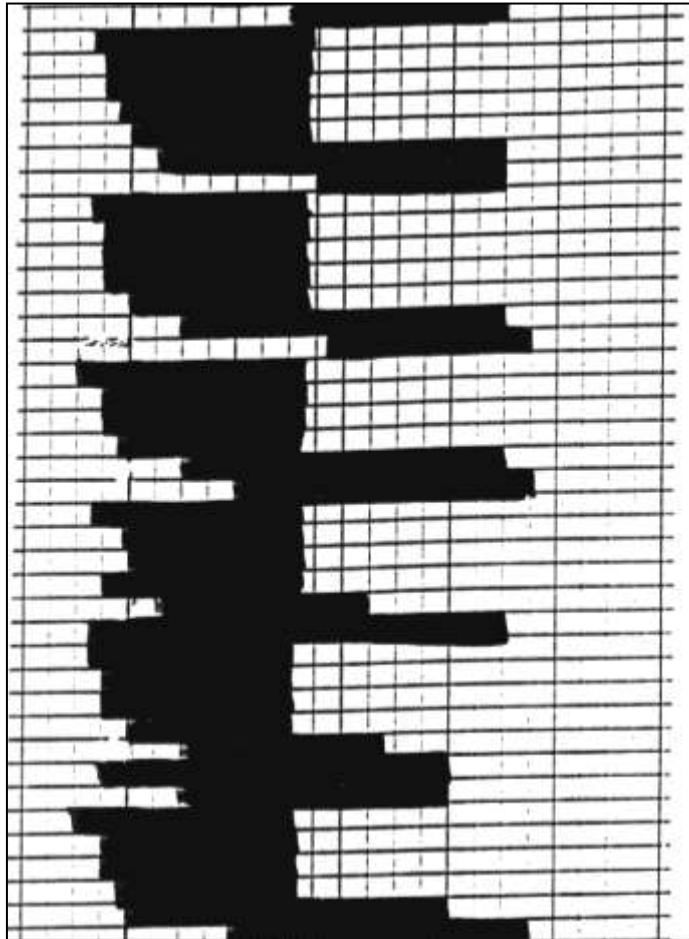
Durada del son



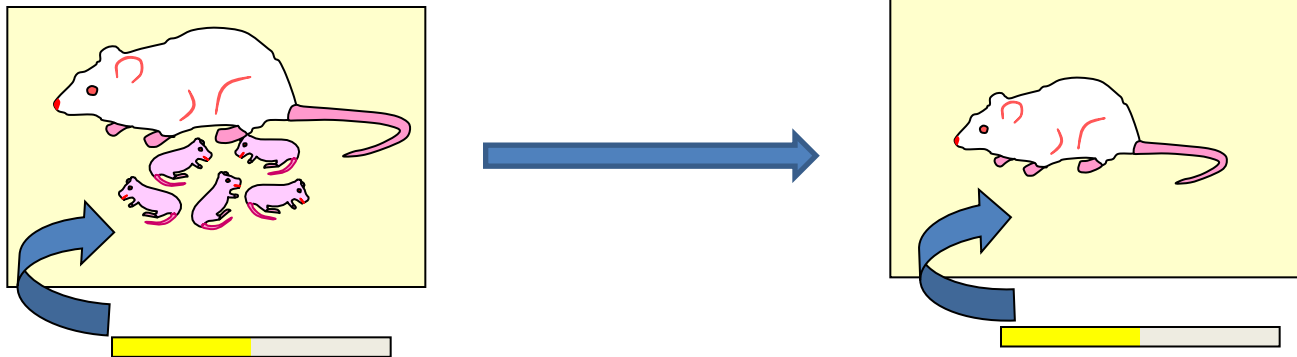
Grau de *jetlag* social



© Ron Leffman • www.Cipact1.com/42877

[illegible]

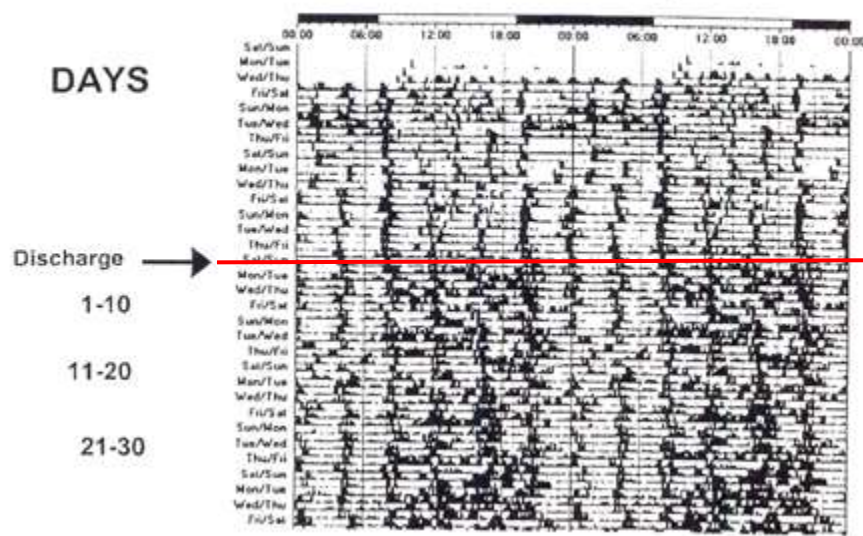
Influències ambientals ???



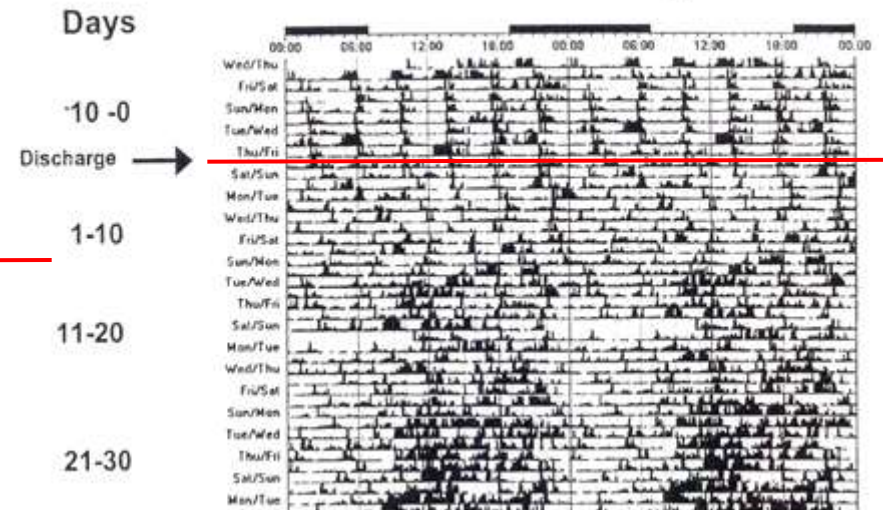
Patrons de llum en el desenvolupament del ritme



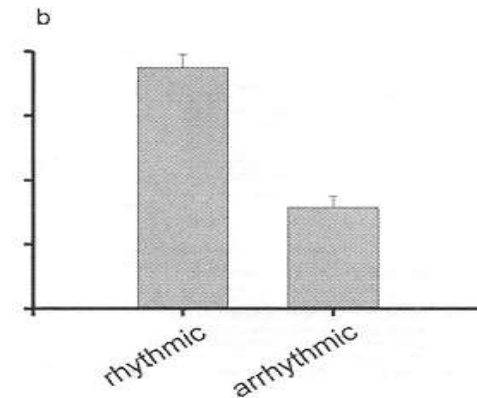
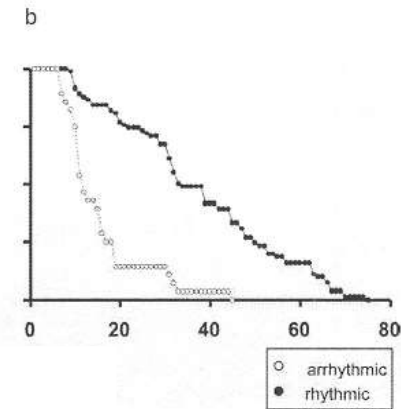
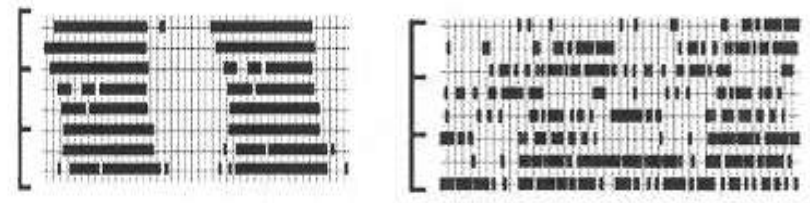
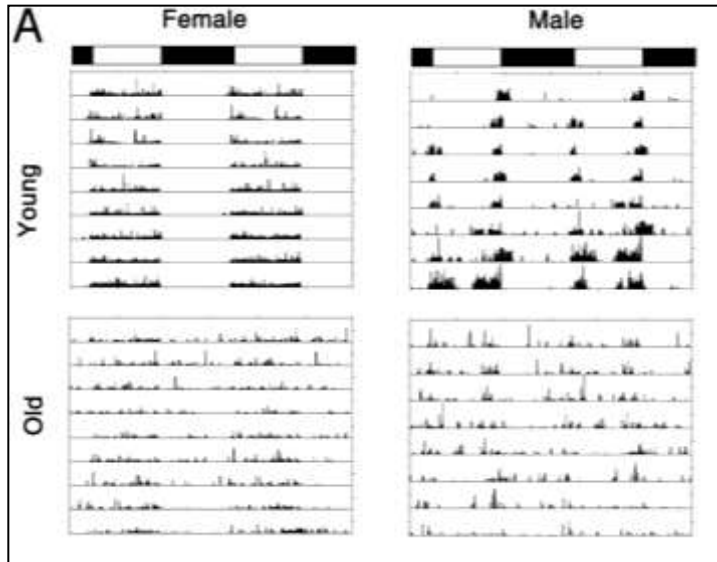
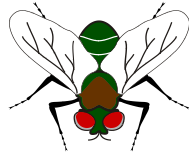
Cycled Lighting



Constant Dim Light

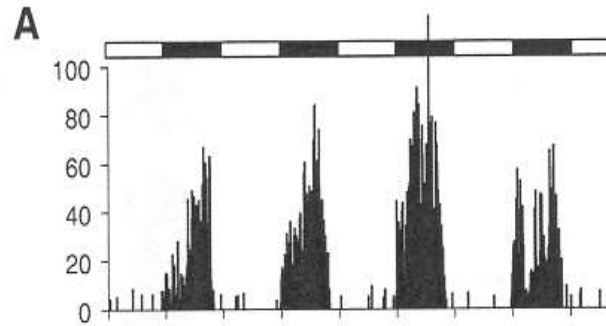
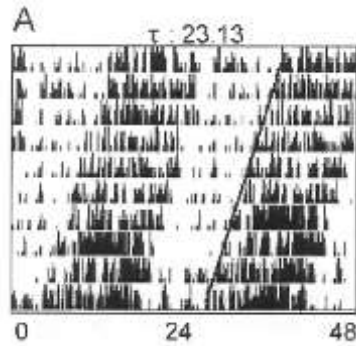


Alteració de ritmes <> envelliment ?

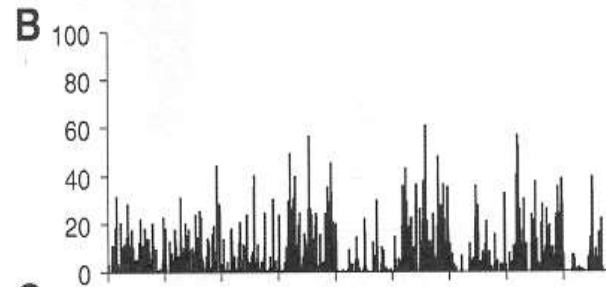
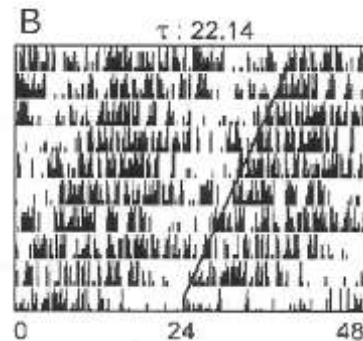


Alteracions repetides dels RC contribueixen a un deteriorament de l'organisme (conseqüències a llarg termini):

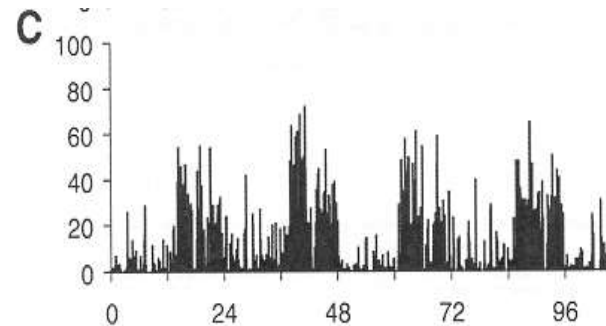
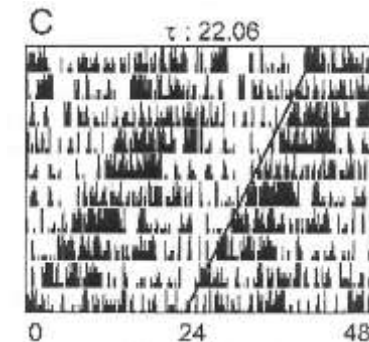
3 anys
Canvis estacionals
de 12 mesos



3 anys
Canvis estacionals
de 5 mesos
(envellits)

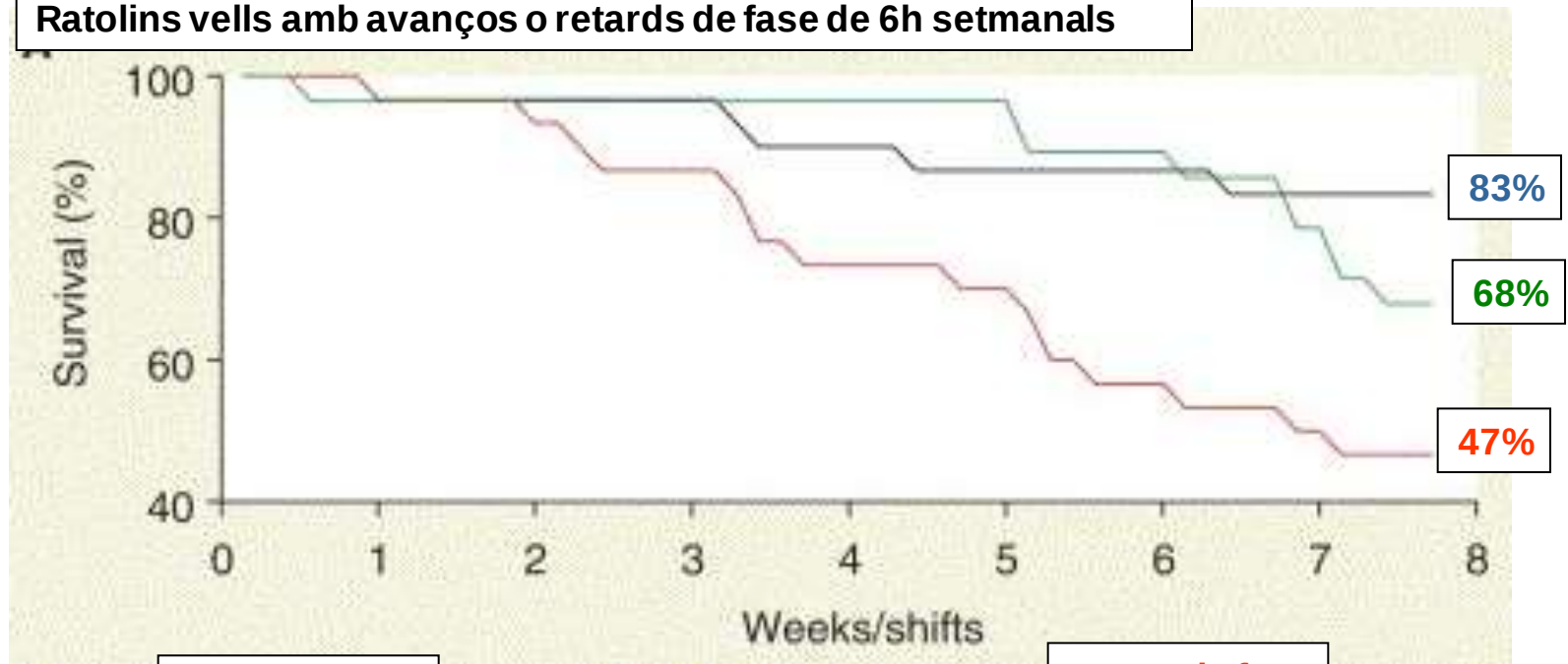


7 anys
Canvis estacionals
de 12 mesos



Mortalitat i canvis de fase (ratolins 27-31 setmanes)

Ratolins vells amb avanços o retards de fase de 6h setmanals



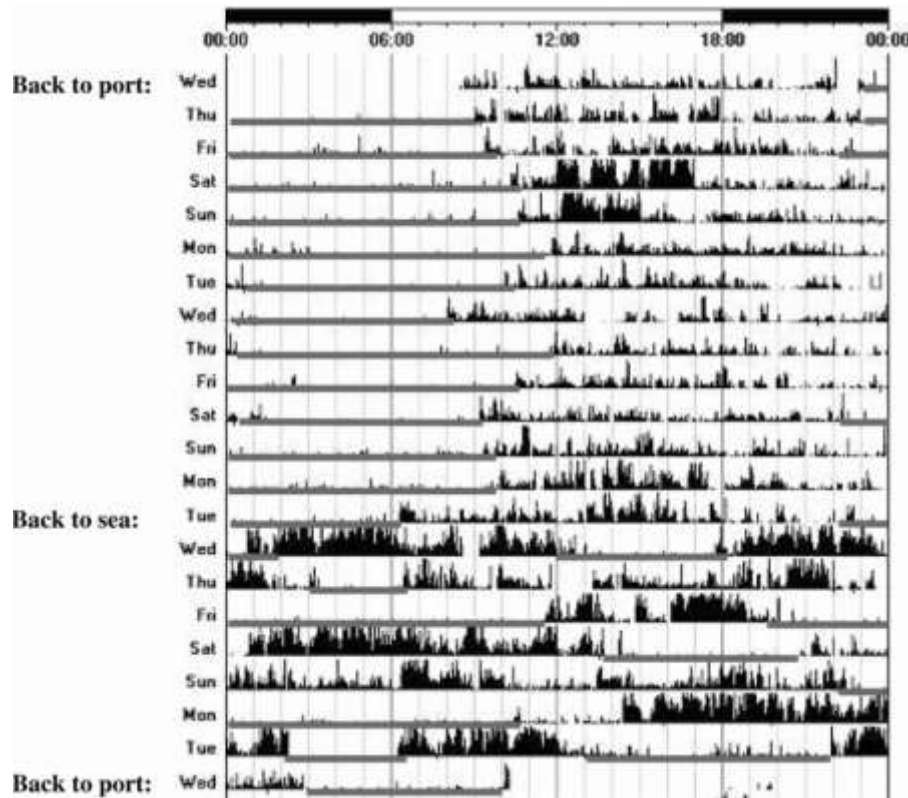
retard de fase



avanç de fase



Adaptació a torns de feina?



Personal de vols i torns de treballs de rotatori tenen més incidència de:

Càncer
Alt. Cardiovasculars
Alt. Metabòliques
Diabetis tipus II

**Cada 15 anys de treball
rotatori → envelliment de 5
anys**

**Gander P et al. Sleep and Sleepiness of
Fishermen on Rotating Schedules, 2008, 25:
389-398**

Els rellotges de la nostra vida

Solar/oficial

Biològic

Social



Moltes Gràcies