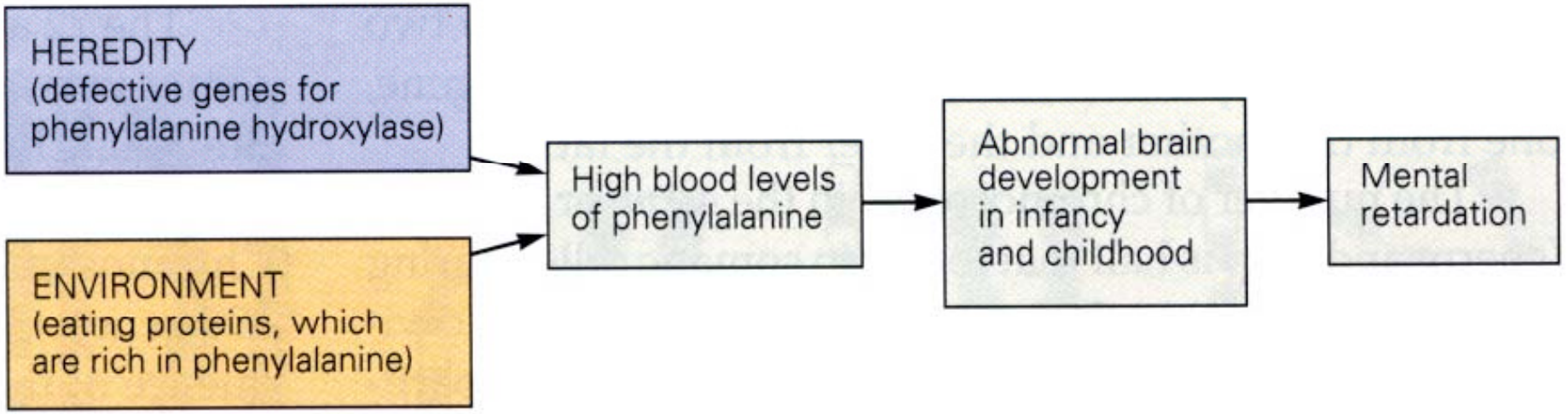
ΓΟΝΙΔΙΑ ΚΑΙ ΣΥΜΠΕΡΙΦΟΡΑ

- Υπάρχει κάποιο γενετικό στοιχείο στην ανθρώπινη συμπεριφορά?
- Ποια στοιχεία της συμπεριφοράς κληρονομούνται?
- Με ποιον τρόπο τα γονίδια οργανώνουν τη συμπεριφορά?

Heredity and Environment are both necessary for the expression of phenylketonouria

- 1/15.000 children
- Phenylalanine --- (phenylalanine hydroxylase)→ Tyrosine



Francis Galton (1822-1911)

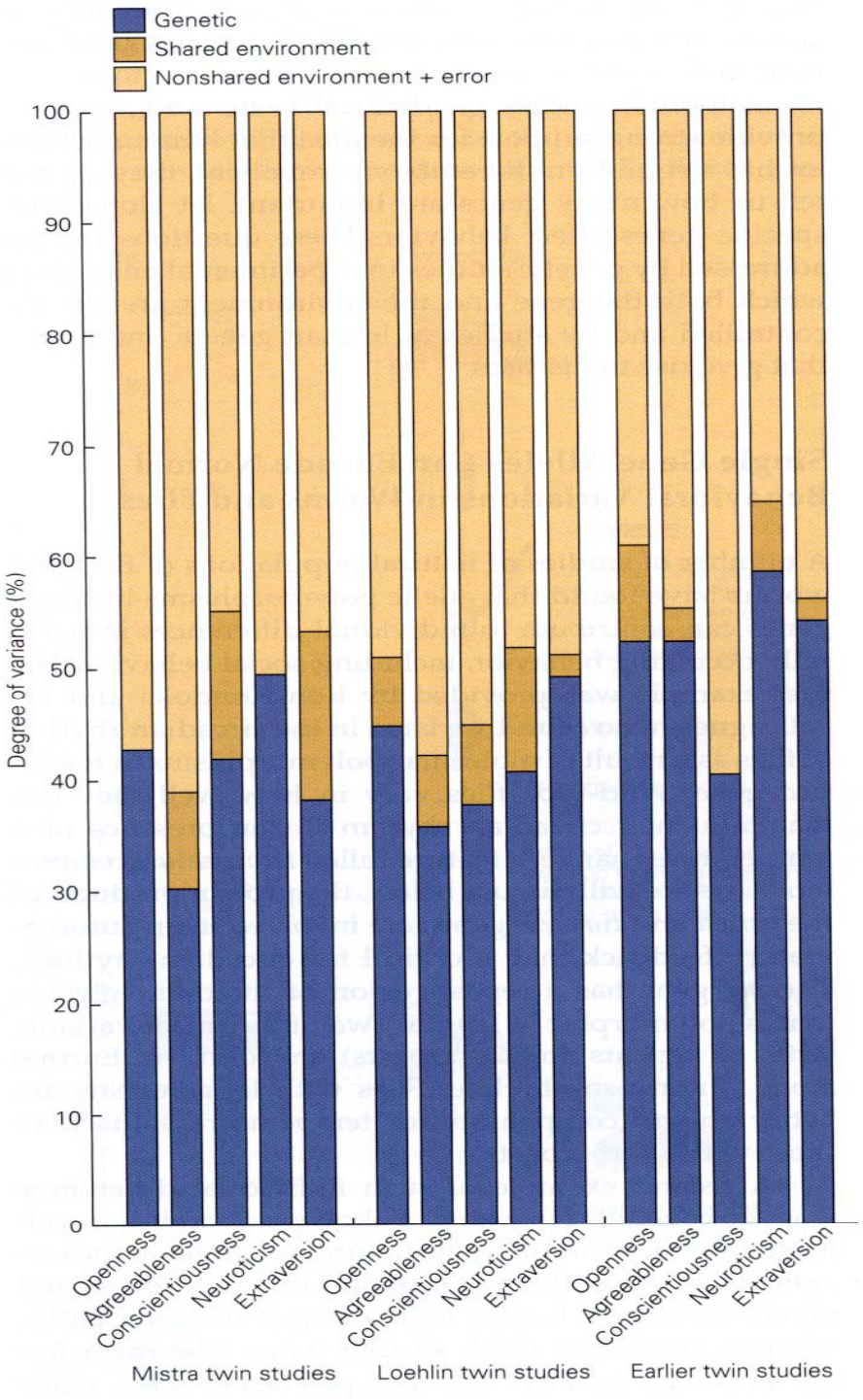
- **Francis Galton began to apply Genetics to Human Behavior in 1869.**
- **"*Hereditary Genius*"**
- **Eugenics: the science of improving human heredity characteristics.**
- **Galton is among the first to address the interplay of inheritance and environment in the determination of behavior:**

"Relatives of eminent individuals also share social, educational, and financial advantages, and these environmental factors might account for the correlation between eminence and familial relationship."

- **In 1883, he introduced the idea of the twin study.**

Variation in personality in studies of twins.

- Minnesota twin registry: 16.000 individuals.
- Thomas Bouchard et al, in Minnesota (1979): 74 pairs of identical twins raised apart (MISTRA).
- These Identical twins tend to be around 80% the same in everything from stature to health to IQ to political views.



Neuroticism

- Anxious
- Depressed
- Low self-esteem
- Irrational
- Emotional
- Alienation

Extraversion

- Active
- Carefree
- Sociable
- Dominant
- Surgent

Openness

- Fantasy
- Aesthetics
- Feelings
- Ideas
- Values

Some schemes for organizing personality traits

Index of abnormal personality

Index of normal personality

Table 2

Genetic Correlations Between MPQ Primary Scales and MMPI Validity and Clinical Scales

	MPQ										
MMPI	wellbe	socpot	achiev	socclos	stress	alien	aggres	control	harmav	tradit	absorp
Lie (L)	.13	−.21	−.11	.01	−.08	−.27	**−.41**	.27	.05	.32	−.27
Frequency (F)	−.31	.25	.37	−.16	**.41**	***.88***	.26	**−.37**	***−.52***	−.07	***.47***
Correction (K)	.21	.02	−.26	.02	***−.77***	***−.75***	***−.56***	.29	.11	−.24	***−.55***
Hypochondriasis (Hs)	−.18	.15	.31	.03	***.72***	***.78***	.25	−.26	−.10	.05	.23
Depression (D)	**−.53**	.04	.05	−.18	**.60**	.34	−.11	−.13	−.14	.14	.01
Hysteria (Hy)	.08	.34	.30	.24	.17	−.03	−.40	.01	.09	−.21	−.05
Psychopathic Deviate (Pd)	***−.48***	**.32**	.33	−.22	***.48***	***.65***	.32	−.28	**−.35**	−.16	**.33**
Masculinity-Femininity (Mf)	−.22	***.62***	.30	.23	.16	−.23	.12	.02	.13	−.22	.23
Paranoia (Pa)	−.32	.33	**.53**	−.25	**.52**	.35	.05	−.02	**−.47**	.07	***.61***
Psychasthenia (Pt)	***−.48***	.01	.22	−.11	***.86***	***.67***	.33	−.14	−.06	.23	***.37***
Schizophrenia (Sc)	**−.35**	.12	.28	−.25	***.68***	***.83***	***.55***	−.31	**−.31**	.06	***.60***
Hypomania (Ma)	.03	.26	**.37**	.06	***.41***	***.78***	***.52***	***−.47***	**−.38**	−.25	***.70***
Social Introversion (Si)	**−.47**	**−.44**	.17	**−.46**	***.61***	***.68***	.19	−.27	−.24	**.39**	−.06

Note. Correlations whose 95% confidence intervals do not include zero are shown in bold. Correlations whose 99% confidence intervals do not include zero are shown in bold-faced italics. wellbe = Wellbeing; socpot = Social Potency; achiev = Achievement; socclos = Social Closeness; stress = Stress Reaction; alien = Alienation; aggres = Aggression; control = Control; tradit = Traditionalism; harmav = Harm Avoidance; absorp = Absorption.

74 monozygotic twin pairs, 52 dizygotic twin pairs

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Genetic Correlations Between MPQ Primary Scales and MMPI Validity and Clinical Scales

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Correction (K)	.21	.02	−.26	.02	***−.77***	***−.75***	***−.56***	.29	.11	−.24	***−.55***
Hypochondriasis (Hs)	−.18	.15	.31	.03	***.72***	***.78***	.25	−.26	−.10	.05	.23
Depression (D)	**−.53**	.04	.05	−.18	**.60**	.34	−.11	−.13	−.14	.14	.01
Hysteria (Hy)	.08	.34	.30	.24	.17	−.03	−.40	.01	.09	−.21	−.05
Psychopathic Deviate (Pd)	***−.48***	**.32**	.33	−.22	***.48***	***.65***	.32	−.28	**−.35**	−.16	**.33**
Masculinity-Femininity (Mf)	−.22	***.62***	.30	.23	.16	−.23	.12	.02	.13	−.22	.23
Paranoia (Pa)	−.32	.33	**.53**	−.25	**.52**	.35	.05	−.02	**−.47**	.07	***.61***
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Social Introversion (Si)	**−.47**	**−.44**	.17	**−.46**	***.61***	***.68***	.19	−.27	−.24	**.39**	−.06

Note. Correlations whose 95% confidence intervals do not include zero are shown in bold. Correlations whose 99% confidence intervals do not include zero are shown in bold-faced italics. wellbe = Wellbeing; socpot = Social Potency; achiev = Achievement; socclos = Social Closeness; stress = Stress Reaction; alien = Alienation; aggres = Aggression; control = Control; tradit = Traditionalism; harmav = Harm Avoidance; absorp = Absorption.

Table 3

Environmental Correlations Between MPQ Primary Scales and MMPI Validity and Clinical Scales

	MPQ										
MMPI	wellbe	socpot	achiev	socclos	stress	alien	aggres	control	harmav	tradit	absorp
Lie (L)	.15	−.03	.08	.11	***−.41***	−.09	***−.36***	**.24**	.12	.12	−.15
Frequency (F)	−.16	−.07	−.18	***−.39***	***.35***	***.32***	***.27***	−.17	−.08	***−.27***	.07
Correction (K)	.09	.00	.12	**.23**	***−.56***	**−.25**	***−.28***	.11	.03	−.02	−.06
Hypochondriasis (Hs)	**−.26**	−.21	−.08	**−.22**	***.31***	.06	.04	−.06	−.18	.01	.14
Depression (D)	***−.64***	***−.29***	−.19	**−.21**	***.50***	***.28***	.09	.01	.03	−.02	−.03
Hysteria (Hy)	***−.32***	−.06	−.04	.10	.07	−.07	−.09	.00	−.10	.00	.03
Psychopathic Deviate (Pd)	***−.33***	.11	−.13	−.11	***.31***	***.34***	***.31***	−.09	−.09	−.18	.06
Masculinity-Femininity (Mf)	−.02	−.11	−.04	−.14	.20	−.02	***−.25***	.00	.02	***−.36***	***.28***
Paranoia (Pa)	***−.47***	−.16	−.03	−.01	***.44***	***.31***	.12	−.03	−.04	**−.22**	−.04
Psychasthenia (Pt)	***−.38***	−.15	***−.33***	***−.31***	***.68***	***.41***	***.39***	−.16	−.14	.06	.14
Schizophrenia (Sc)	***−.31***	−.12	**−.22**	***−.33***	***.58***	***.42***	***.29***	−.09	−.17	−.13	.10
Hypomania (Ma)	***.29***	***.42***	.10	−.04	.07	.14	***.34***	−.12	−.20	**−.22**	.20
Social Introversion (Si)	−.21	**−.21**	***−.32***	**−.25**	***.33***	**.23**	**.23**	−.02	.06	.11	.09

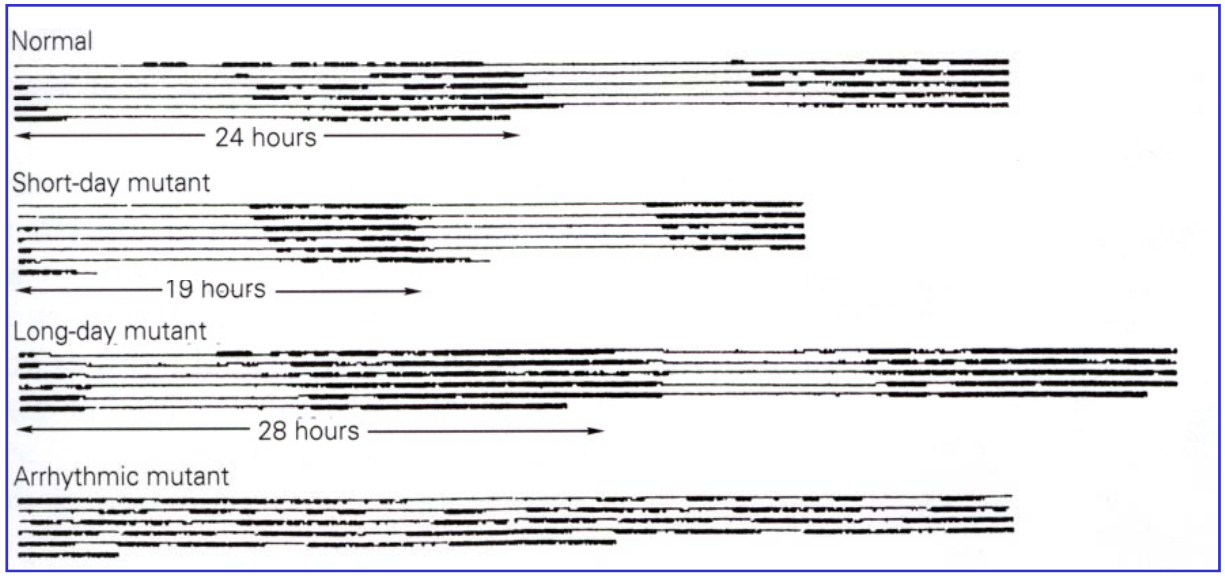
Note. Correlations whose 95% confidence intervals do not include zero are shown in bold. Correlations whose 99% confidence intervals do not include zero are shown in bold-faced italics. wellbe = Wellbeing; socpot = Social Potency; achiev = Achievement; socclos = Social Closeness; stress = Stress Reaction; alien = Alienation; aggres = Aggression; control = Control; tradit = Traditionalism; harmav = Harm Avoidance; absorp = Absorption.

Genetic and Environmental Influences on Self-Reported Diet: A Reared-Apart Twin Study

- **50% of the variance in the self-report of diet was attributable to genetic factors.**
- **Sharing a current family environment exerts minimal influence on individual differences in self-reported diet.**

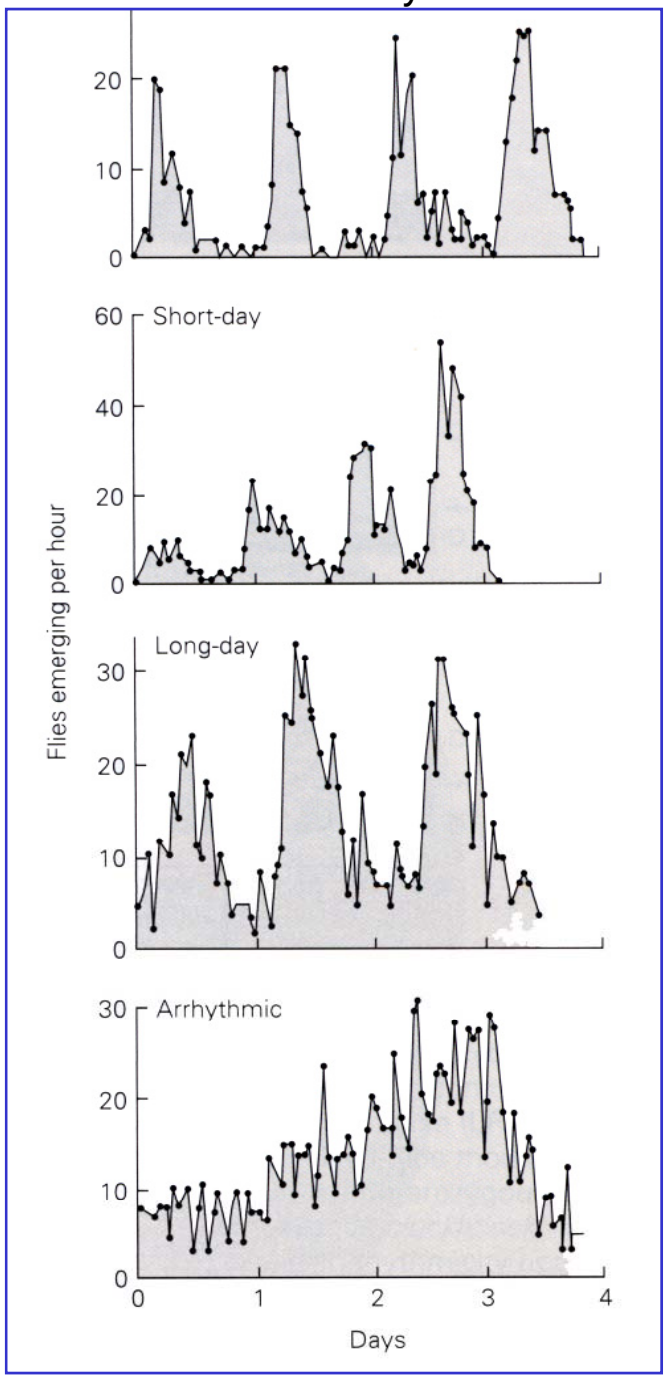
The influence of genes on behavior can be explored most rigorously in simple animals

Loco motor rhythms

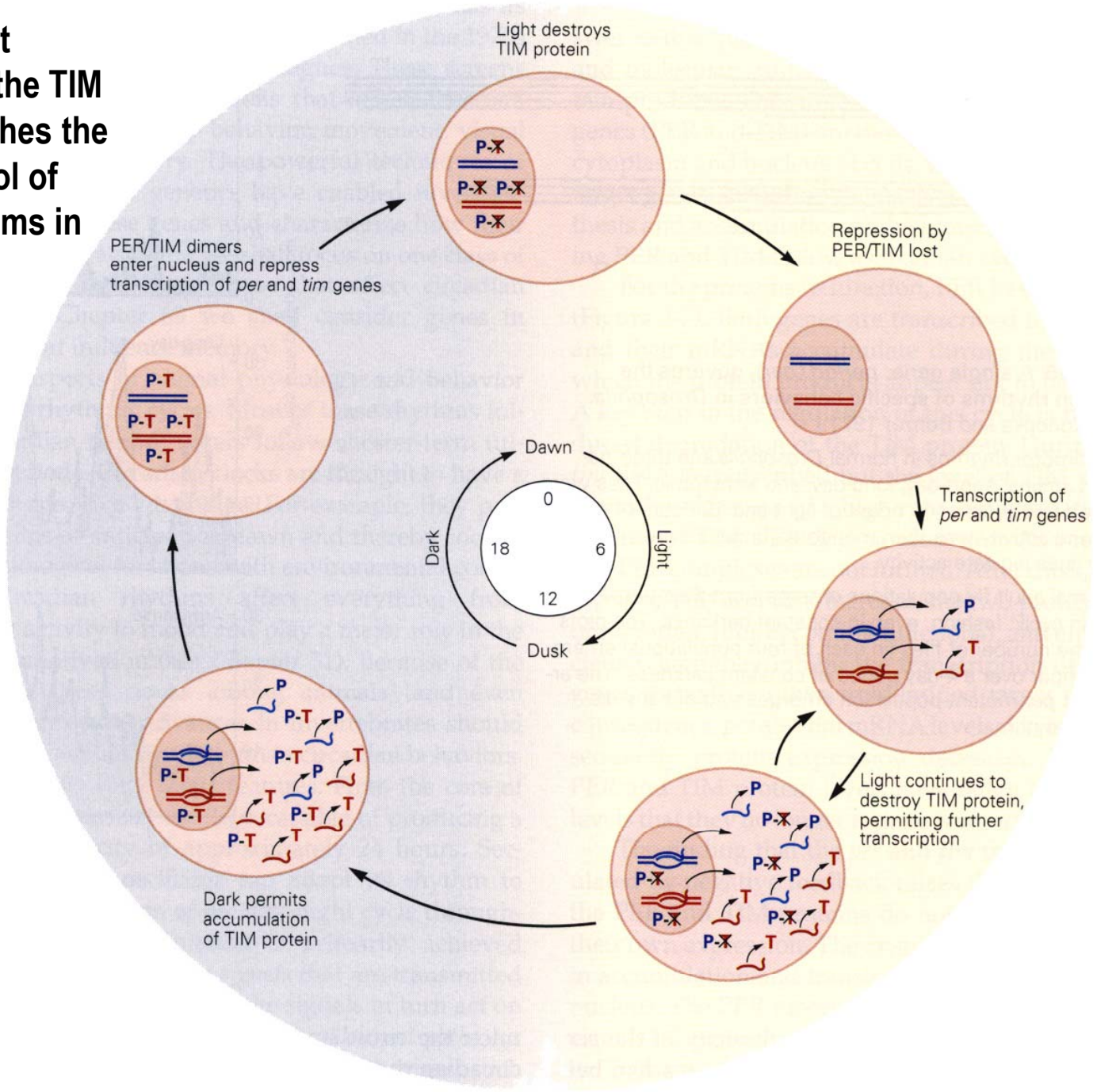


A single gene, *period (per)*, governs the circadian rhythms of specific behaviors in Drosophila

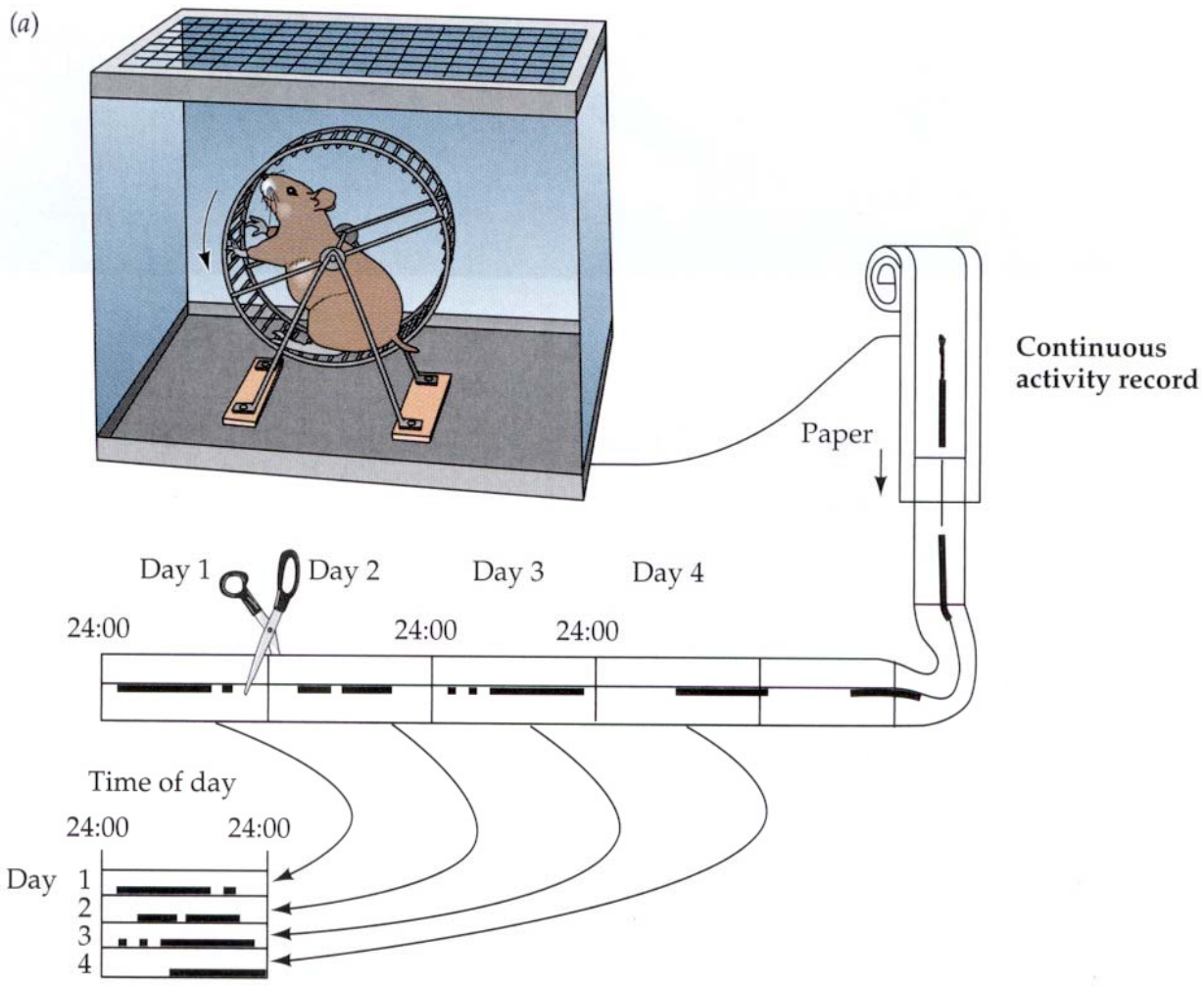
Eclosion rhythms

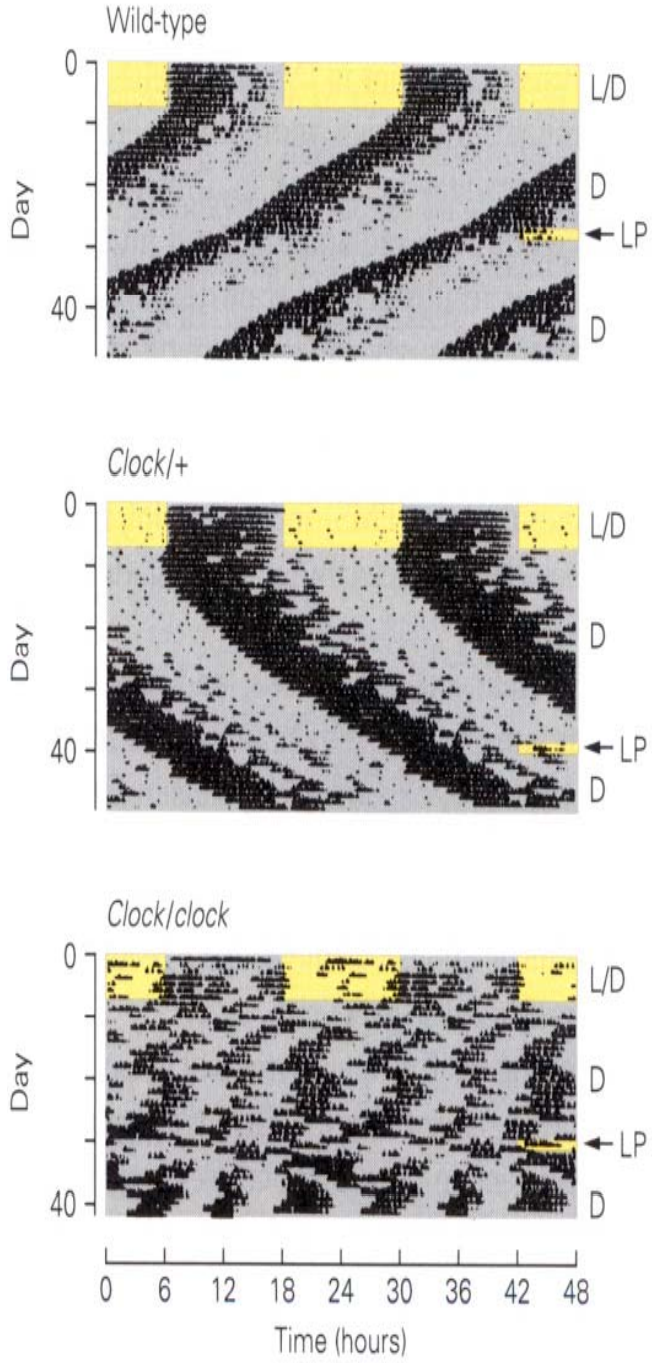


Light dependent degradation of the TIM protein establishes the circadian control of biological rhythms in *Drosophila.*

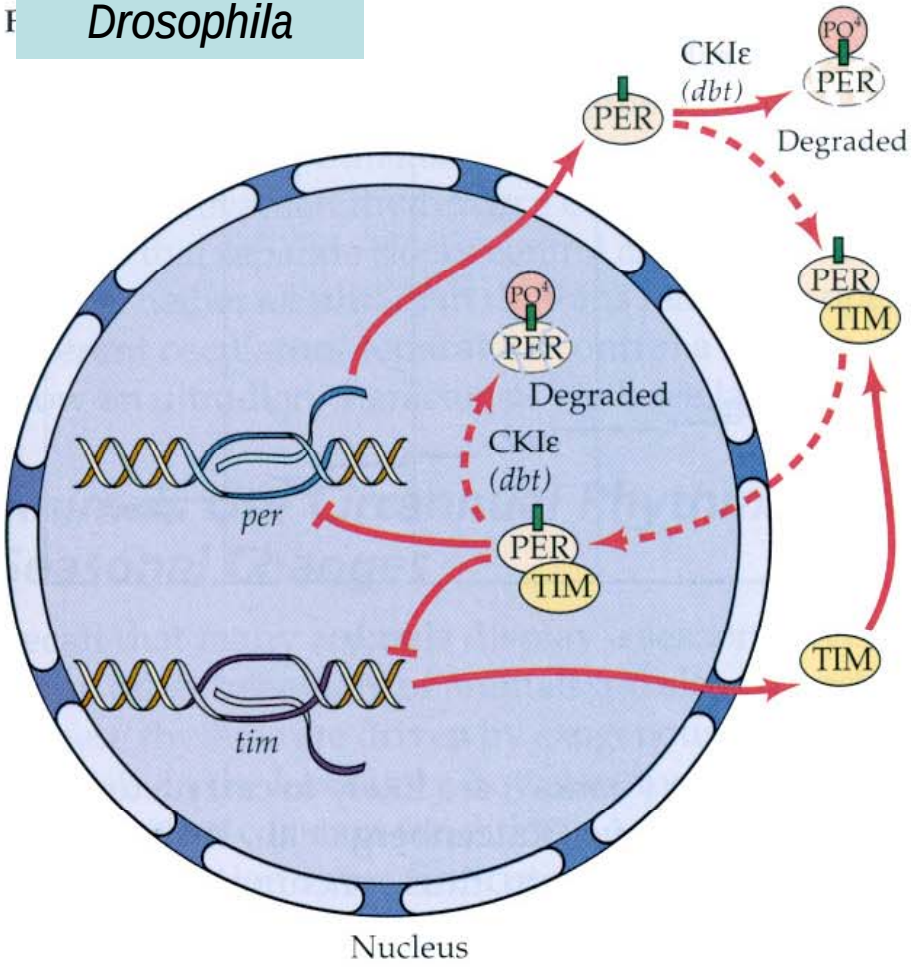


Locomotor activity records of *clock* mutant mice





Drosophila



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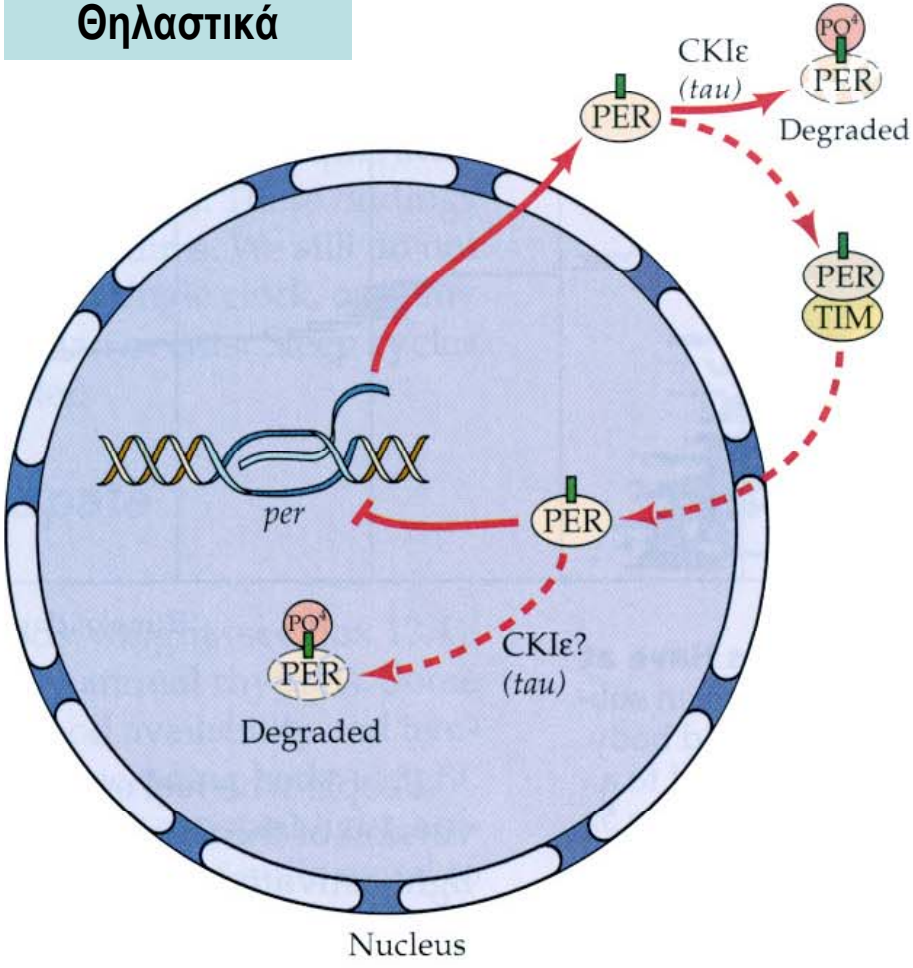


Mutations in the Gene encoding Leptin affect Feeding Behavior

obese/obese: 67gr

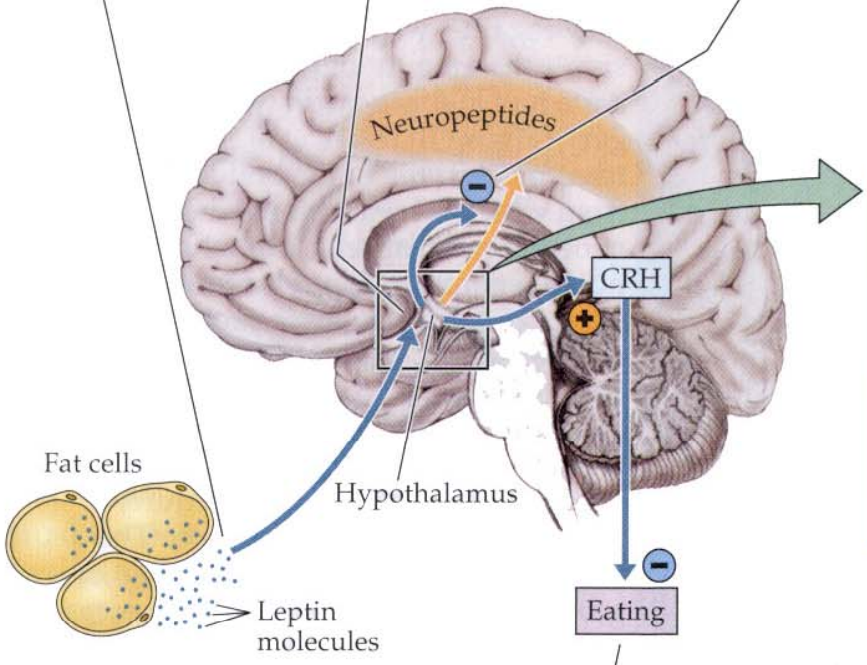
obese/obese + Leptine: 35gr

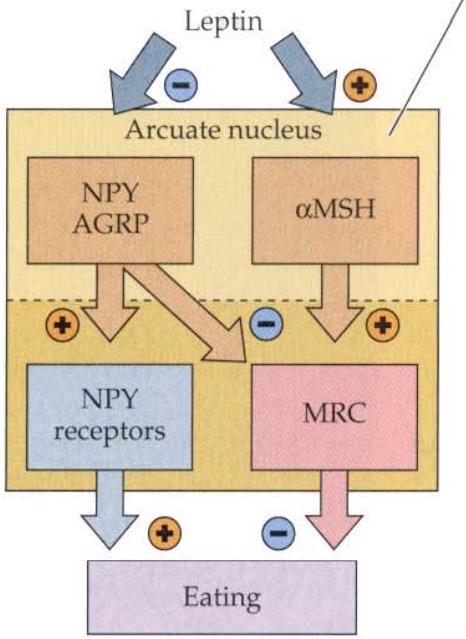
1. Fat cells secrete leptin into circulation. The more and larger the fat cells, the more leptin is released.

2. Leptin reaches leptin receptors in hypothalamic regions, including the LH, and the arcuate, supraoptic, and paraventricular nuclei.

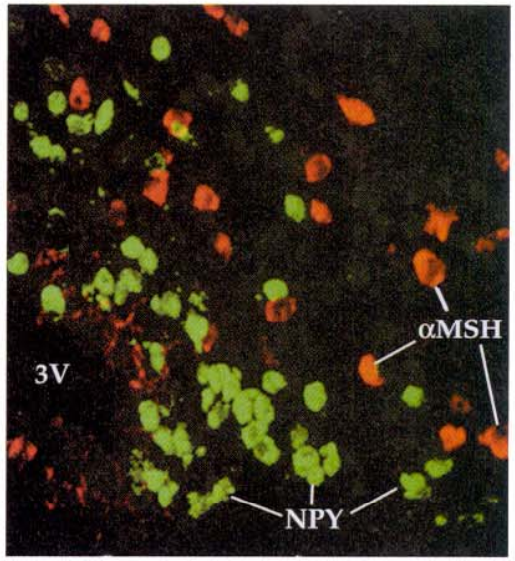
3. Leptin receptor activation suppresses neuropeptide production and release.

4. Leptin inhibits arcuate neurons releasing NPY and AGRP, but excites neurons releasing αMSH. NPY-receptive neurons in those regions normally trigger feeding, while the melancortin-receptive neurons (which are excited by αMSH and inhibited by AGRP) normally inhibit eating. As leptin levels fall, the circuits will induce hunger.



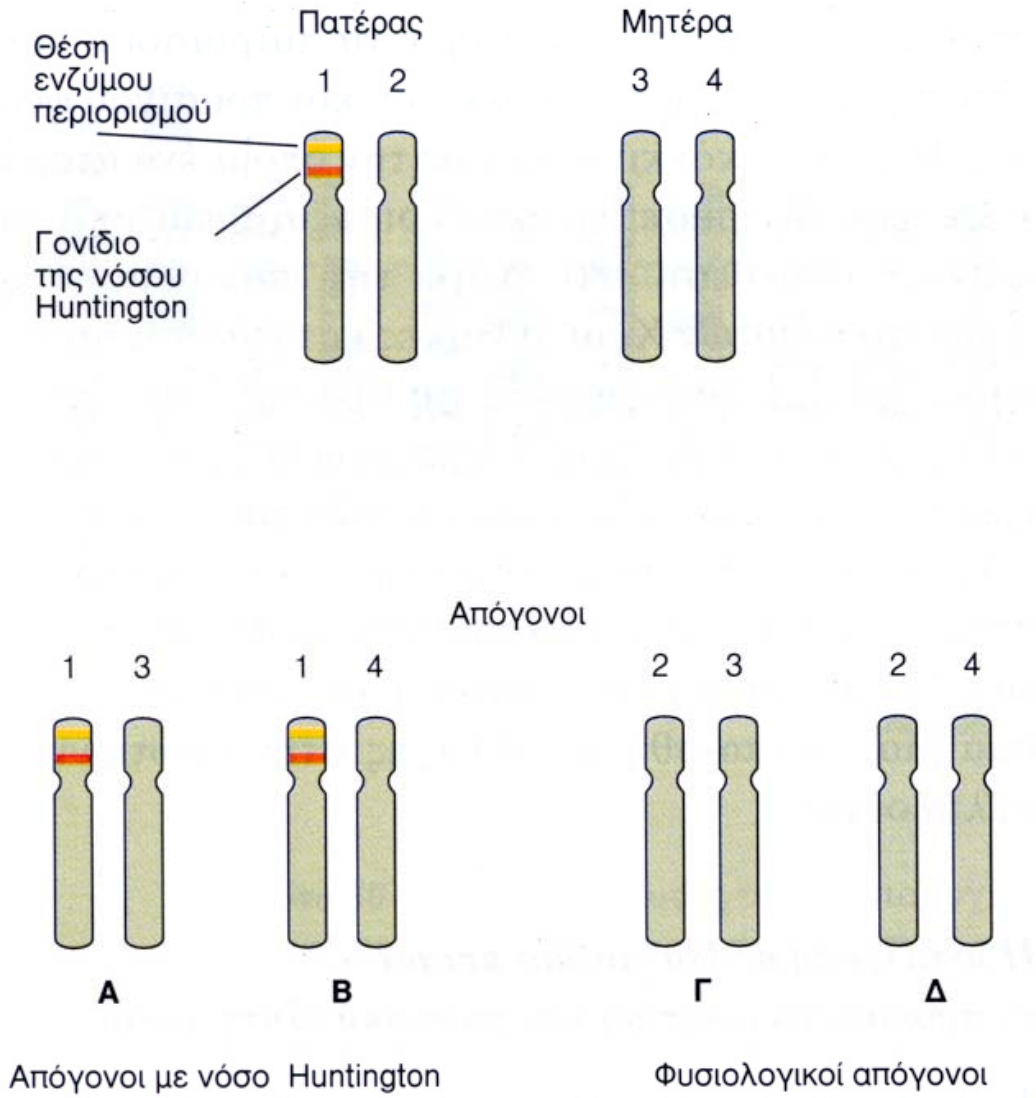


Arcuate nucleus neurons



5. Leptin receptor activation also increases levels of corticotropin-releasing hormone (CRH), which suppresses hunger.

13.28 A Working Model of the Effect of Leptin on Body Weight (Image from Schwartz et al., 2000; courtesy of Denis G. Baskin.)



Εικόνα 30-4 Η κληρονόμηση του γονιδίου στο οποίο οφείλεται η νόσος Huntington είναι δυνατόν να ανιχνευθεί εάν ακολουθηθεί η κληρονόμηση των πολυμορφισμών μήκους θραυσμάτων εκ περιορισμού για το χρωματόσωμα 4.

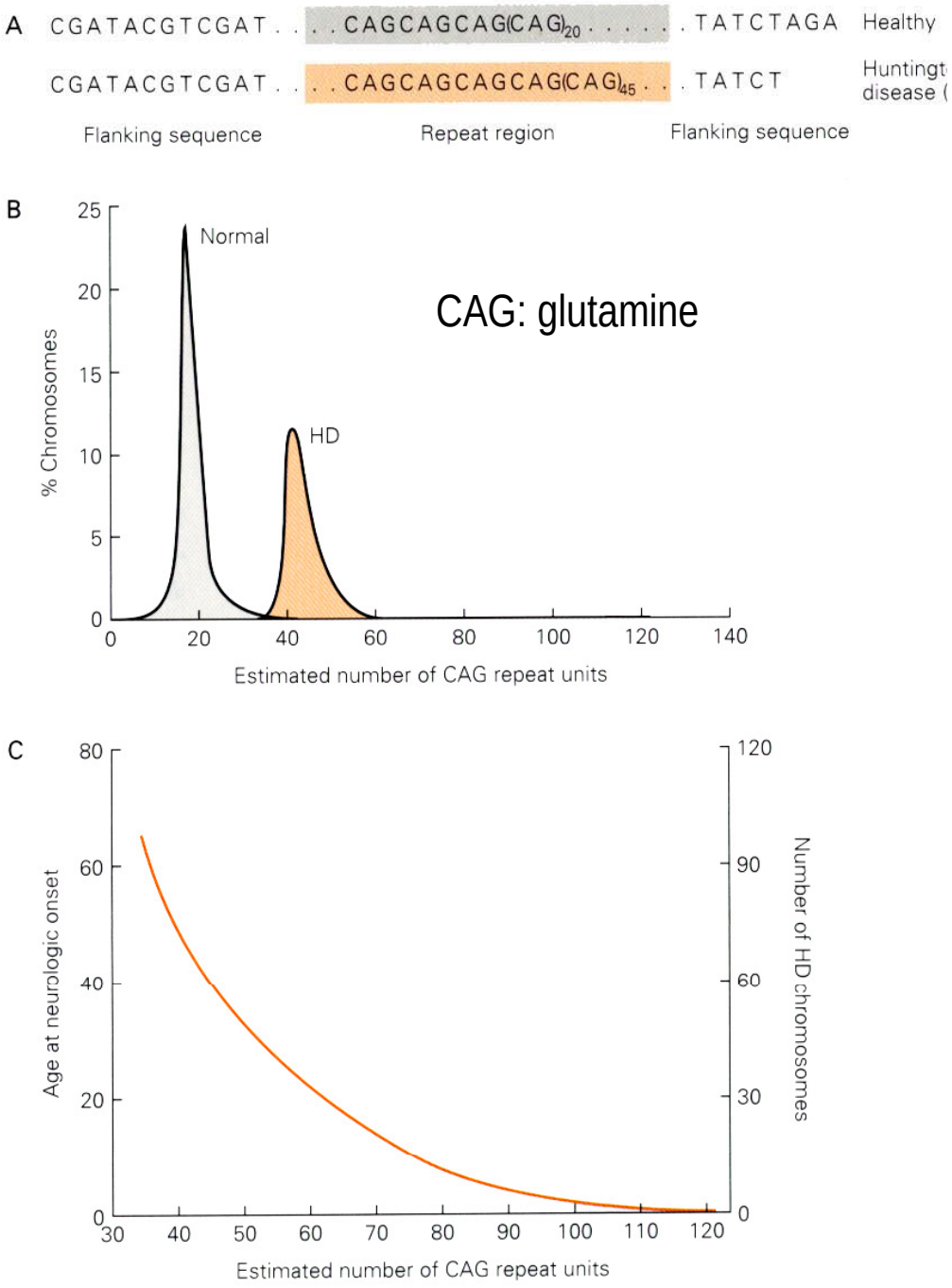


Figure 3-12. The DNA mutation in Huntington disease is an unstable CAG repeat.

A. The nucleotide sequence in the region of the unstable CAG repeat in the Huntingtin gene.

B. Distribution of CAG repeat lengths on normal and Huntington disease (HD) chromosomes. The percentages of normal and HD chromosomes containing different CAG repeat lengths (from 6 to 125) are compiled from several published studies.

C. A highly significant inverse correlation between age of onset of Huntington disease movements and CAG repeat length occurs across all HD alleles. (Modified from Gusella and MacDonald 1995.)

Κίνδυνος εκδήλωσης σχιζοφρένειας