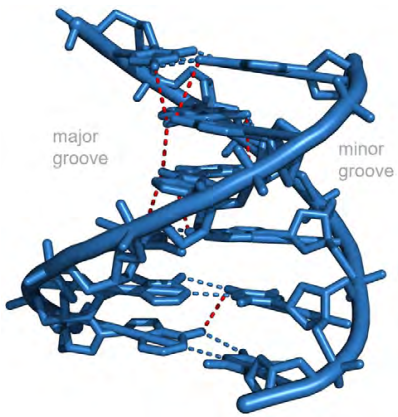
"МИС-РТ"-2022 Сборник №79-2 http://ikar.udm.ru/mis-rt.htm



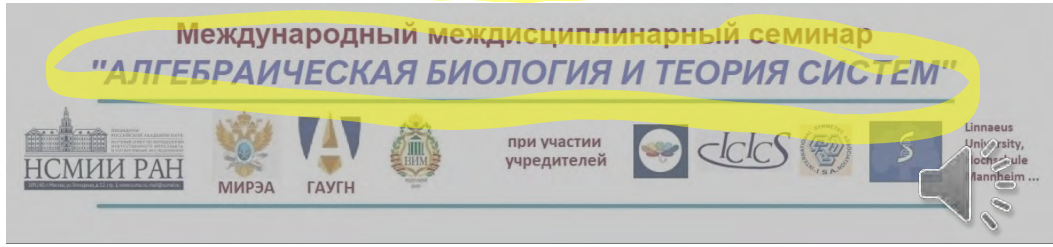
Modeling of charge oscillations in DNA. A search for resonance structures in the genome.

Max Myakishev-Rempel, max@dnaresonance.org

I. Savelev[1], A. Samchenko[1], A. Klimov[1], L. Shishkin[1], L. Yulmetova[1], O. Polesskaya[2], V. Bashinskaya[1], A. Voronka[1], A. Vetcher[1,3,4], R. Miller[5], E. Naumova[6], M. Myakishev-Rempel[1]

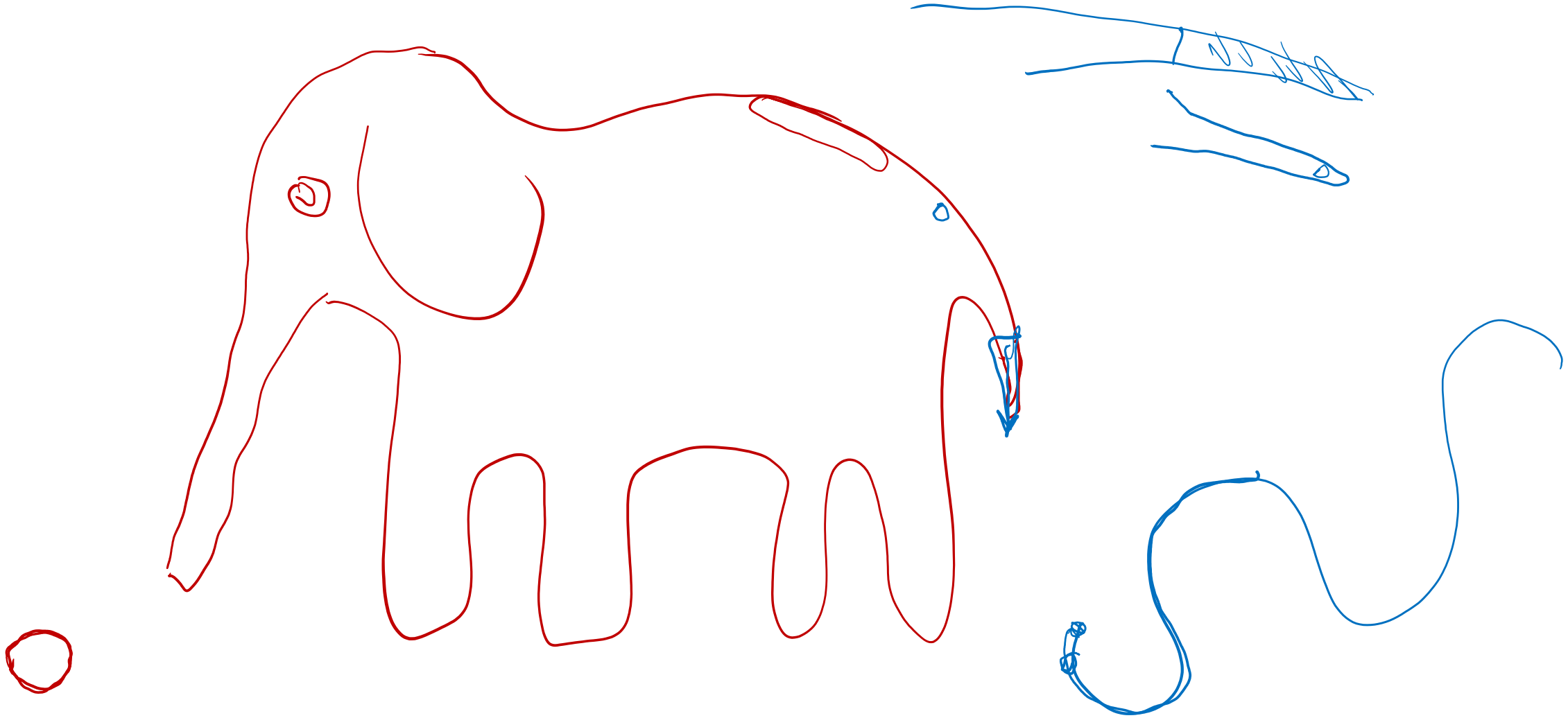
1 - DNA Resonance Research Foundation, San Diego, CA, USA
2 - University of California, San Diego, USA
3 - Nanotechnology Scientific and Educational Center, Institute of Biochemical Technology
and Nanotechnology, Peoples Friendship University of Russia, Moscow, Russia
4 - Shishonin Complementary and Integrative Health Clinic, Moscow, Russia
5 - OAK, Inc., Grants Pass, OR, USA
6 - Rzhanov Institute of Semiconductor Physics, Siberian Branch of RAS, Novosibirsk, Russia

Jan 18, 2022

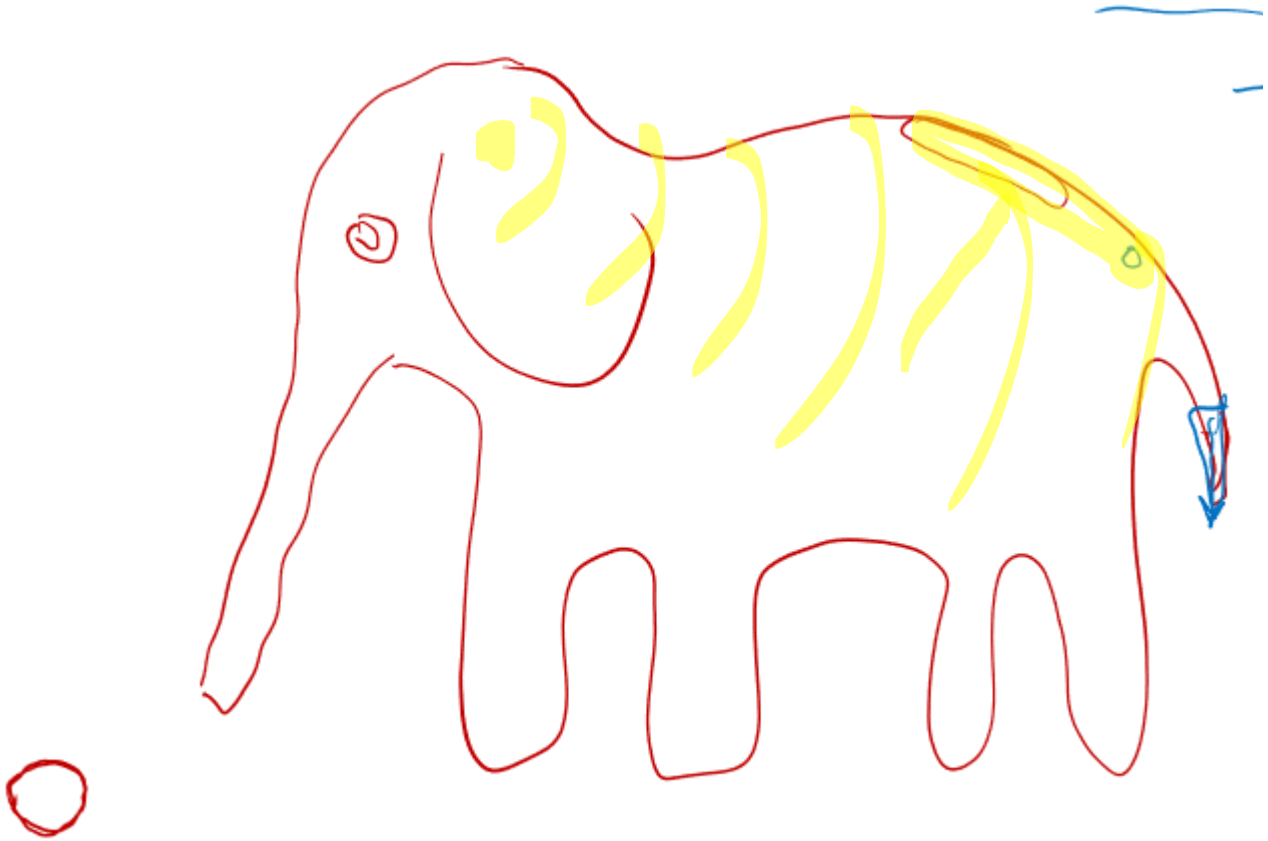


Morphogenetic field

Morphogenetic field

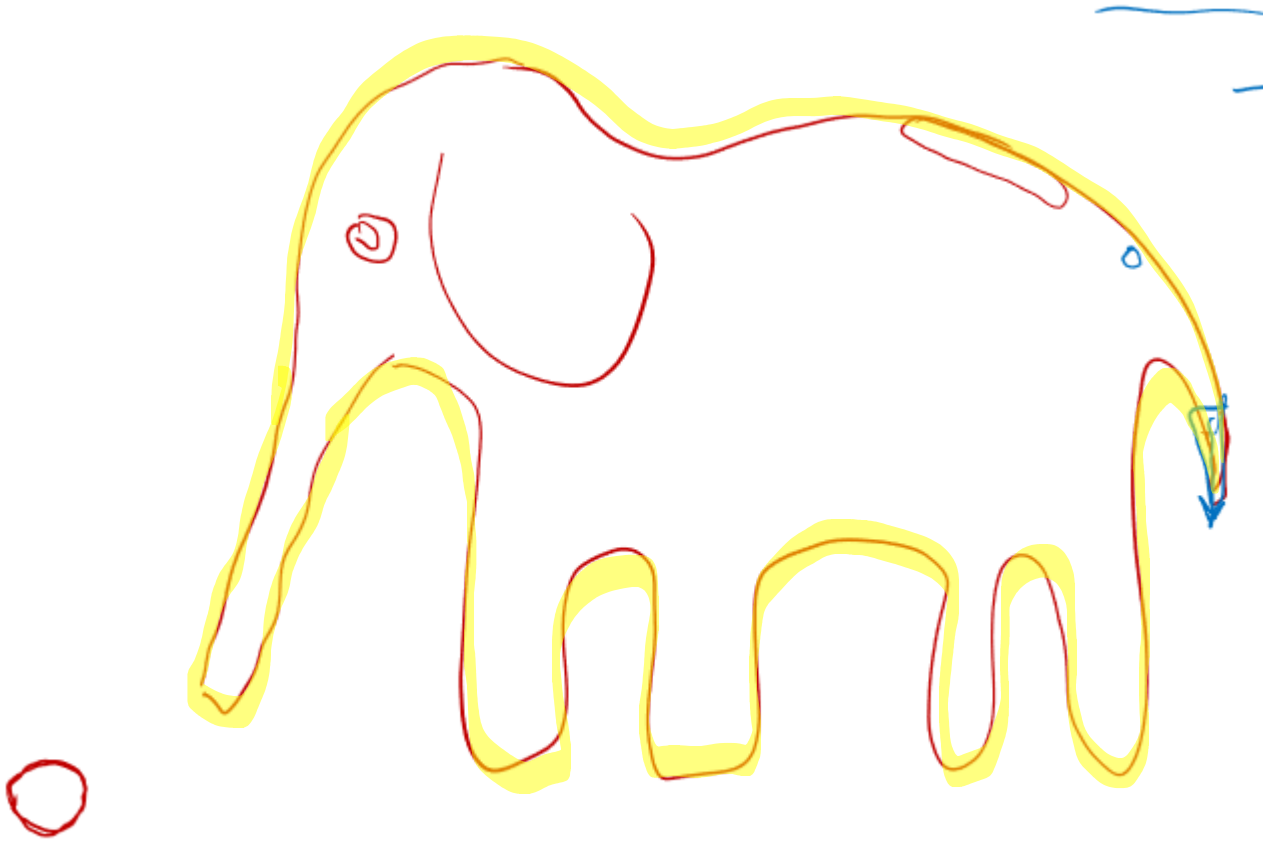


Morphogenetic field



- Gradients of morphogenic proteins and other signaling molecules
- Neuronal signaling
- Mechanoception
- Electrostatic fields
- [Electromagnetic, acoustic and other fields are rejected]

Morphogenetic field



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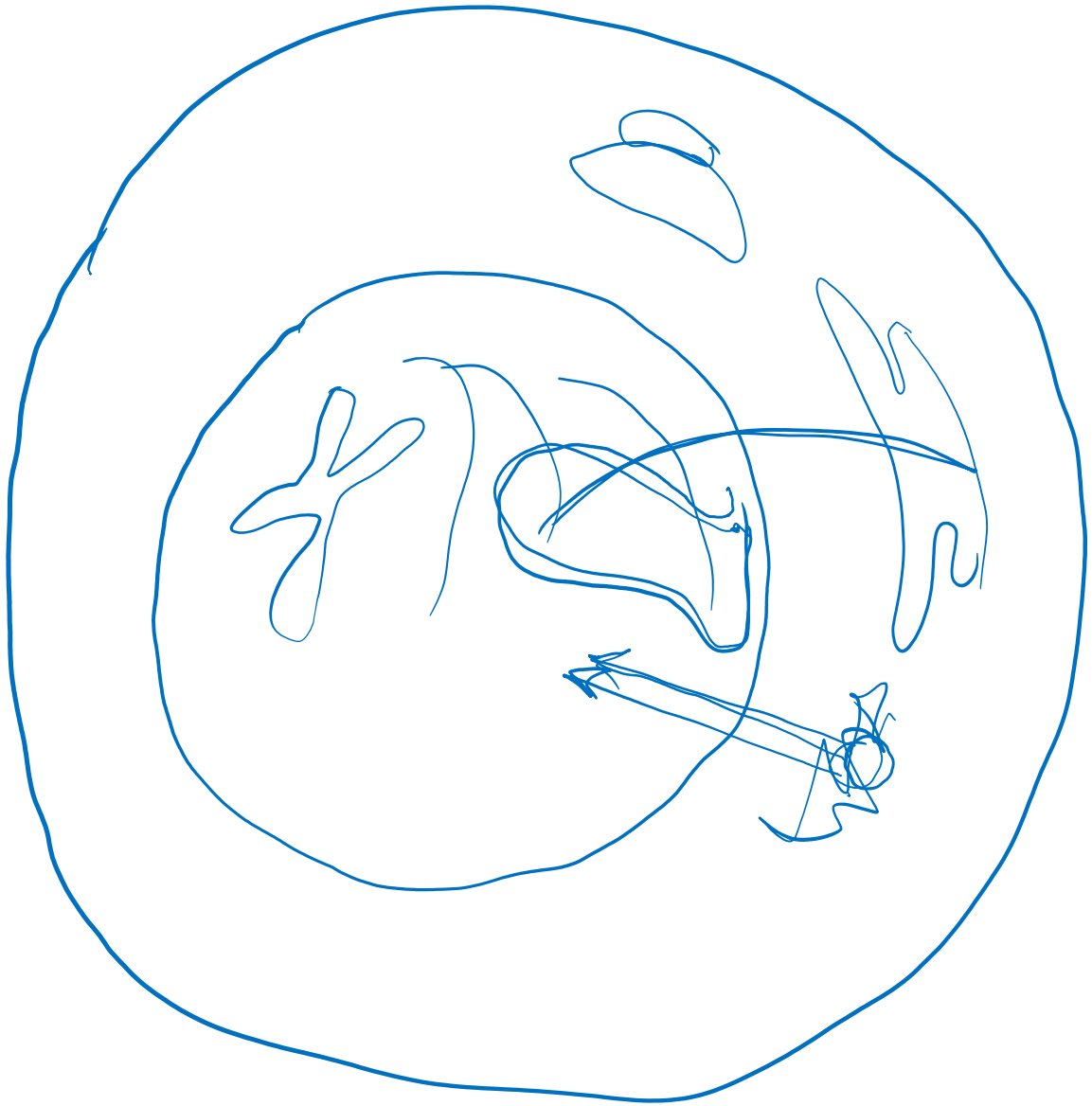
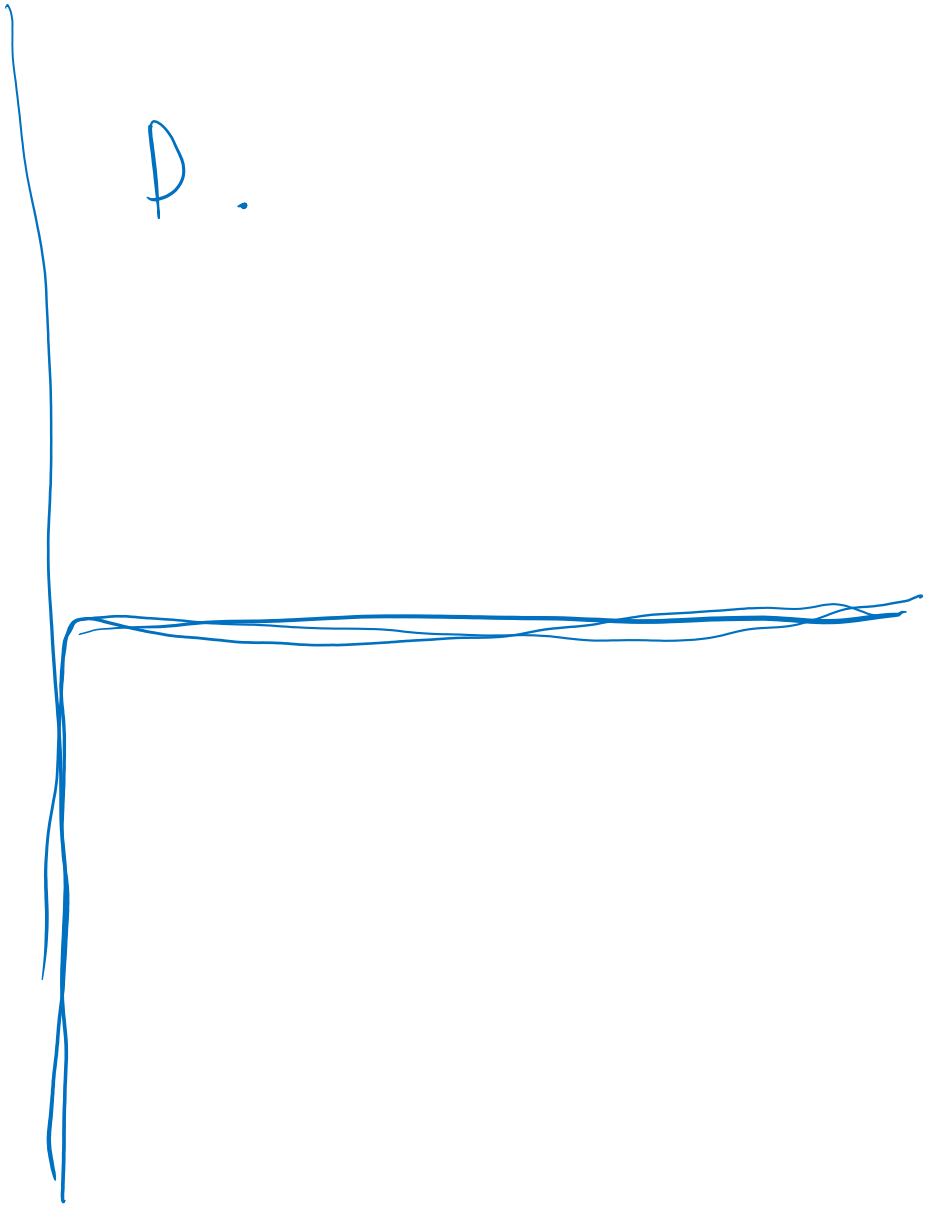
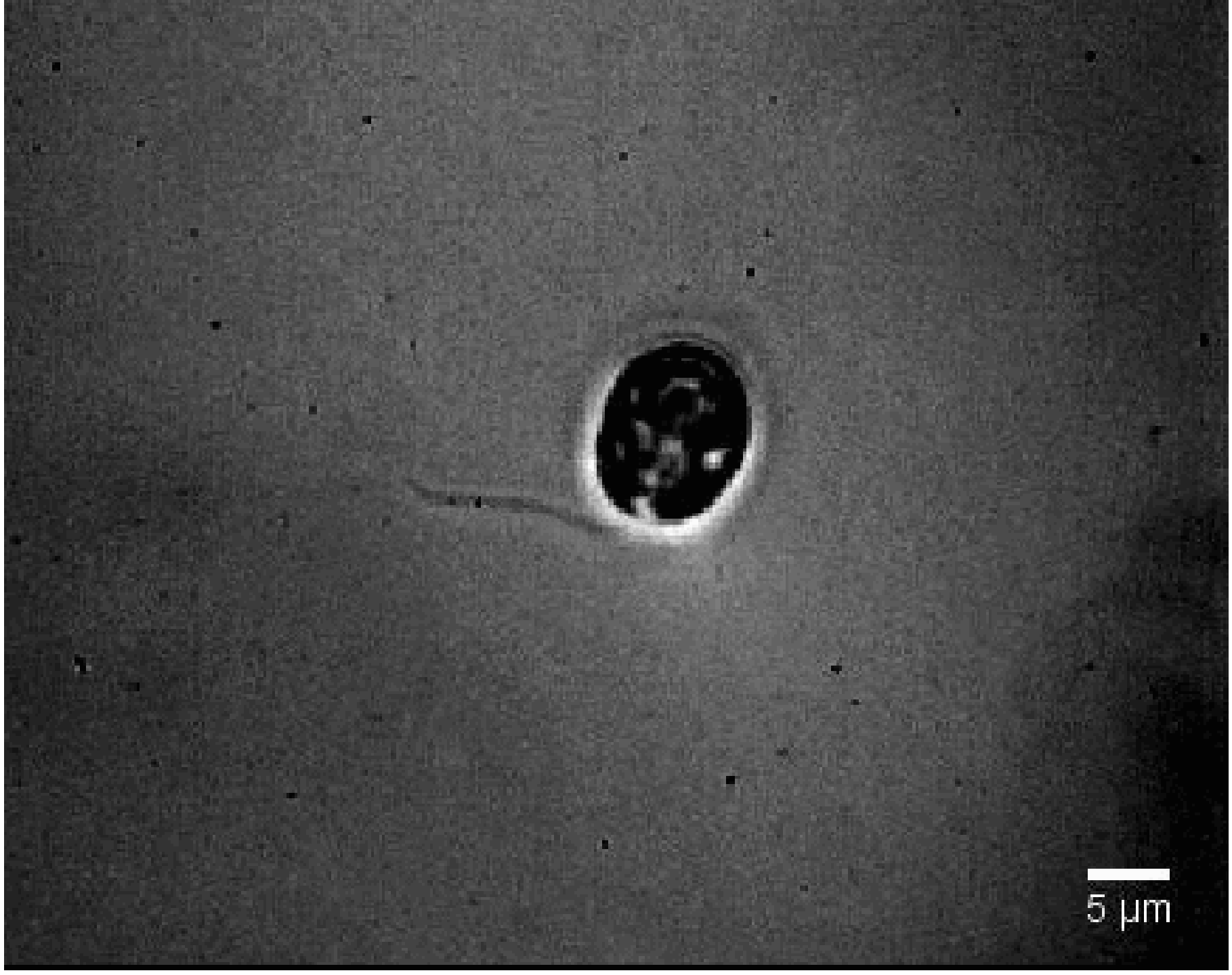
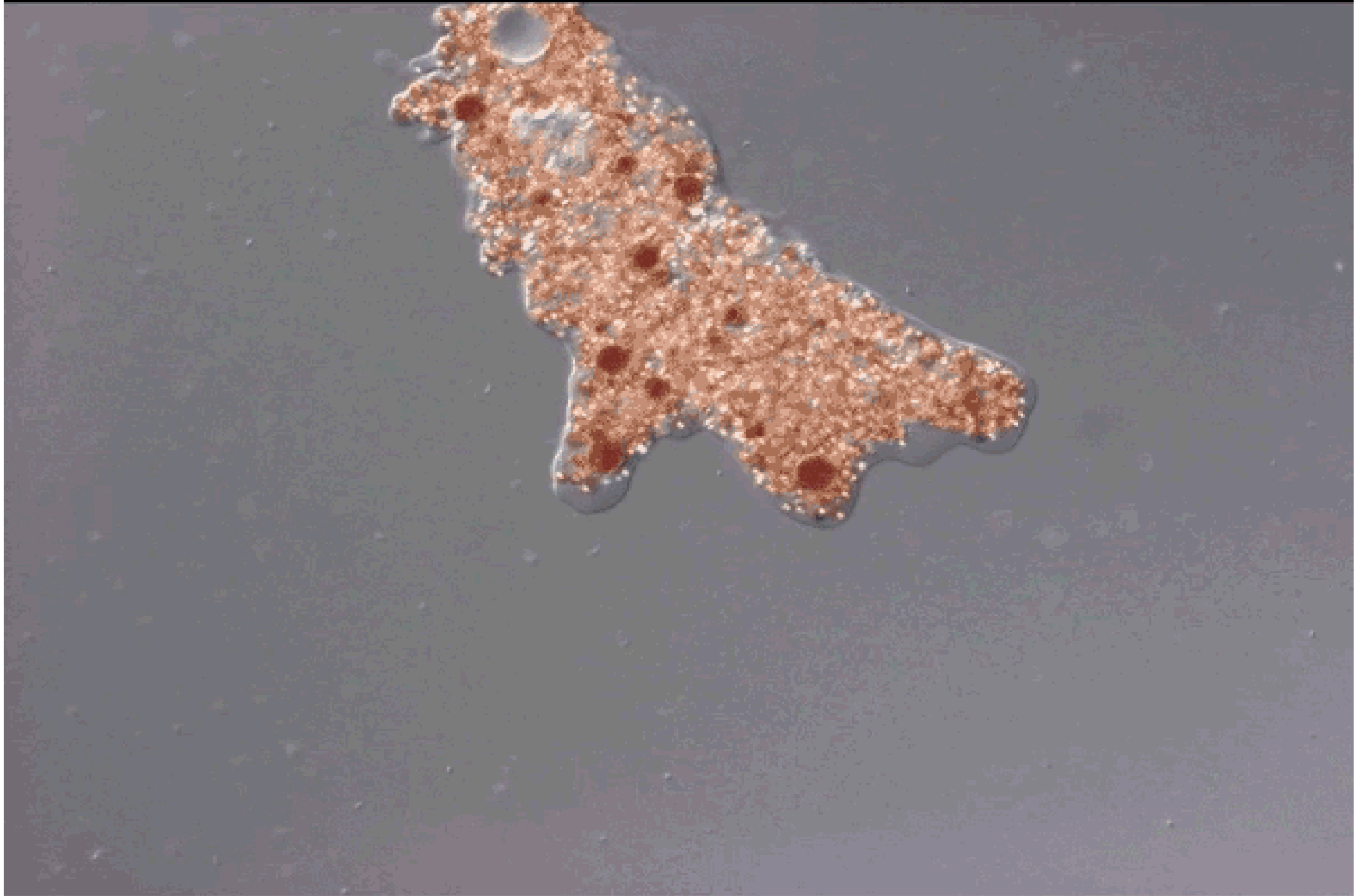
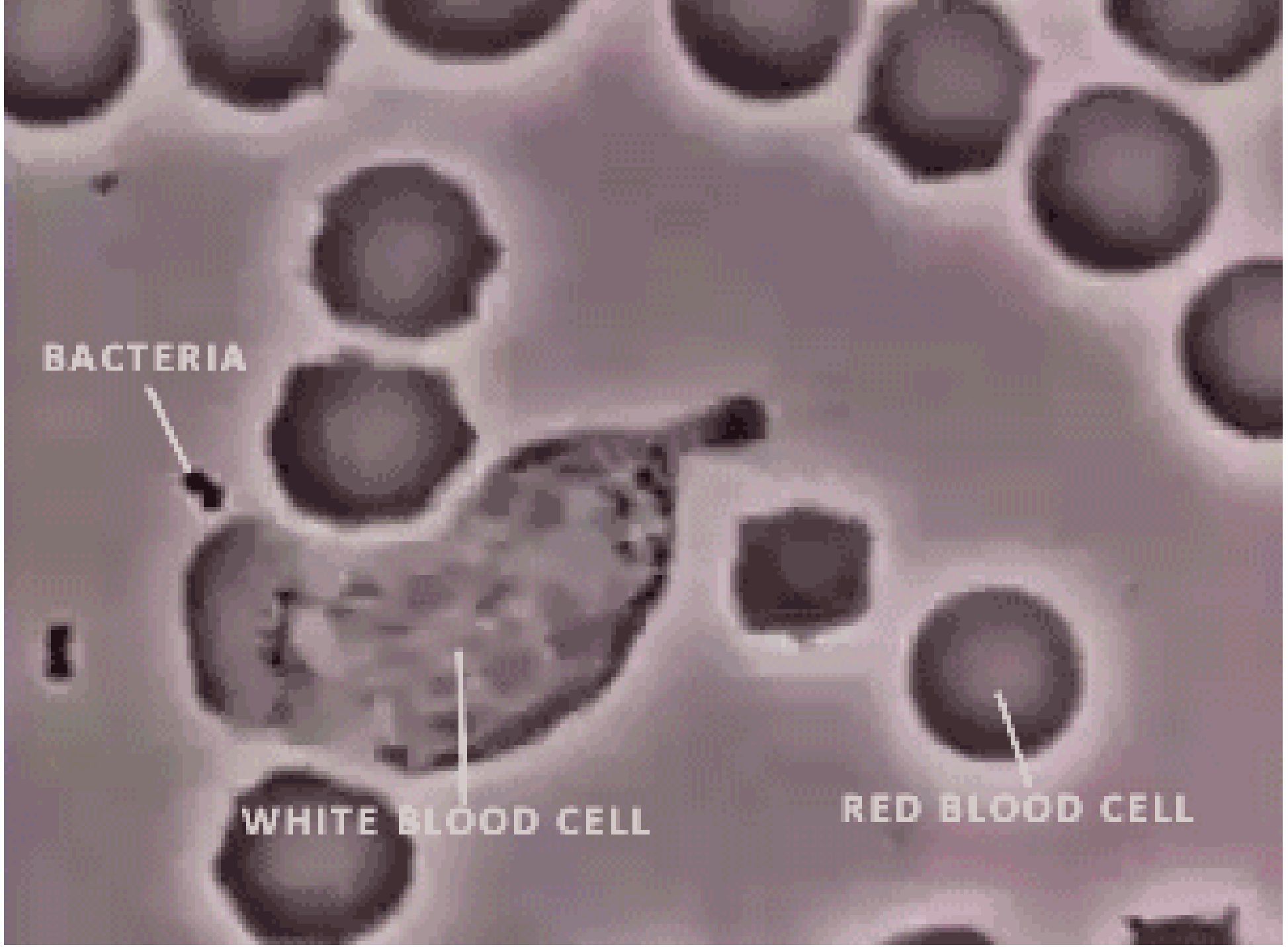



P.


5 µm




BACTERIA
WHITE BLOOD CELL
RED BLOOD CELL

1774

Animal magnetism

Franz Mesmer

1810

vitalism: life is driven by a vital force.

Berzelius

1840

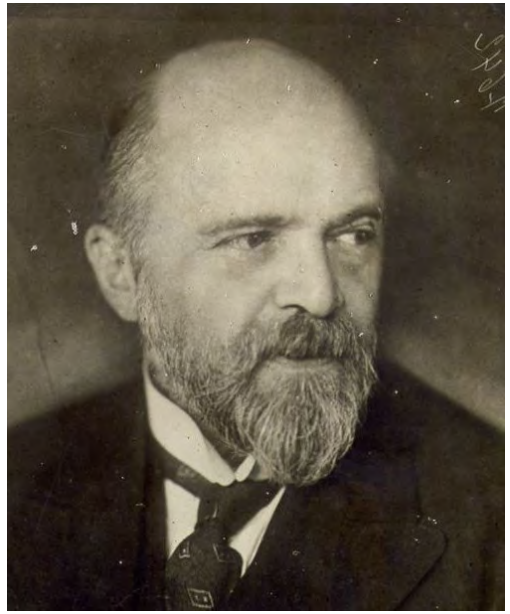
Johannes Peter Müller

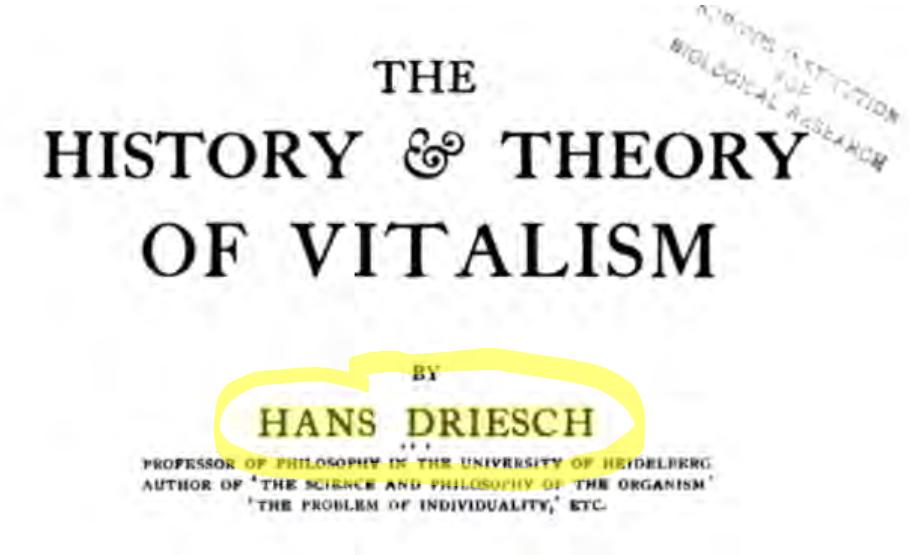
- the presence of a soul makes each organism an indivisible whole and
- light and sound waves show that living organisms possess a life-energy unexplainable by physical laws.

Müller, J (1840). *Handbuch der Physiologie des Menschen: für Vorlesungen. Bd. 2*. J. Hölscher.

1892

Based on experiments with fertilized sea urchin eggs
proposed **biofield**





Experimental biologist and metaphysicist Hans Driesch.

early 1920s

Alexander Gurwitsch, Hans Spemann, and Paul Weiss independently proposed **morphogenetic fields**

Alexander Gurwitsch

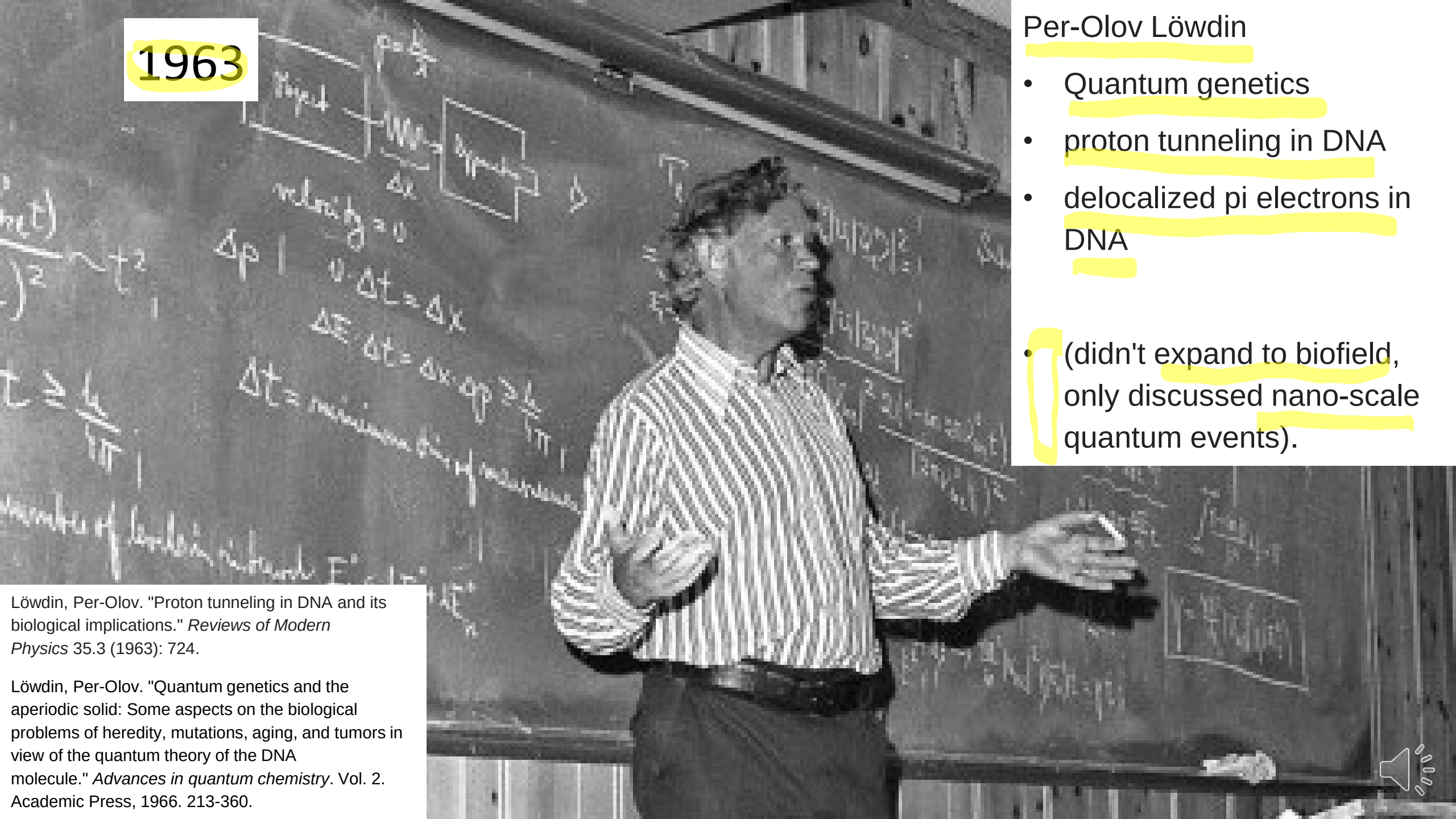
Hans Spemann

Paul Alfred Weiss

1953

Double helix

Crick, Watson, Franklin, Wilkins



1963

Per-Olov Löwdin

- Quantum genetics
- proton tunneling in DNA
- delocalized pi electrons in DNA

- (didn't expand to biofield, only discussed nano-scale quantum events).

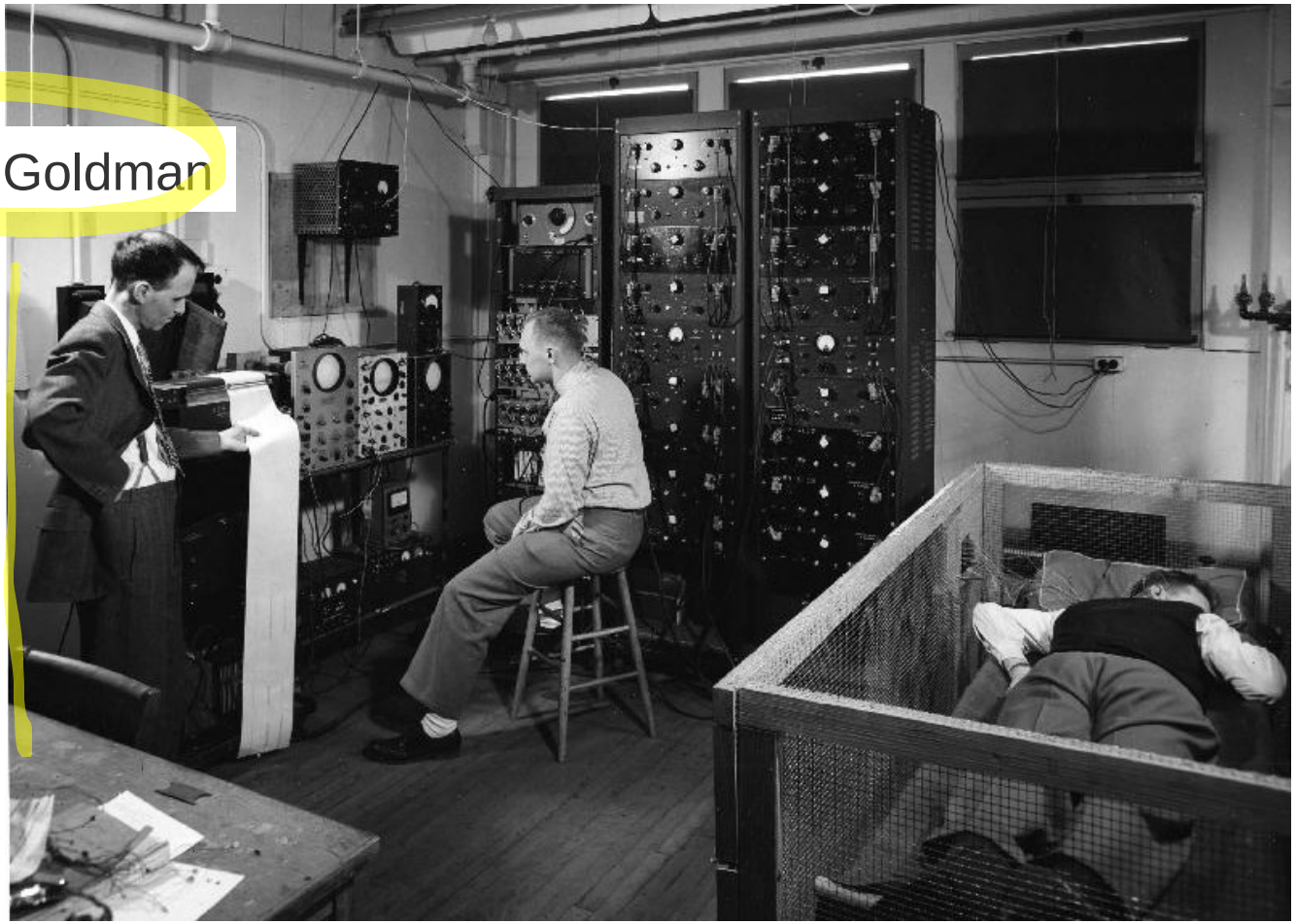
Löwdin, Per-Olov. "Proton tunneling in DNA and its biological implications." *Reviews of Modern Physics* 35.3 (1963): 724.

Löwdin, Per-Olov. "Quantum genetics and the aperiodic solid: Some aspects on the biological problems of heredity, mutations, aging, and tumors in view of the quantum theory of the DNA molecule." *Advances in quantum chemistry*. Vol. 2. Academic Press, 1966. 213-360.

1969

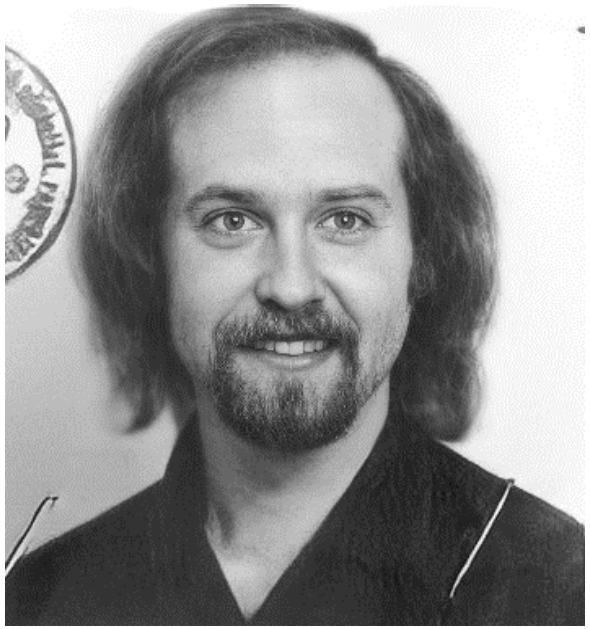
Biological Quantum Mechanics and DNA hologram - an electrical engineering view.

Stanford Goldman



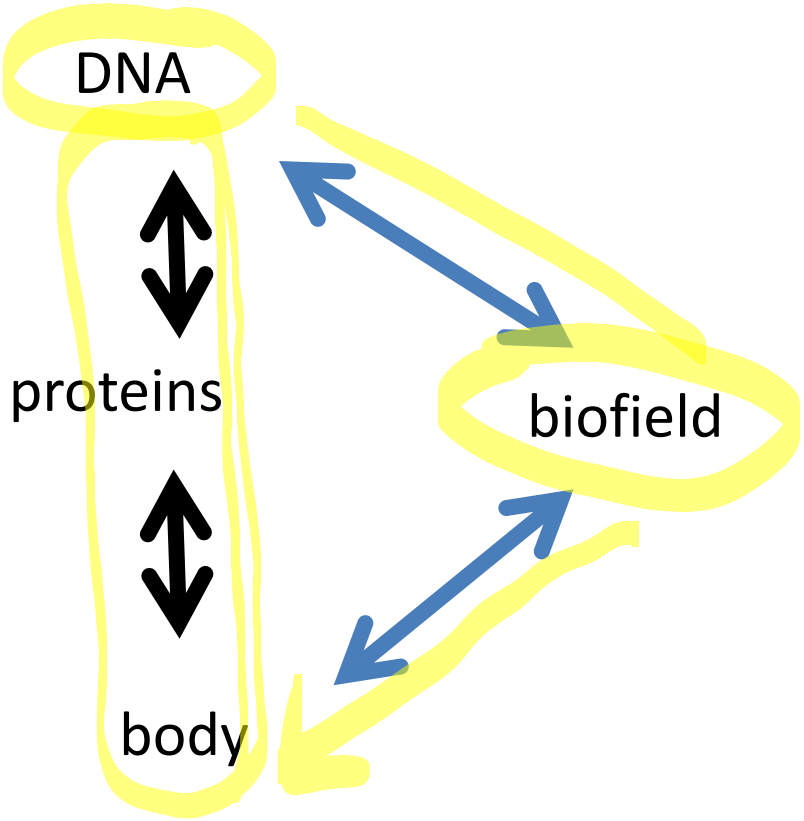
Goldman, Stanford. *INTRODUCTION TO BIOLOGICAL QUANTUM MECHANICS*. SYRACUSE UNIV NY DEPT OF ELECTRICAL ENGINEERING, 1969.

1972



Dr. Richard Alan Miller,
the coauthor,
proposed that DNA creates biofield in 1972.

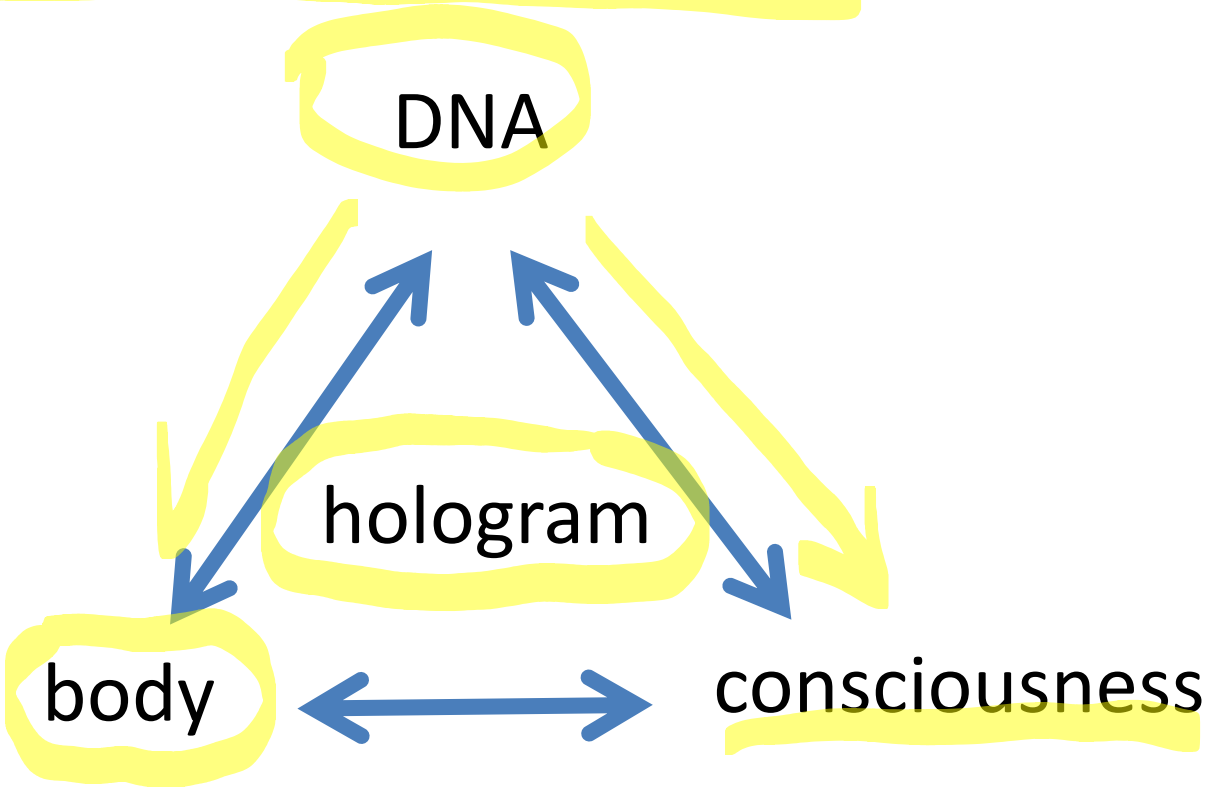
DNA hologram is the biofield



Richard Alan Miller, Burt Webb - conference presentation, 1972.
Richard Alan Miller, Burt Webb, and Darden Dickson. "A holographic concept of reality." *Psychoenergetic Systems* 1 (1975): 55-62.

1976

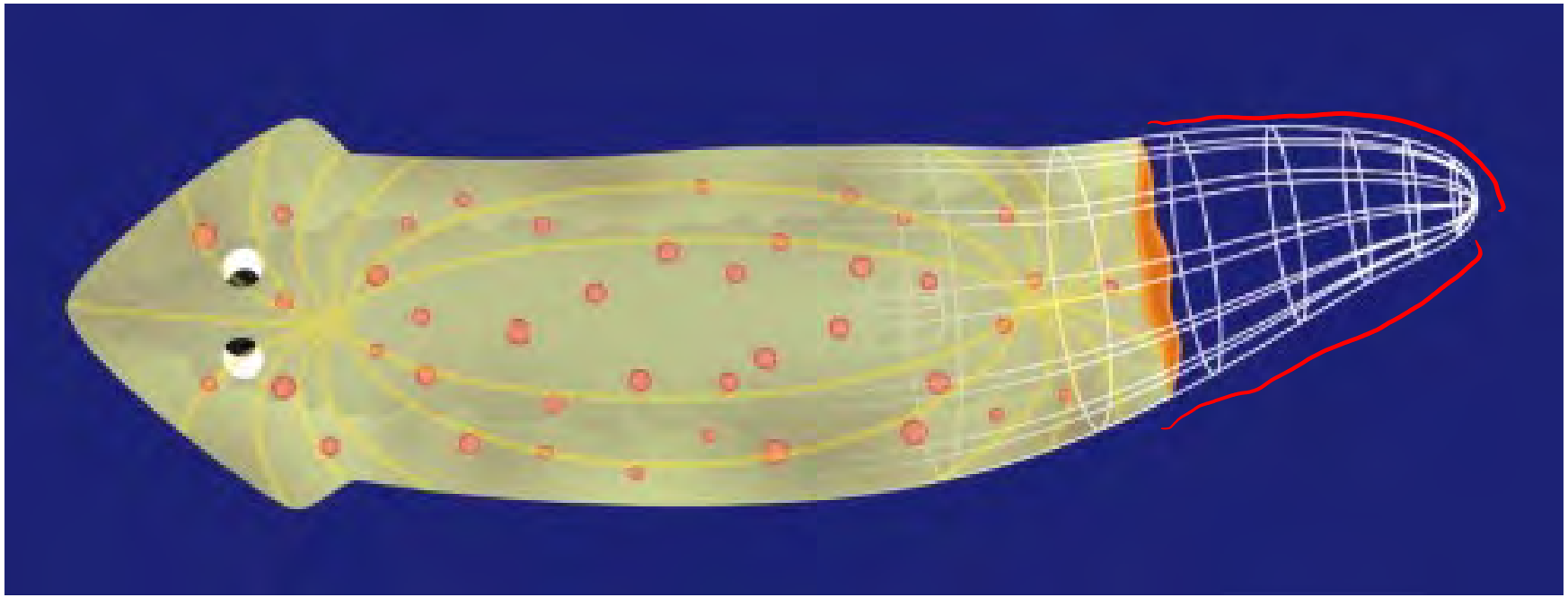
Terence and Dennis McKenna



McKenna, Terence K., and Dennis J. McKenna. *The invisible landscape: Mind, hallucinogens, and the I Ching*. Harper San Francisco, 1993.

Experimental evidence is scarce

Objective: To verify the existence of the biofield

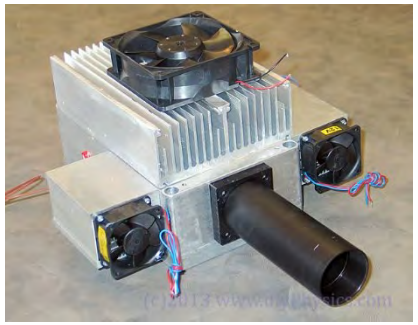


Levin 2016

biological object

biological object

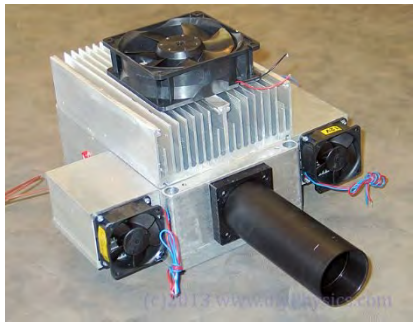
device

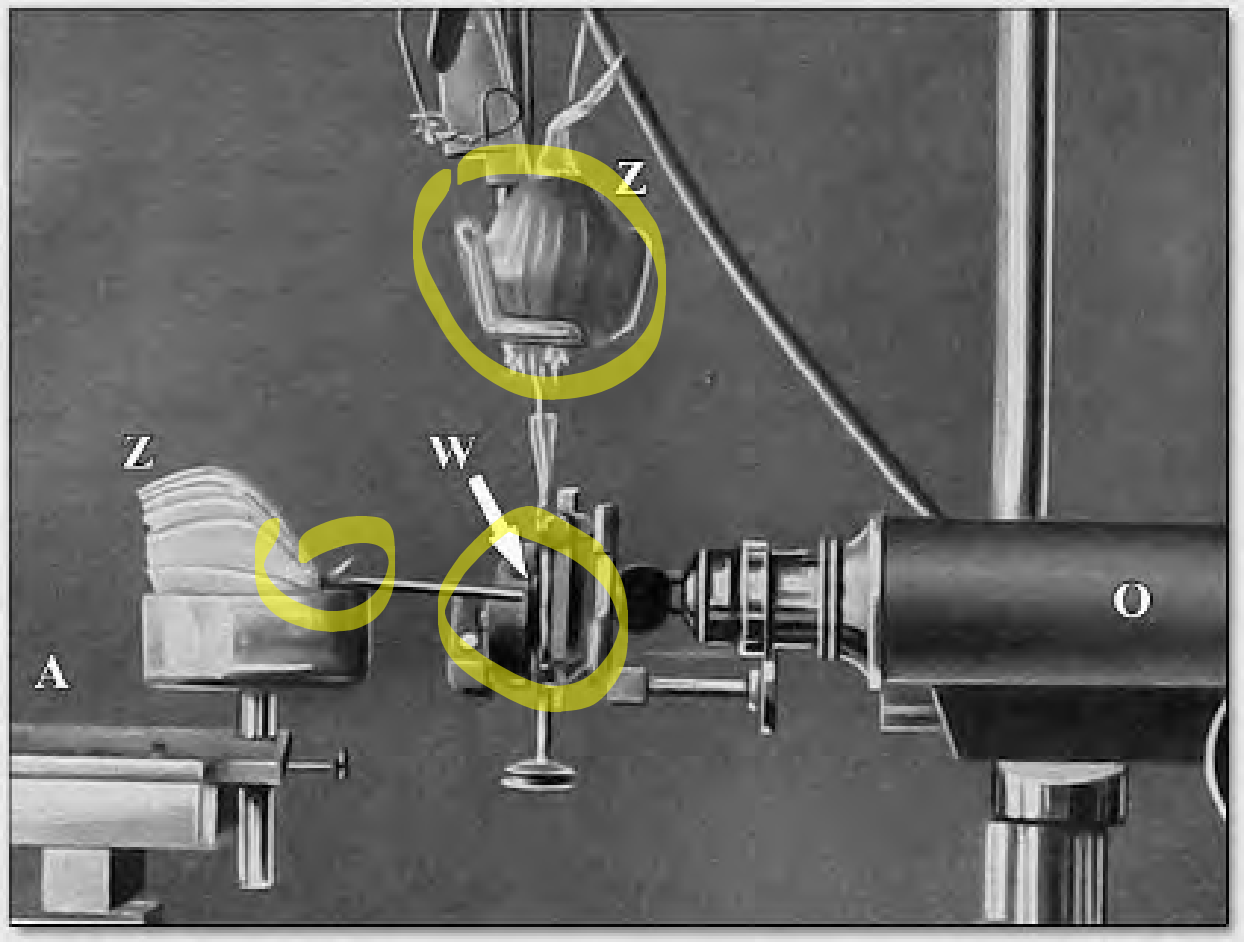


biological object

biological object

device





Gurwitsch, A. G., Über den Begriff des embryonalen Feldes. 1922
"Die Mitogenetische Srtahlung", Berlin, 1932

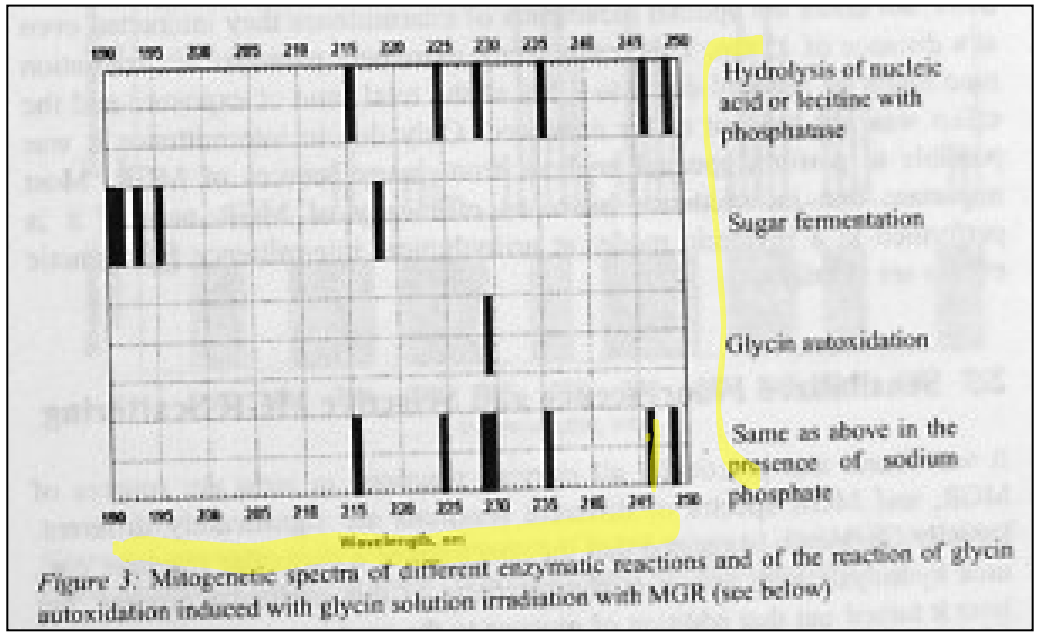
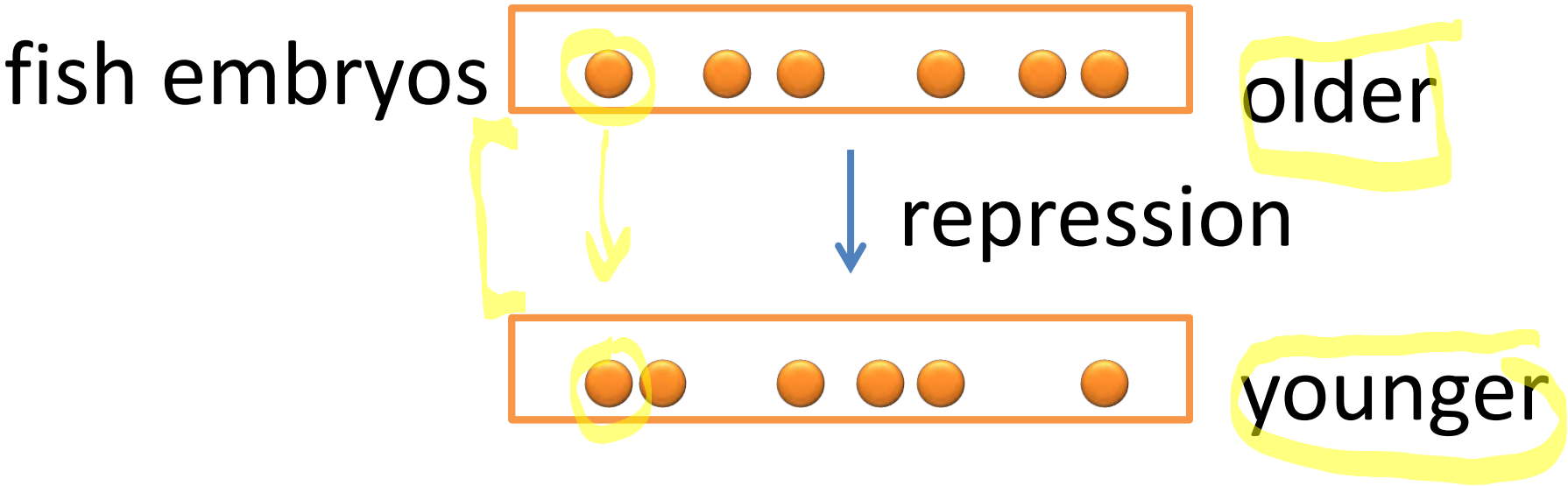


Figure 3: Mitogenetic spectra of different enzymatic reactions and of the reaction of glycin autoxidation induced with glycin solution irradiation with MGR (see below)

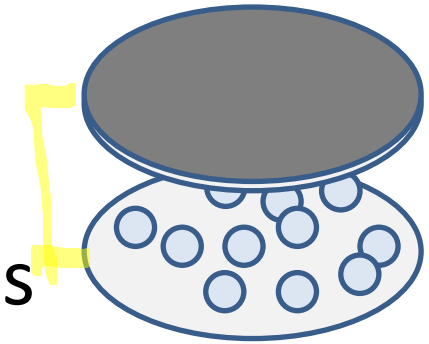
Non-chemical signaling

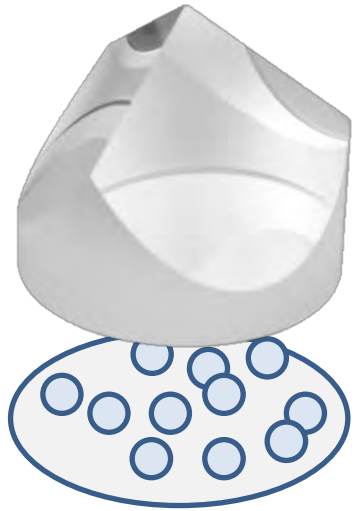


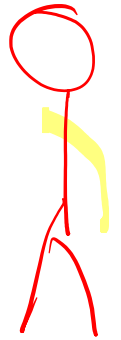
Burlakov 2013
bit.ly/burlakov

Germanium mirror

retroreflector



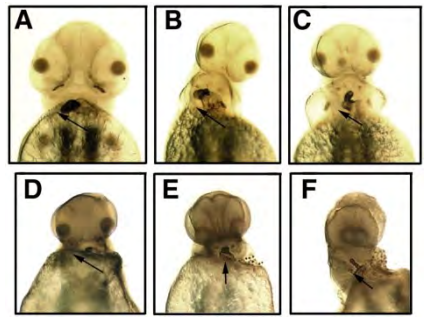




fish embryos

acceleration of growth

repression, abnormalities



Burlakov 2013

bit.ly/burlakov

What needs to be proven or verified:

- The existence of biofield
- Its morphogenic function
- That DNA produces the biofield
- That DNA produces the biofield in a sequence-specific manner.

Гурвич, 1920е годы

гипотеза морфогенного поля: поле влияет на форму организма

механизм?

Гурвич 1923 г.
Частичное эксп. подтверждение: митогенетическое излучение в УФ спектре влияет на скорость роста

Бурлаков 1990е, эксп. нарушение поля влияет на форму организма

Миллер 1973 г.
гипотеза о механизме:
ДНК создает морфогенное поле
посылает и принимает сигналы.

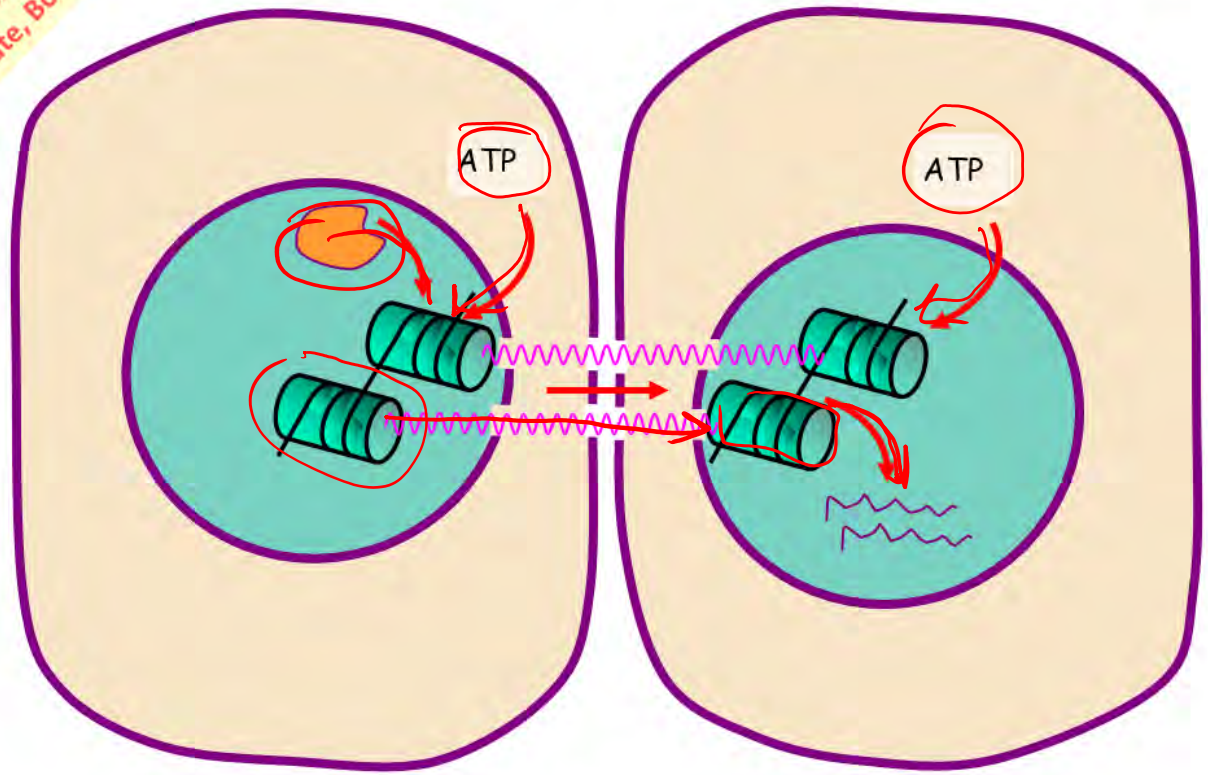
до сих пор нет подтверждения

Наши исследования
1. Гипотеза о молекулярном механизме
2. Косвенное подтверждение участия ДНК в резонансной передаче сигнала.

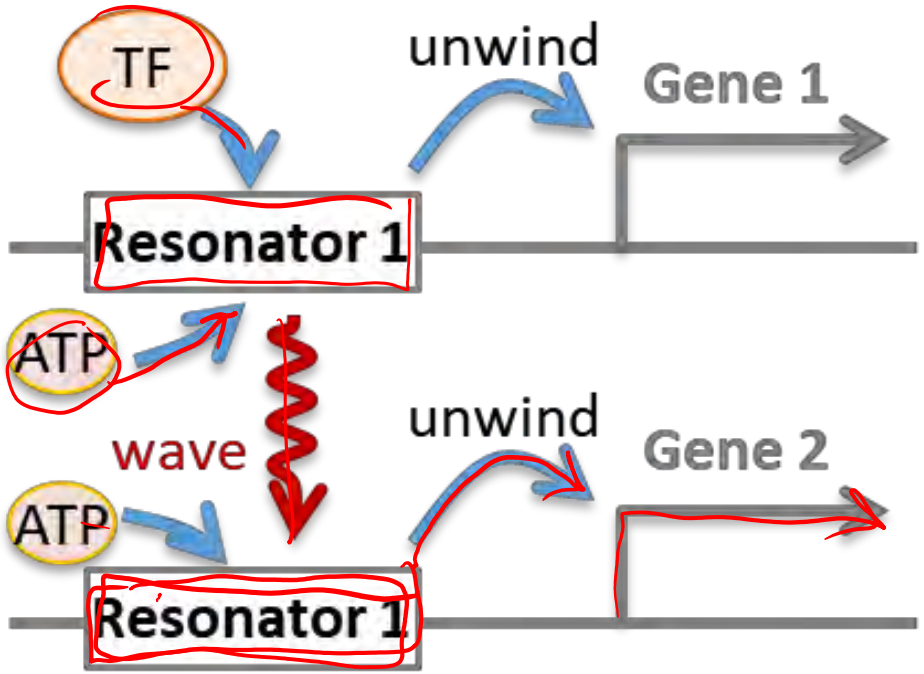
Max Rempel 2003

A Slide from 2003 talk in Forsyth Institute, Boston

chromatin structures may transmit and receive electric signals



DNA RESONANCE

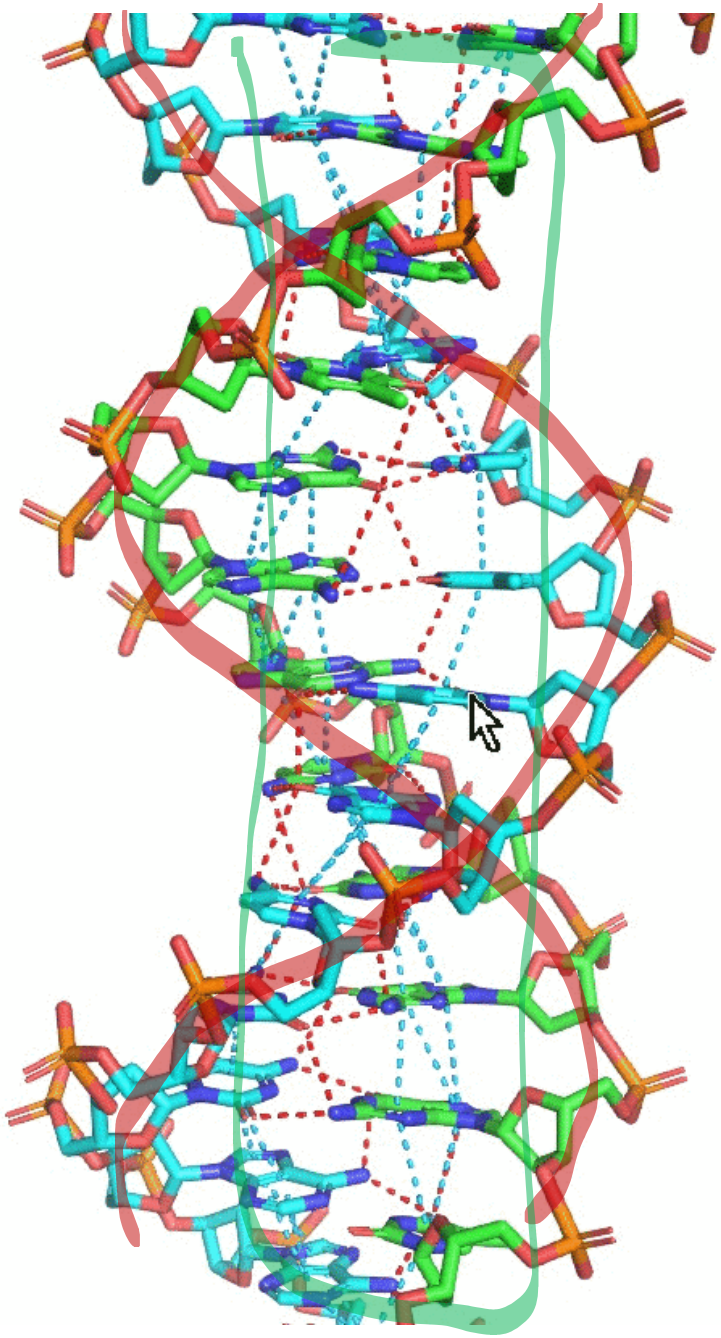


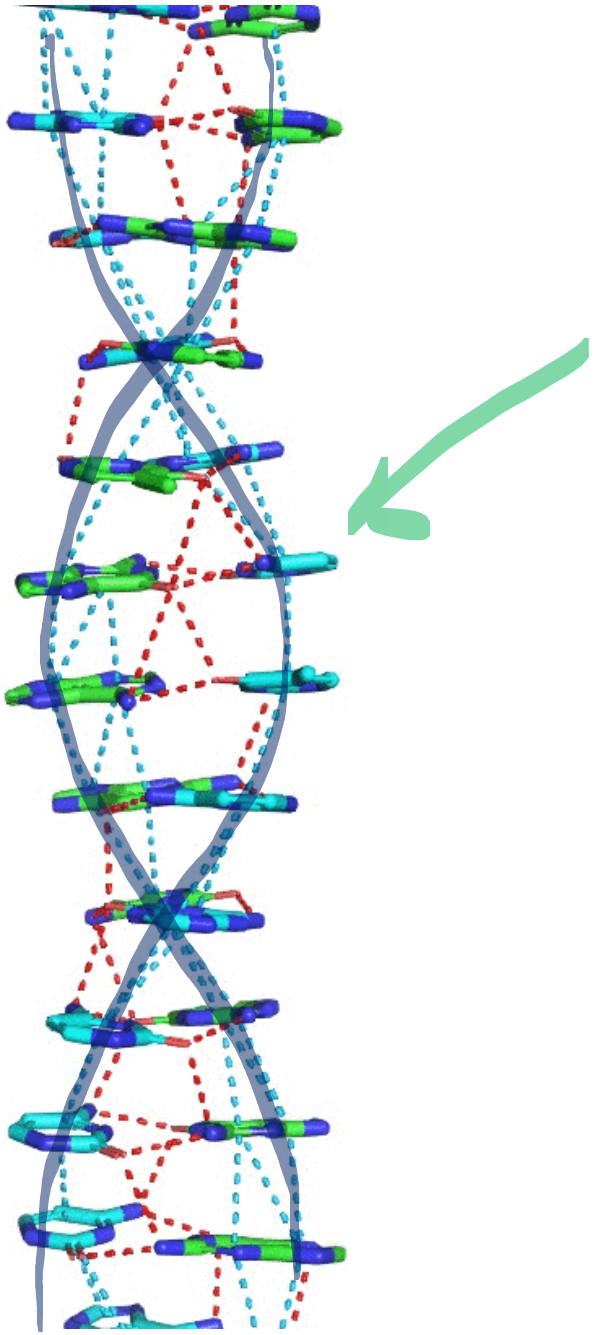
Electron wire patterns in the genome

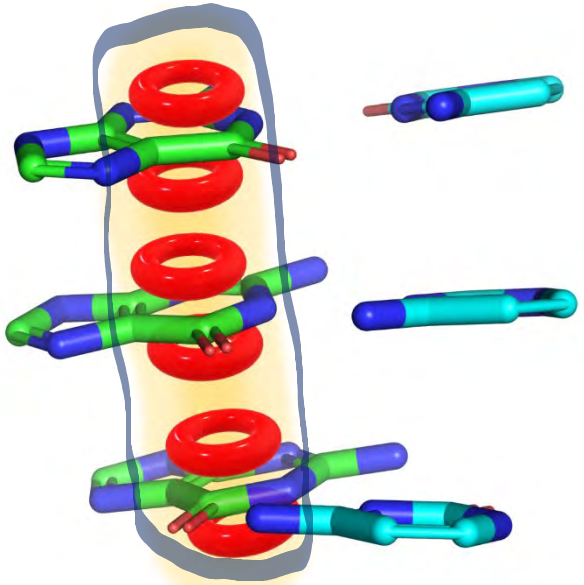
3.7A cutoff
for h-bonds

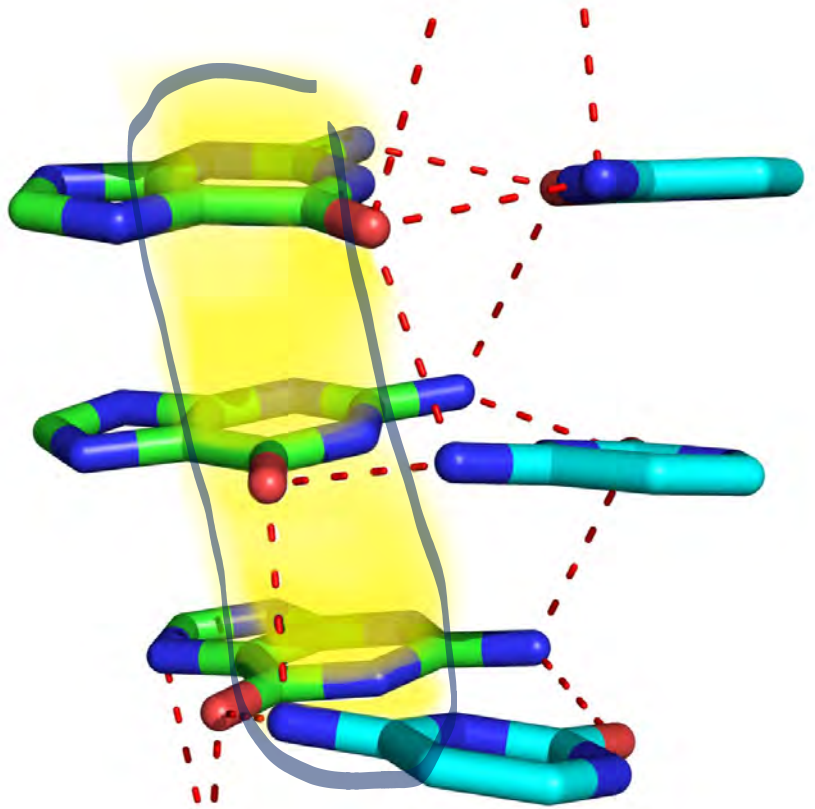
electron wires

proton wires

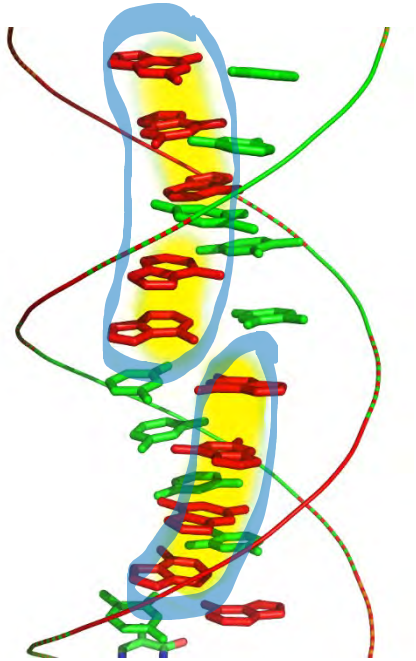








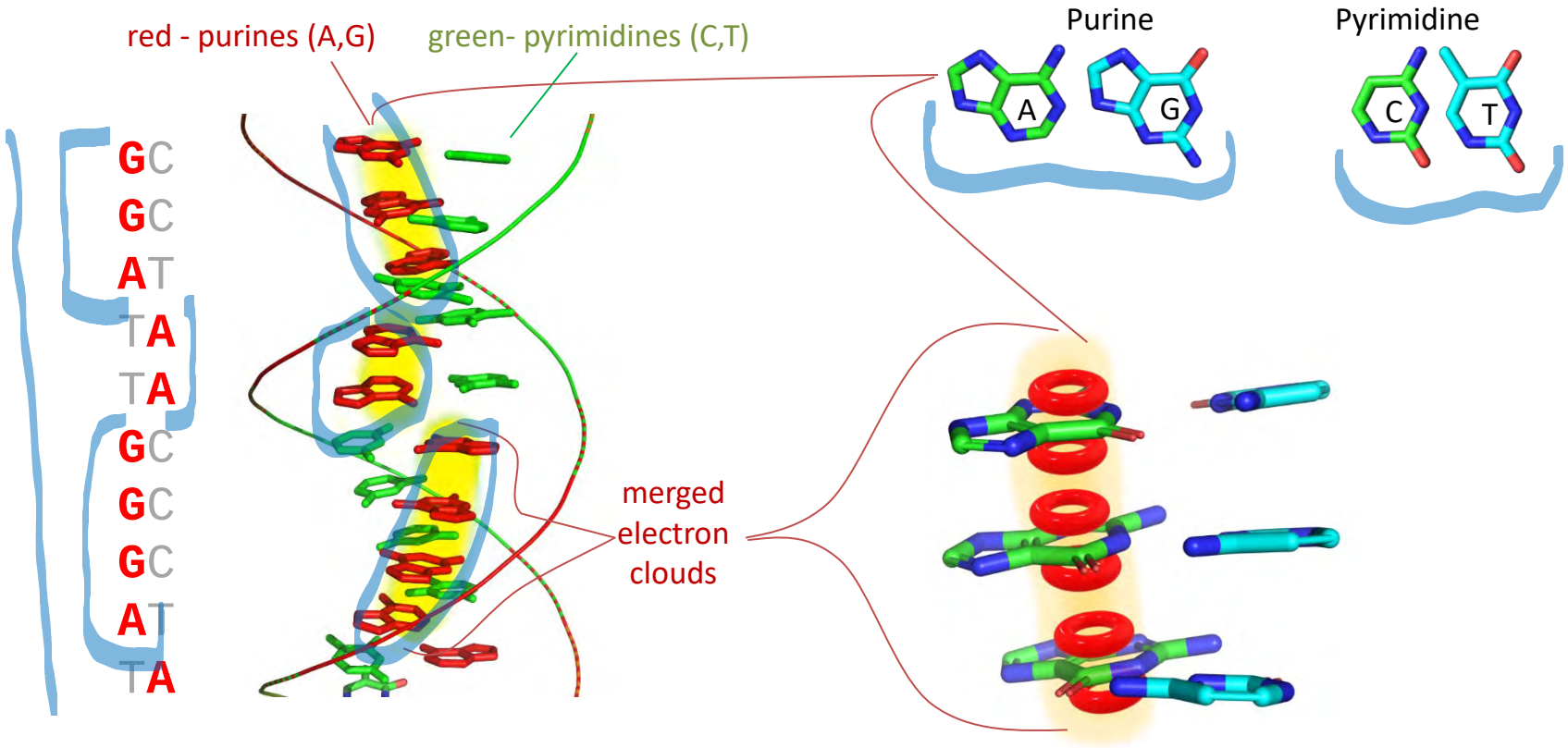
Natural oscillation criteria



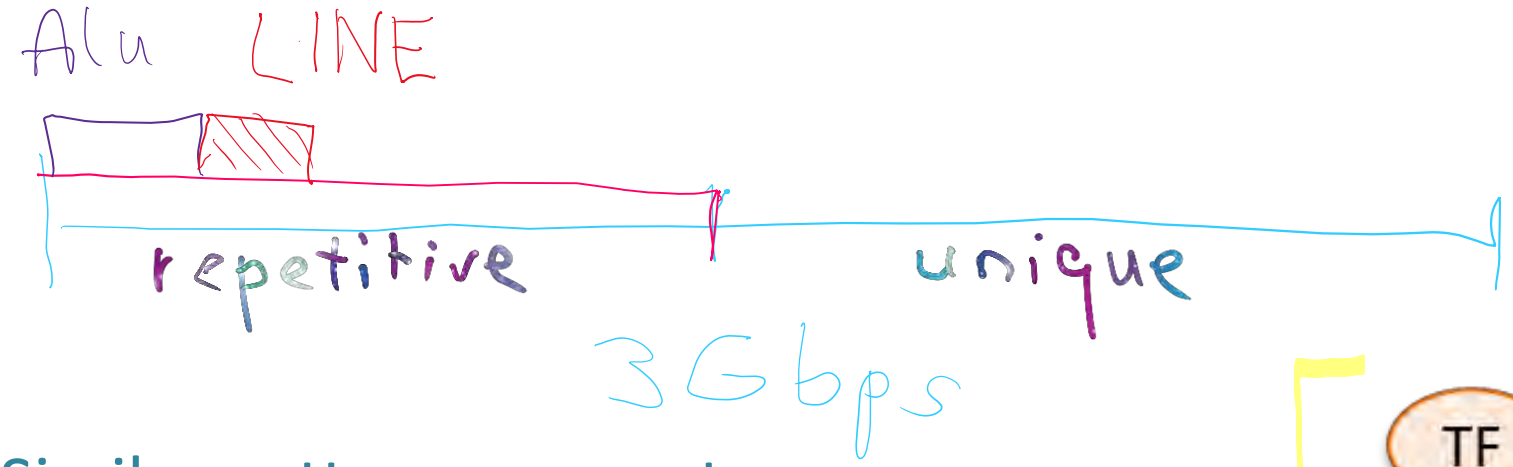
1. Not damped by viscosity
2. DNA sequence dependent

Electron clouds in
purine stretches
meet the requirements

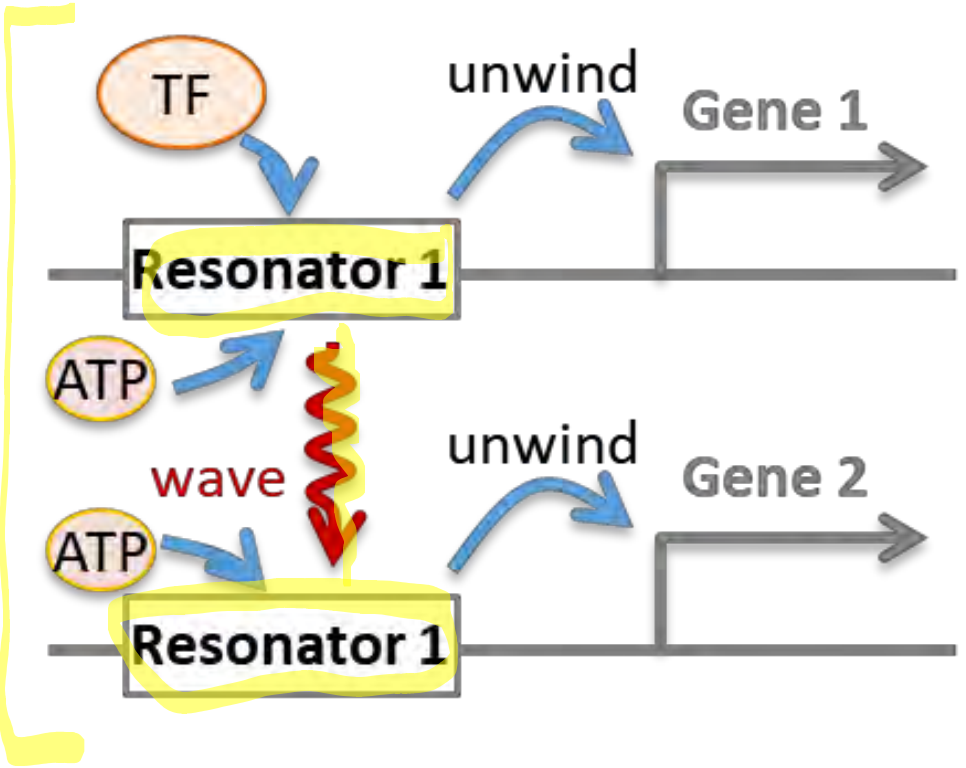
Molecular modeling -
merged electron clouds of purines as oscillators

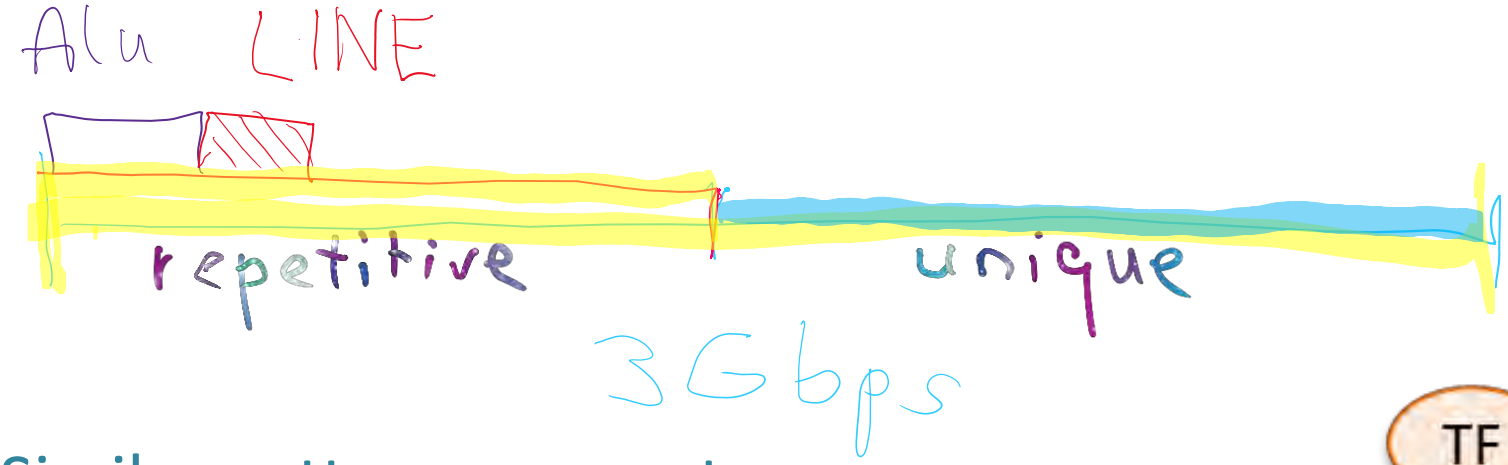


Rempel 2017 PMID: 29294317



- Similar patterns resonate
- Our genome is 3 Gbps
- 50% of the genome is repetitive
- Alu repeat - 11% of our genome
- Line repeat - 6% of our genome.
- 50% of the genome is made of unique sequences





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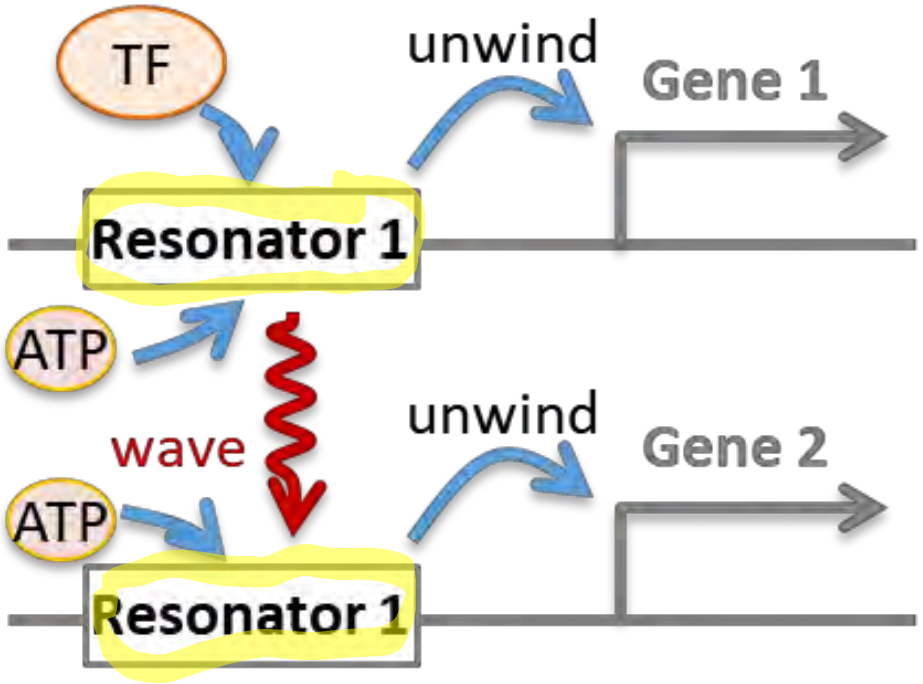

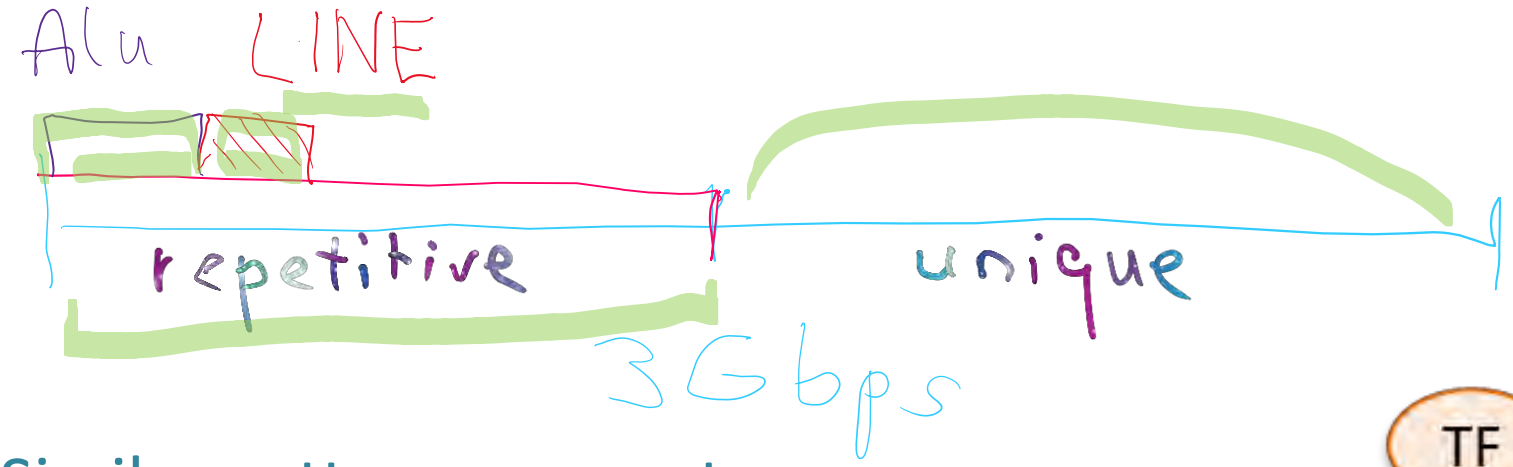

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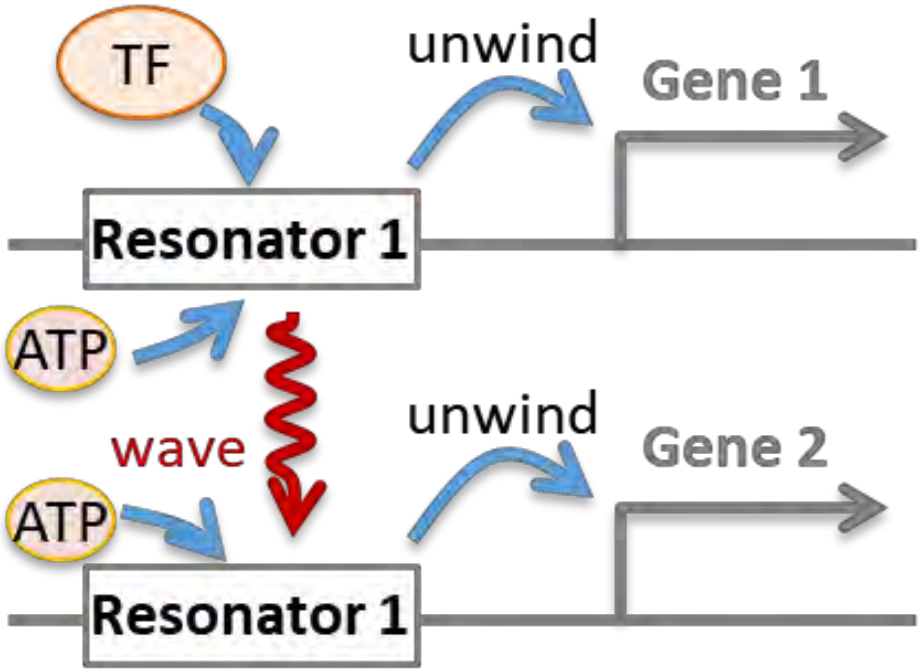

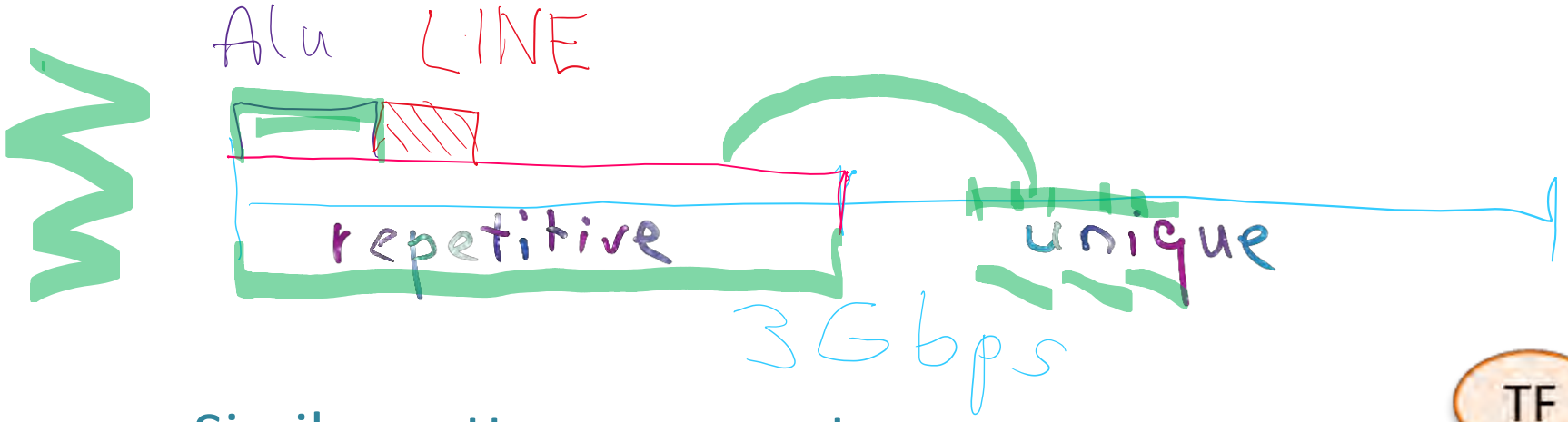

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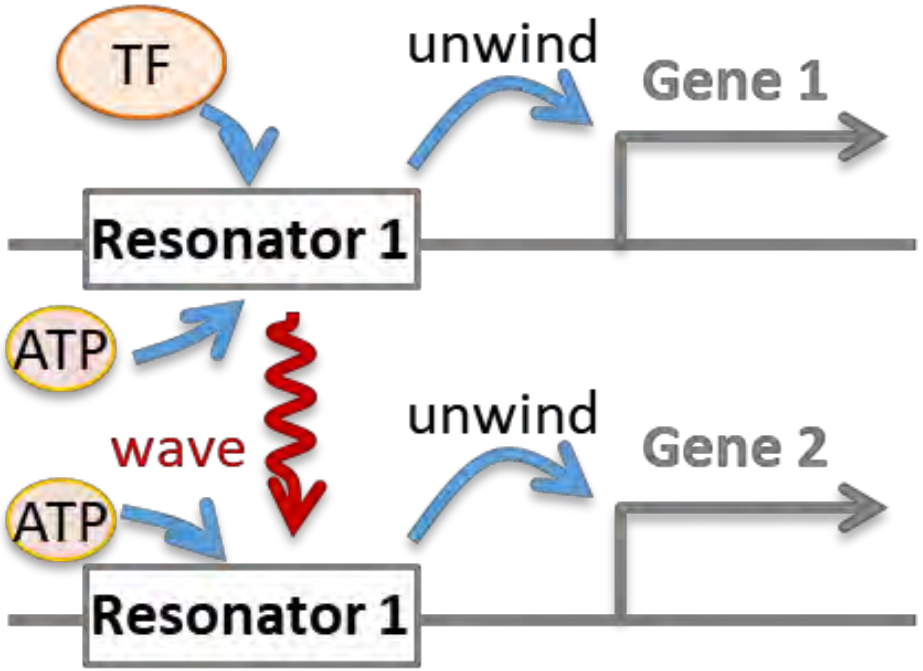
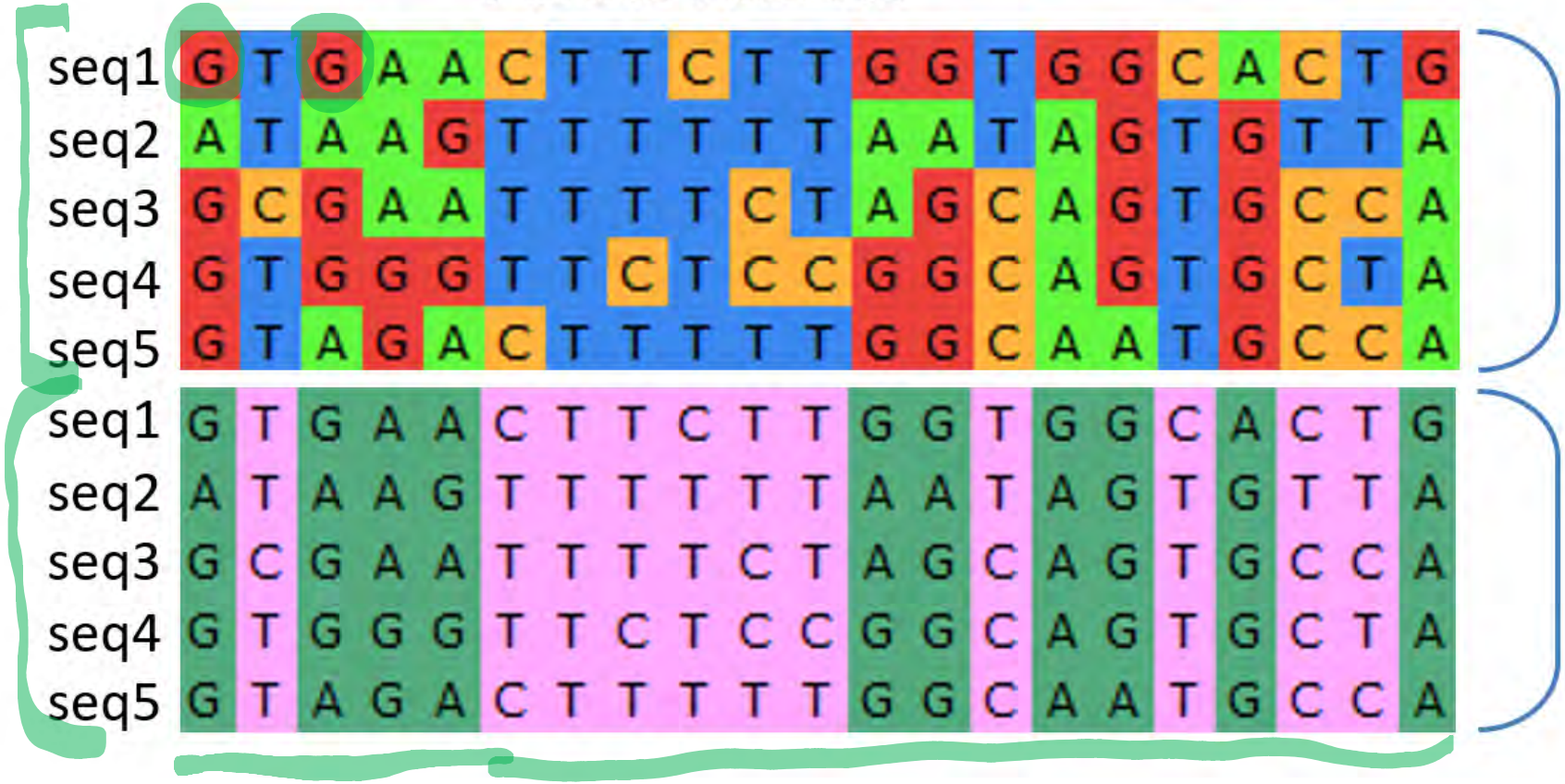


Purine HIDERs



A

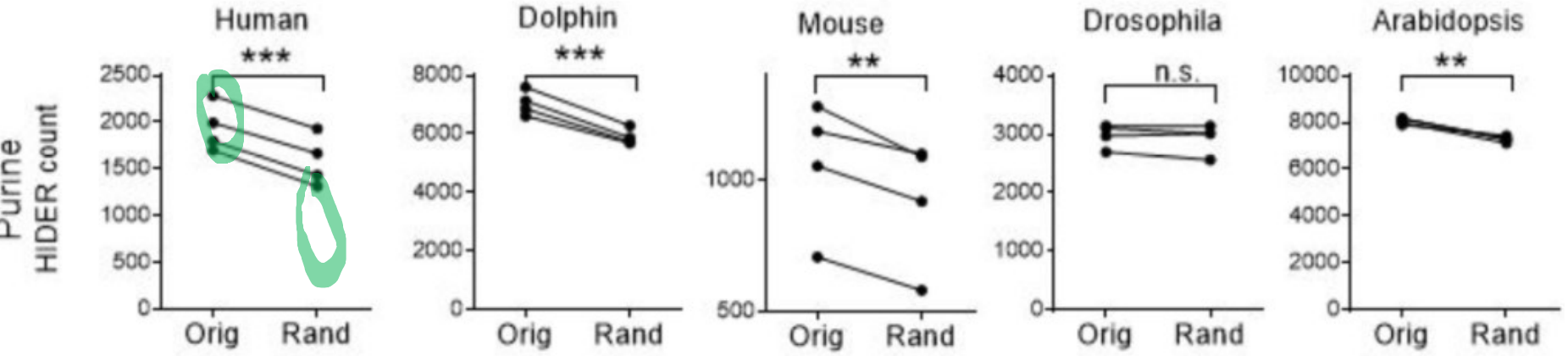
Colored by nucleotide

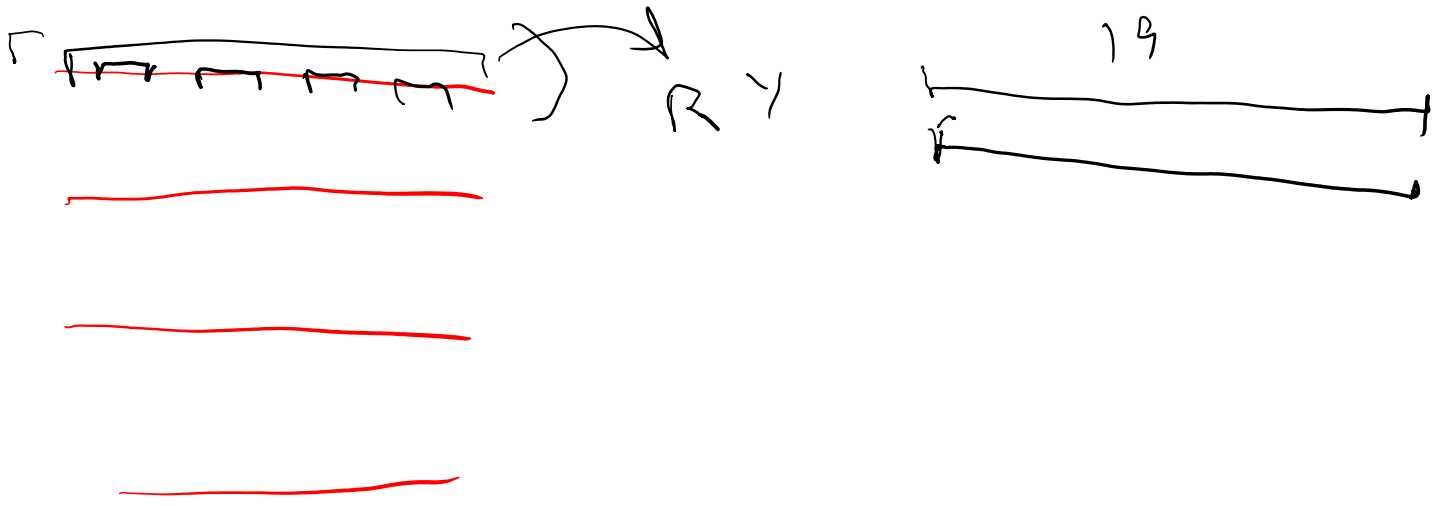
A C G T

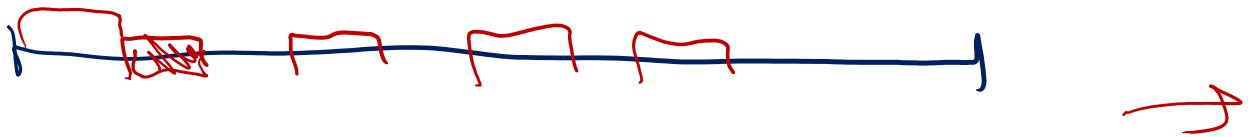
B

Colored by purine code

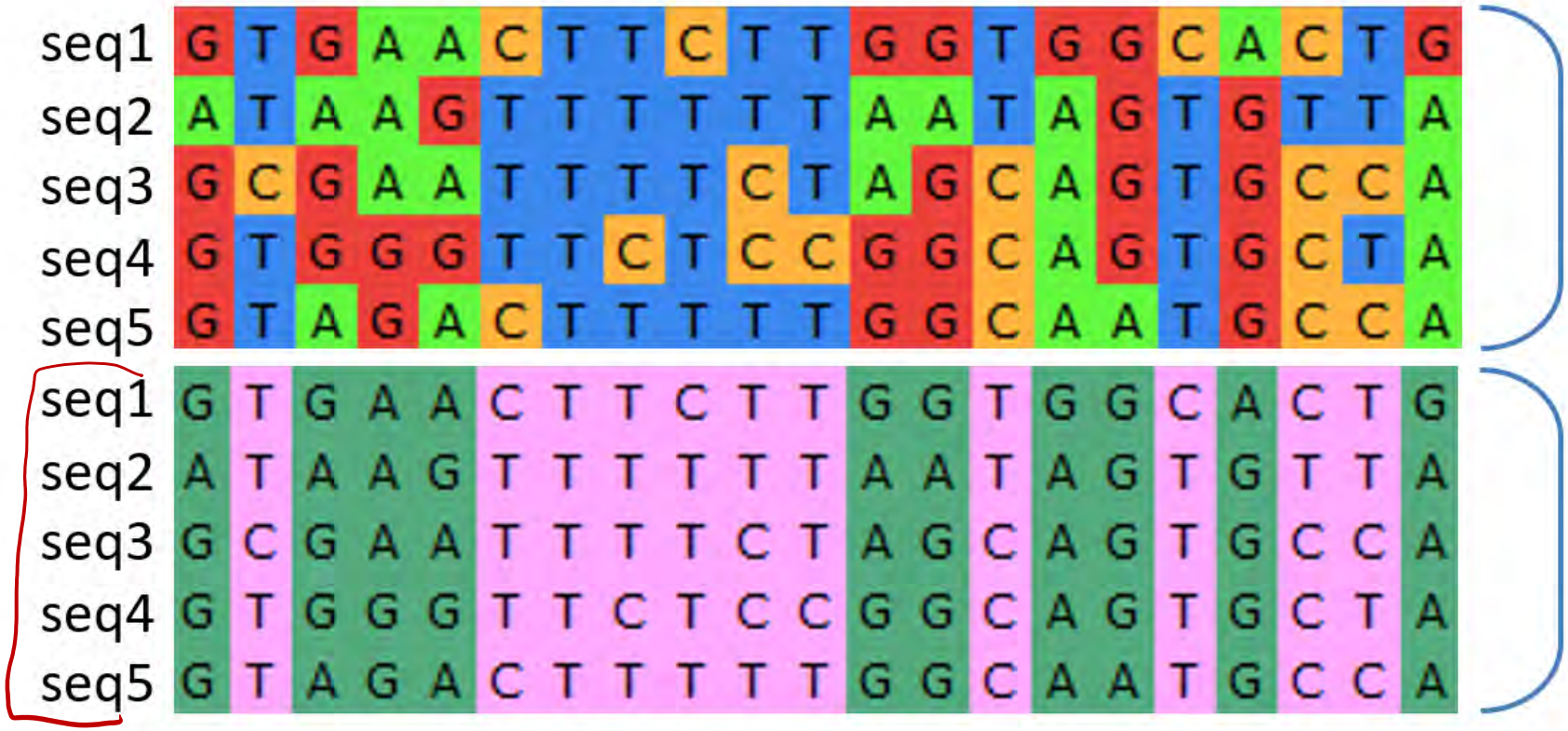
A G purines C T pyrimidines

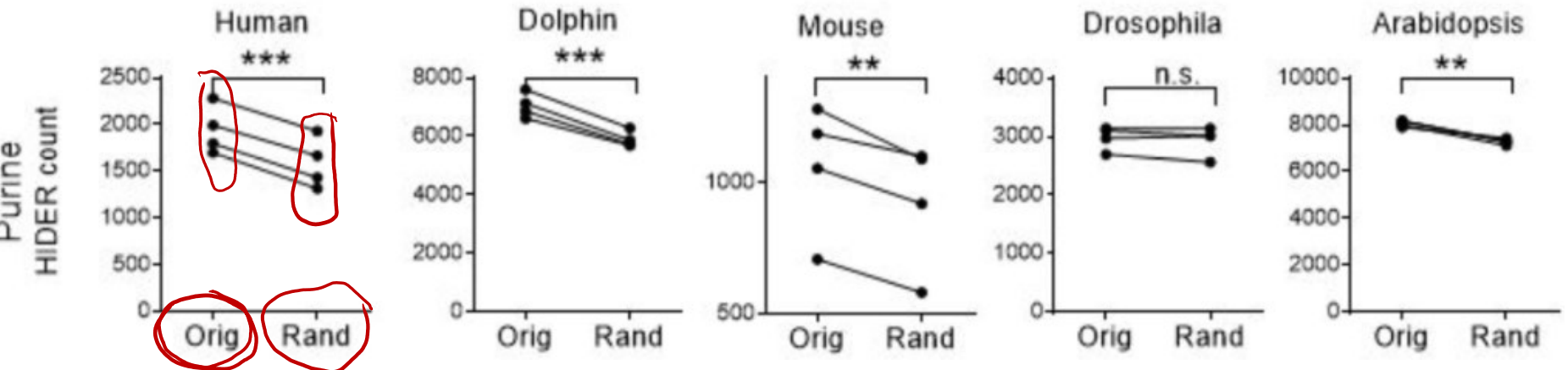






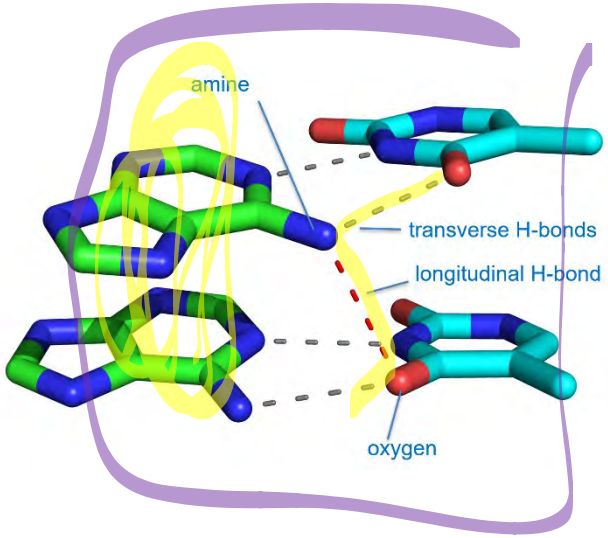
Purine HIDERs

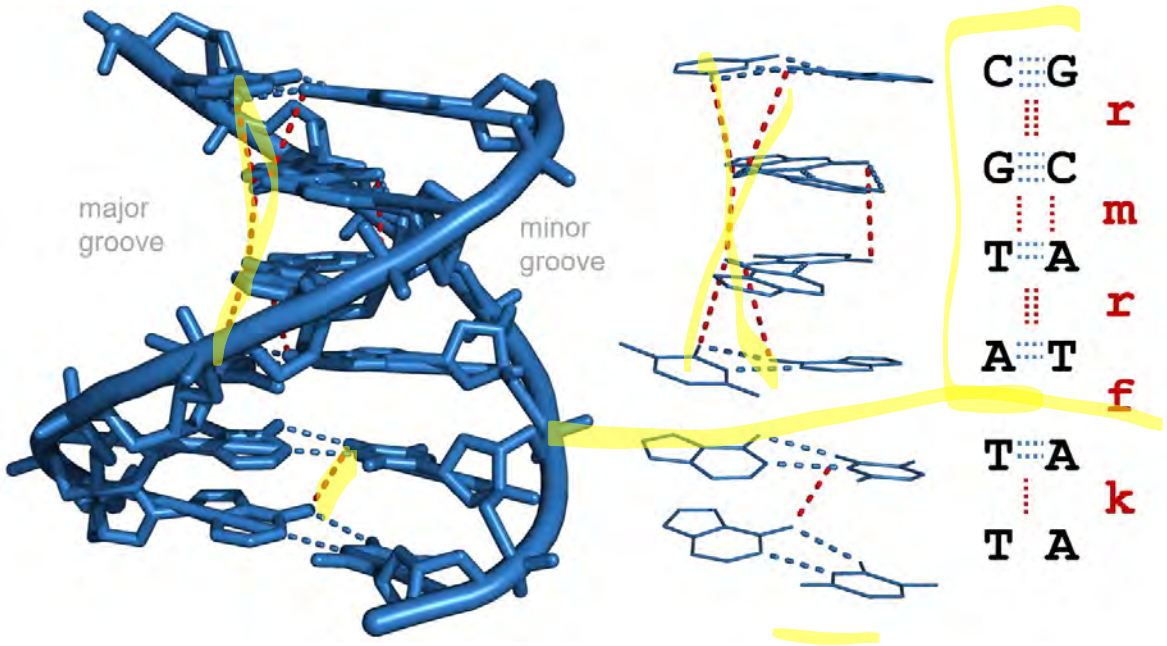




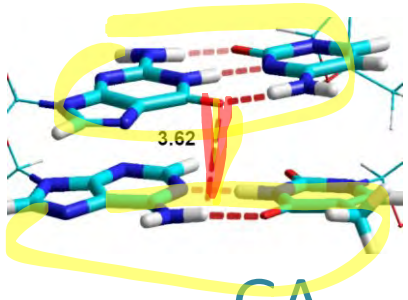
Proton wires

Longitudinal hydrogen bonds

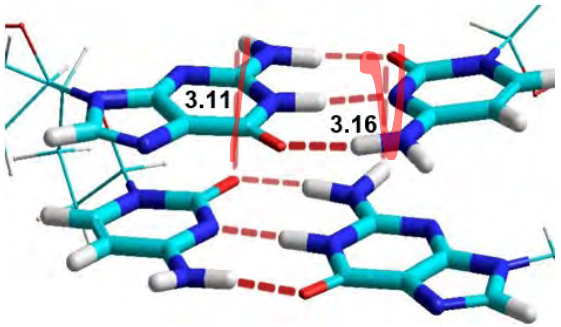




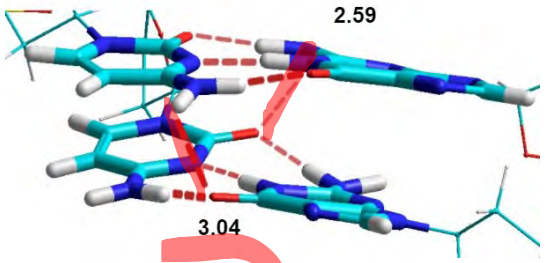
Dinucleotides have different longitudinal hydrogen bonds



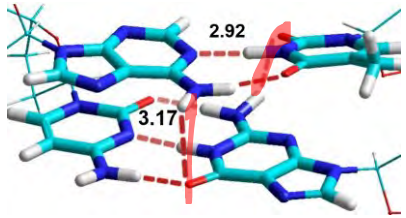
GA



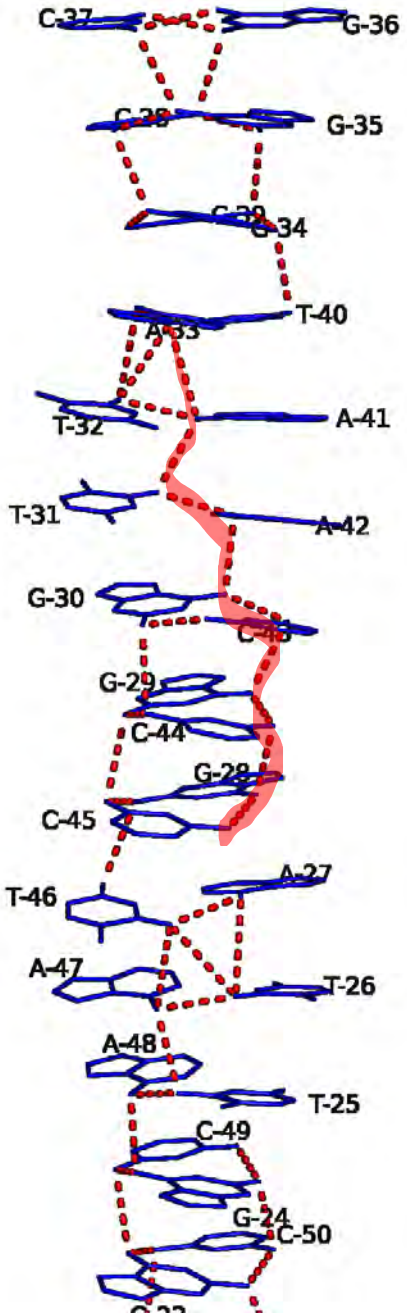
GC



CC



AC



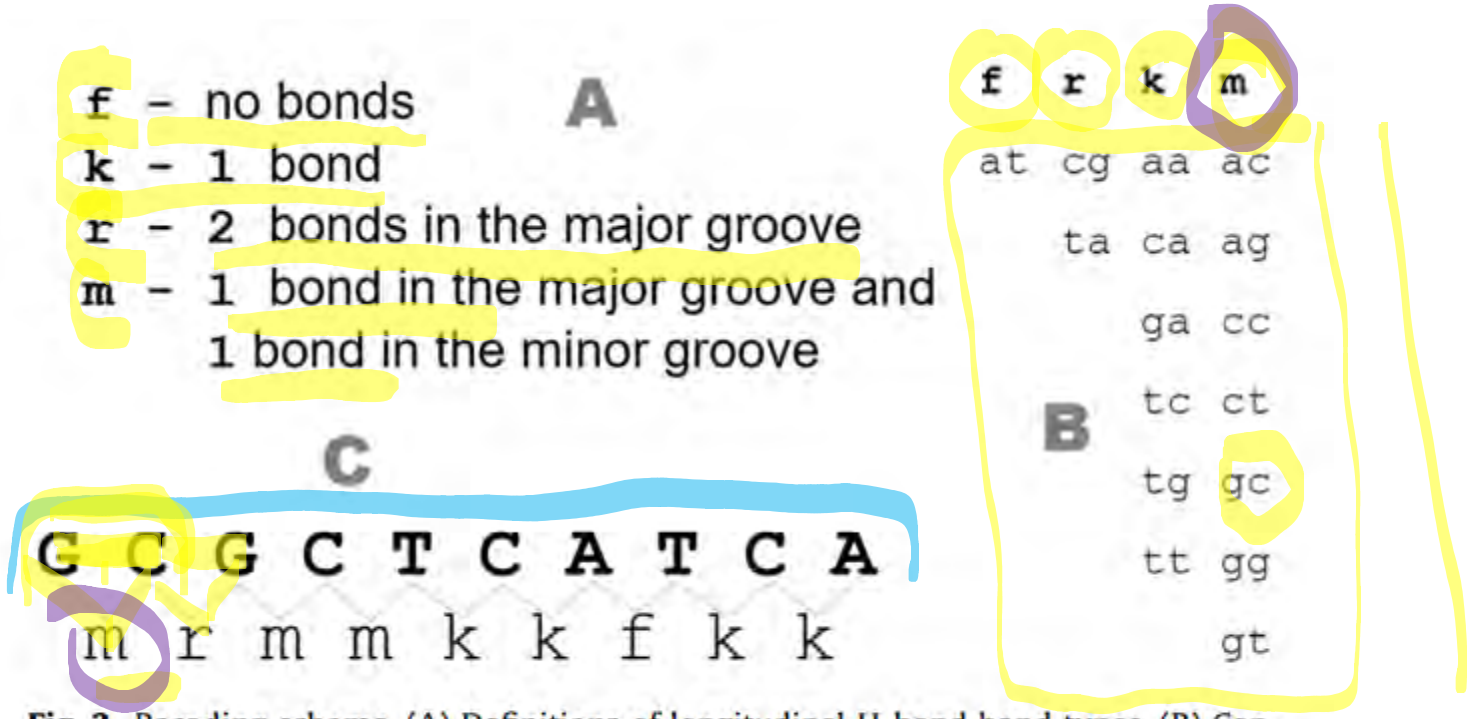
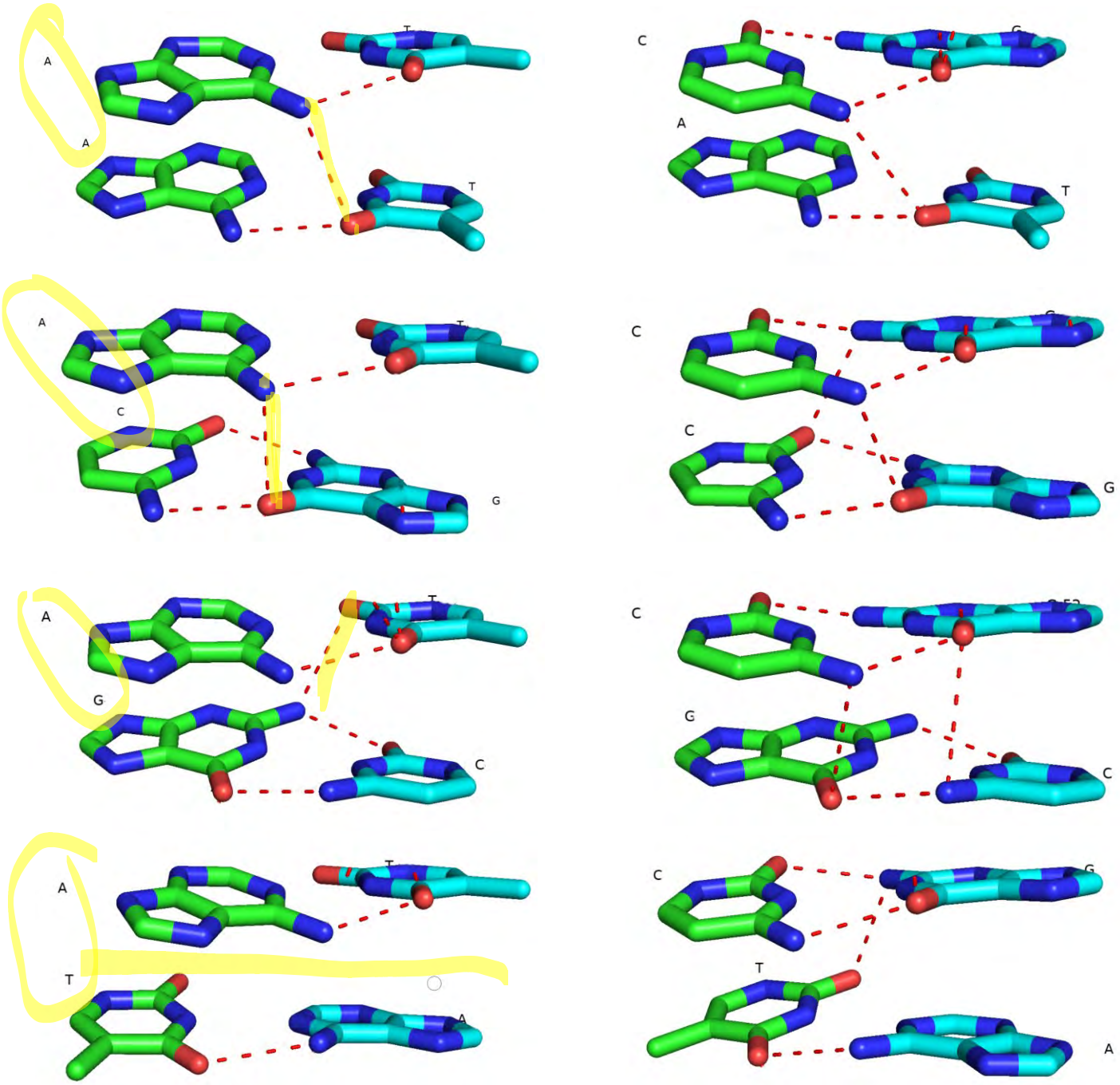


Fig. 3. Recoding scheme. (A) Definitions of longitudinal H-bond bond types. (B) Conversion table of dinucleotides to longitudinal H-bond types. (C) Algorithm of recoding a nucleotide sequence into protocode.


A
T
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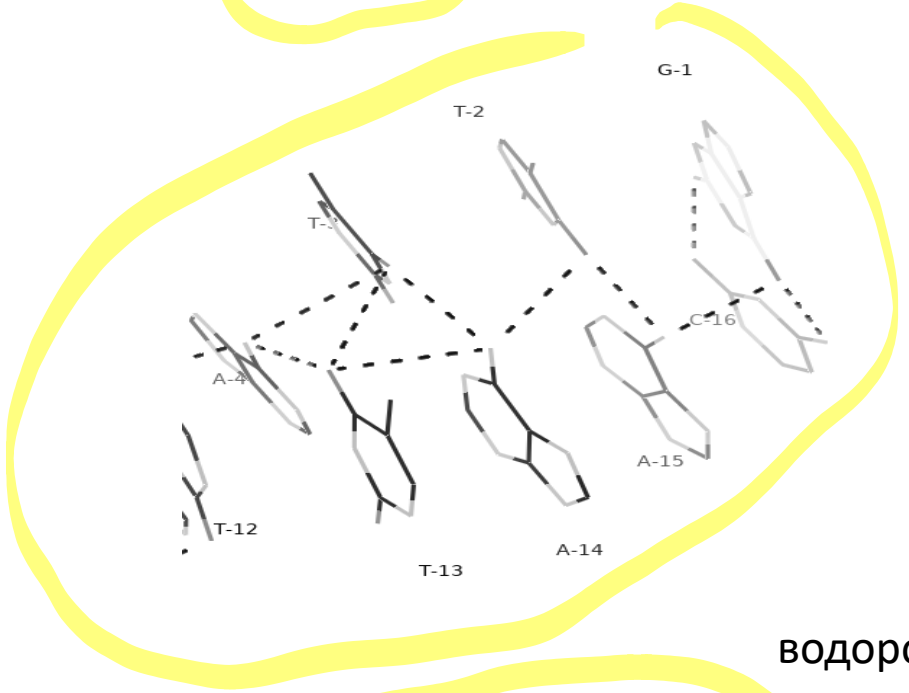
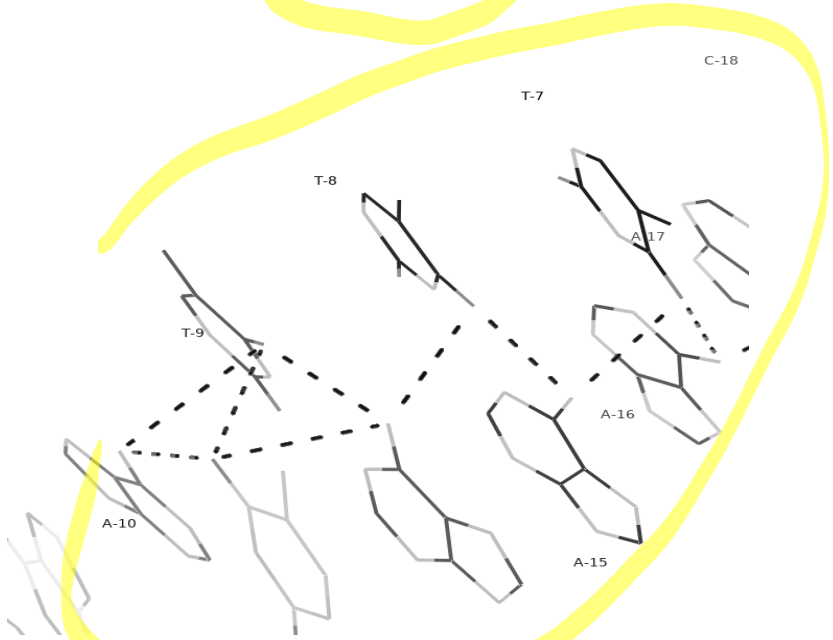
A

Хайдеры

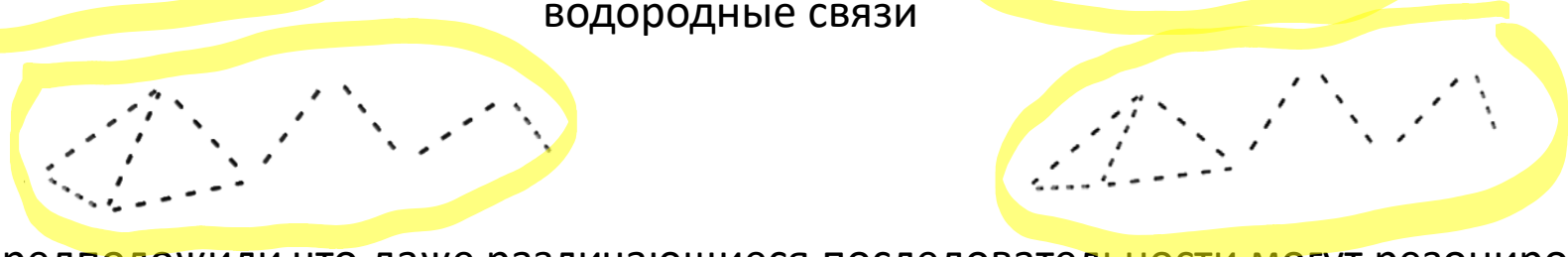
ATTG



ATTT



водородные связи



Мы предположили что даже различающиеся последовательности могут резонировать, если в них похожие струкруры водородных связей.

Хайдеры = фрагменты ДНК, имеющие различные первичные последовательности, но совпадающие по структуре продольных водородных связей)

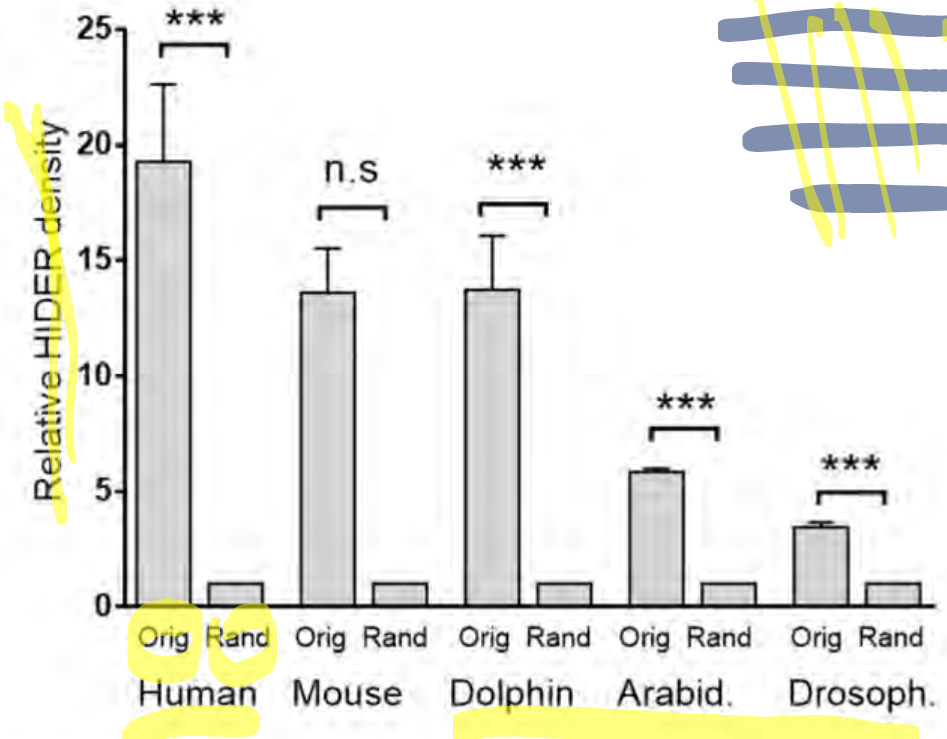


Fig. 5. HIDER density is enriched in the original over the randomized sequence.

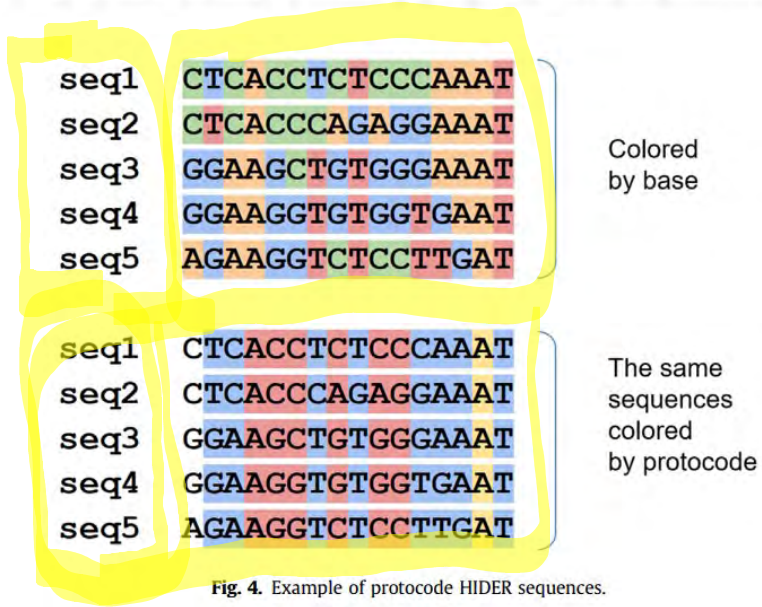


Fig. 4. Example of protocode HIDER sequences.

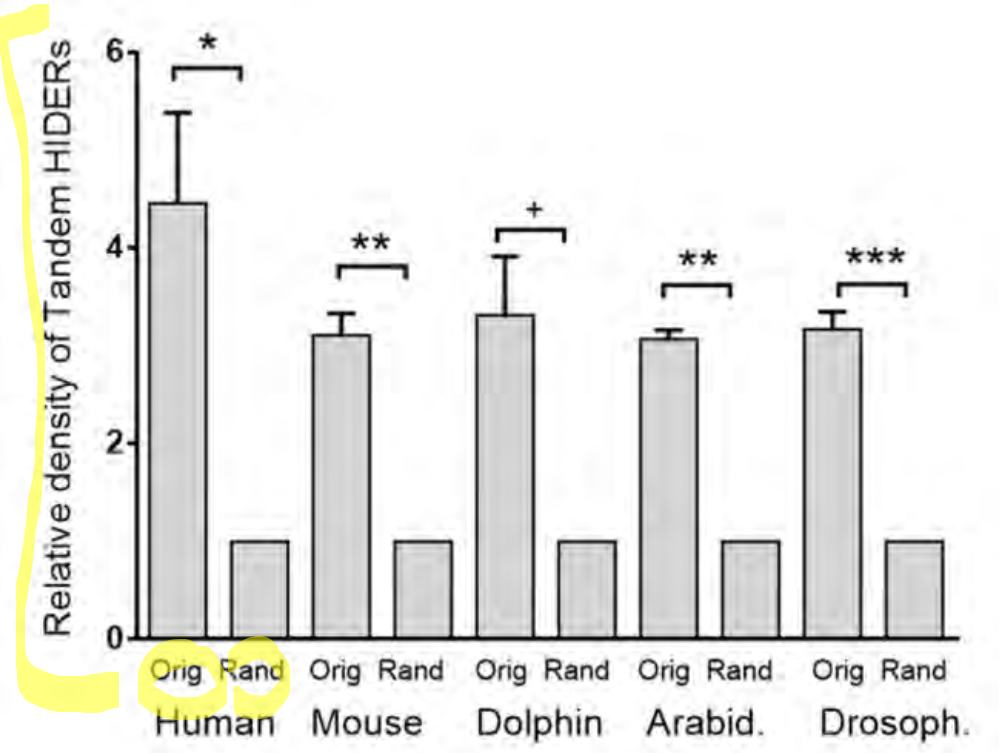
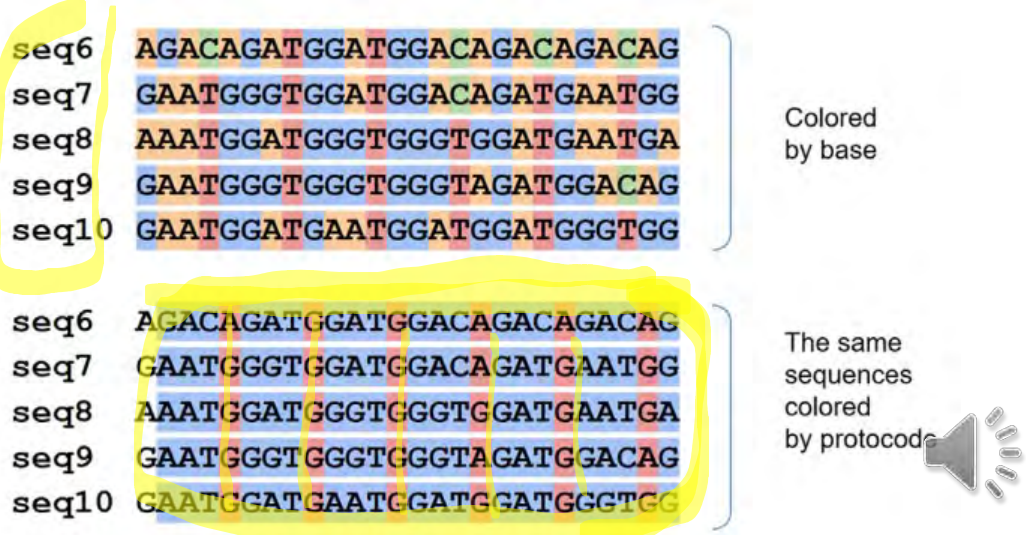


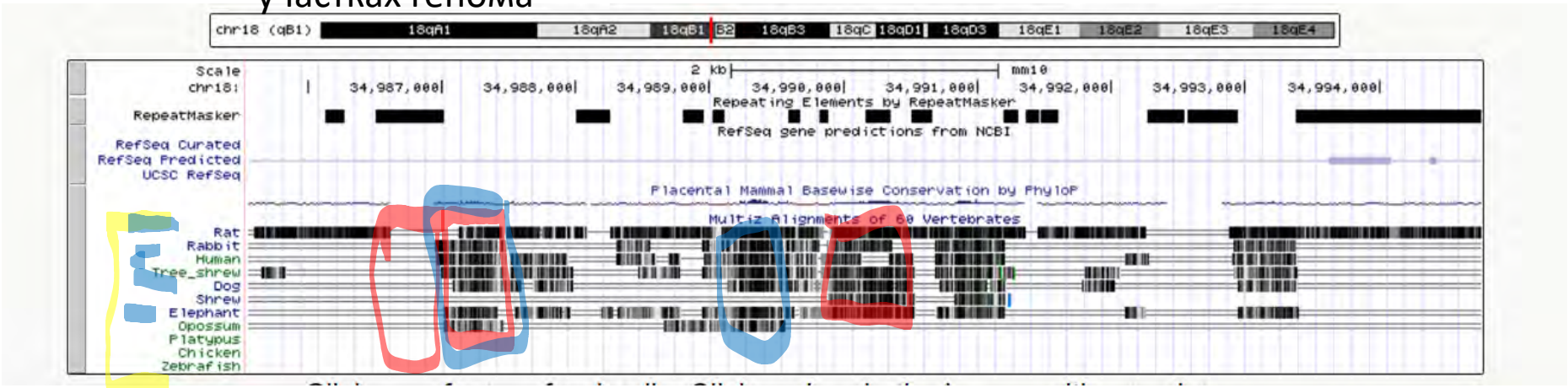
Fig. 7. The density of Tandem HIDERs is enriched in the original over the randomized sequence.

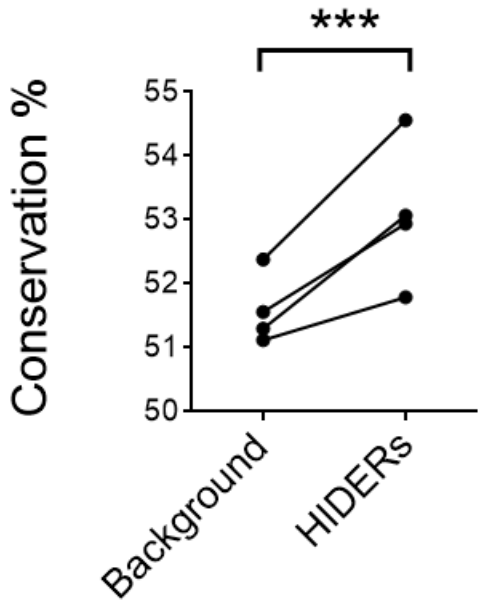


Логика

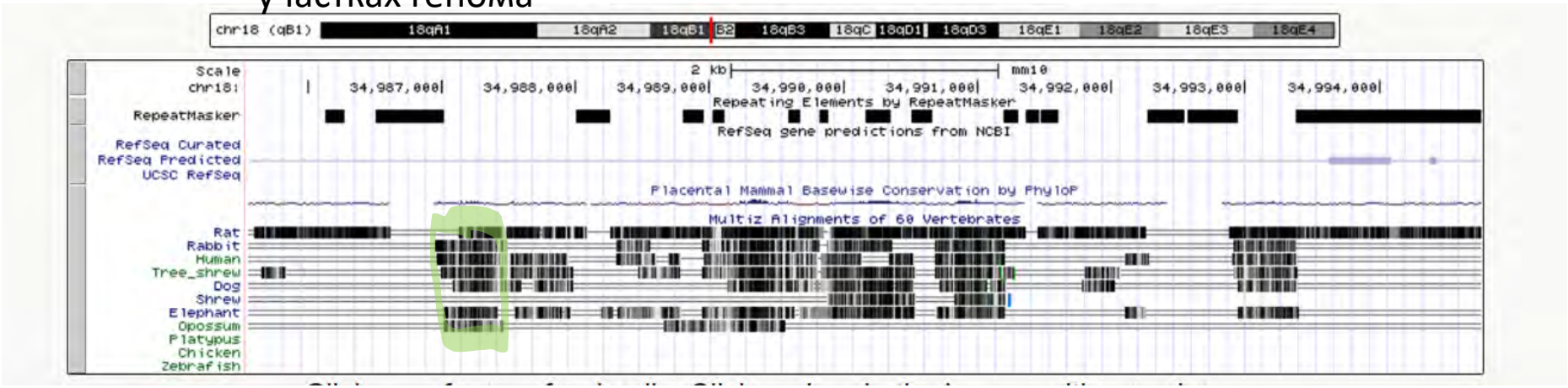
- Морфогенное поле должно создаваться ДНК (Гурвич - Миллер)
- Для добротности колебаний, ДНКовые резонаторы должны быть высококопийными повторами.
- Внутри резонатора должно быть изолированное облако делокализованных электронов или протонов, так чтобы форма облака зависела от последовательности.
- Облако делокалозованных протонов (протонный провод) получается из продольных водородных связей
- Должны существовать Хайдеры. Повторы и хайдеры должны участвовать в передаче сигнала и регуляции генома.
- Хайдеры должны быть обогащены в процессе эволюции
- Проверили - обнаружено сильное и статистически значимое обогащение. Это косвенно подтверждает всю логическую цепочку.

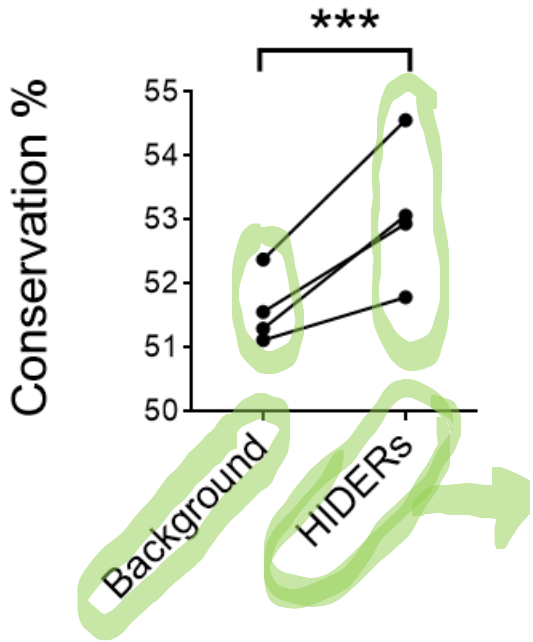
Хайдеры обогащены в консервативных участках генома





Хайдеры обогащены в консервативных участках генома





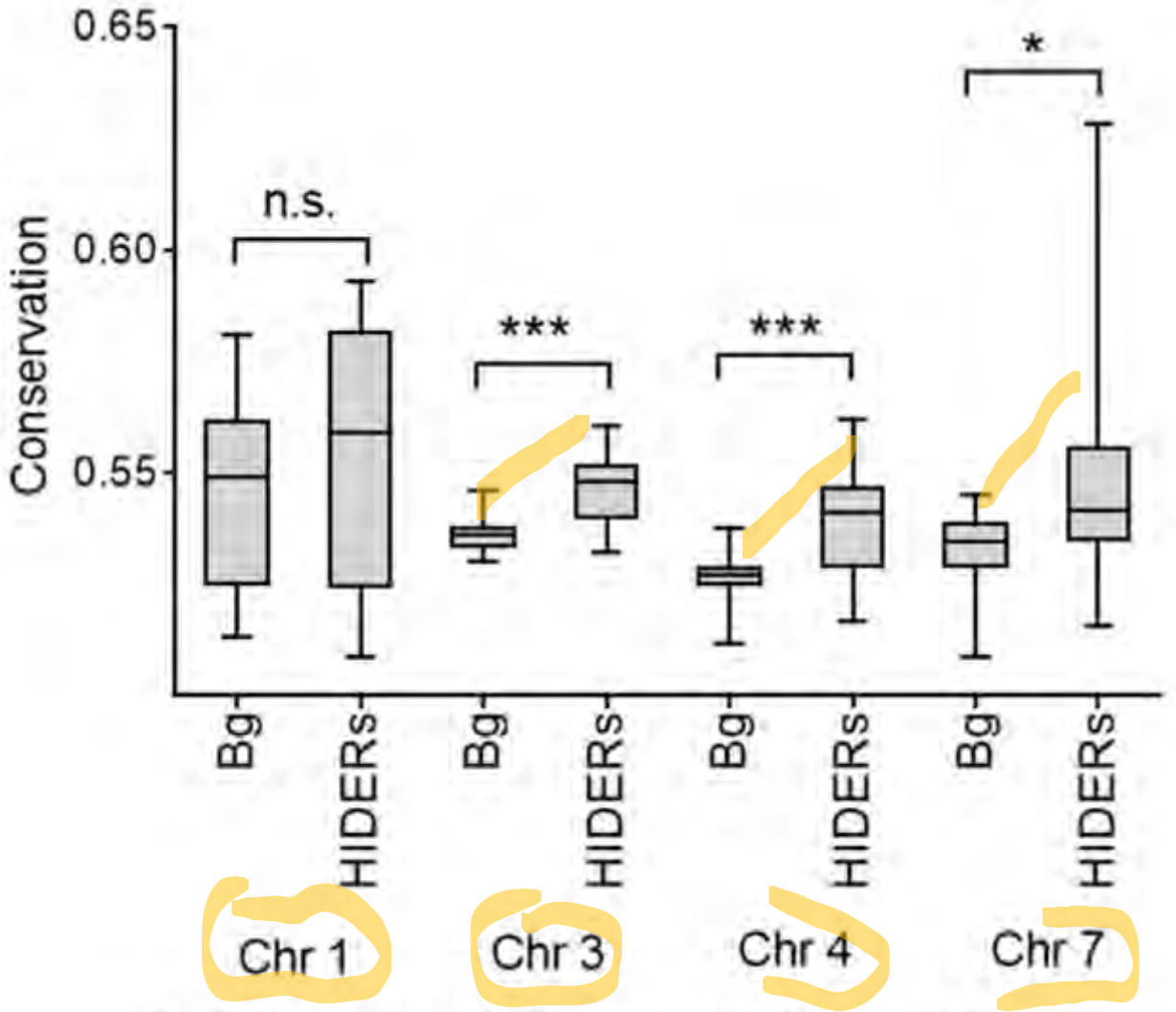
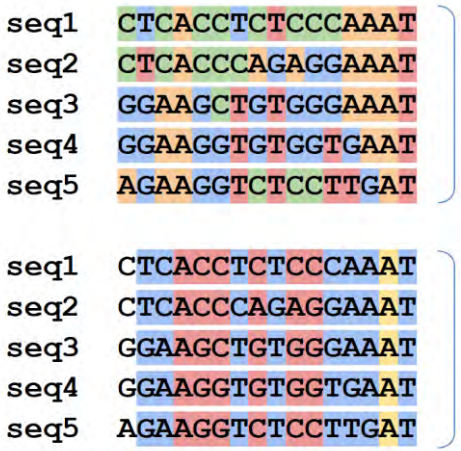
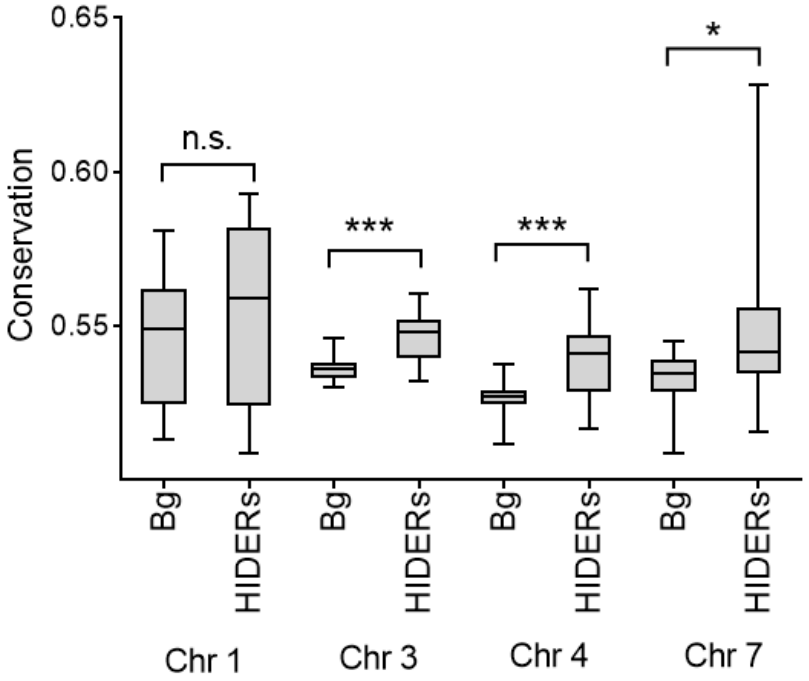
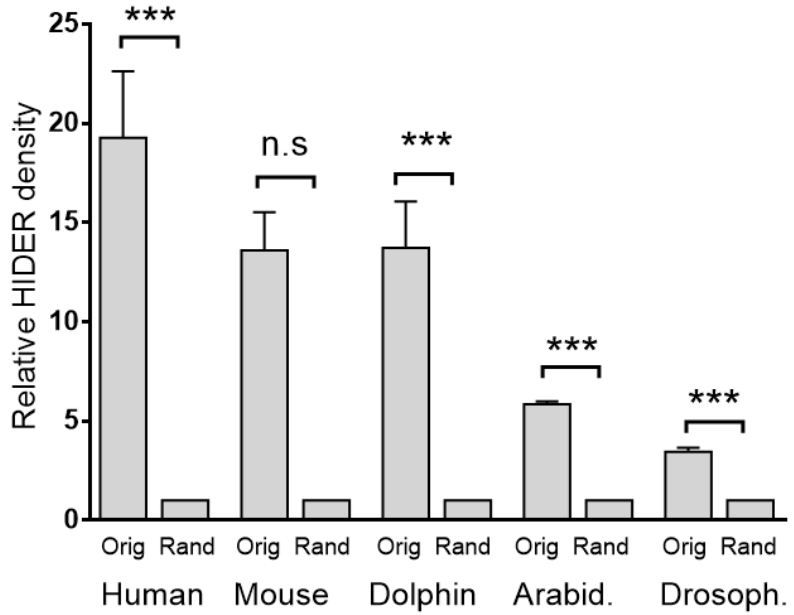


Fig. 8. Conservation of HIDERs compared to background (Bg).

Repetitive patterns of proton wires are enriched by evolution in all tested species



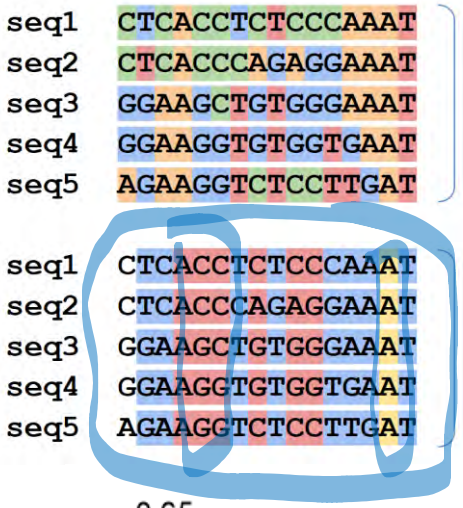


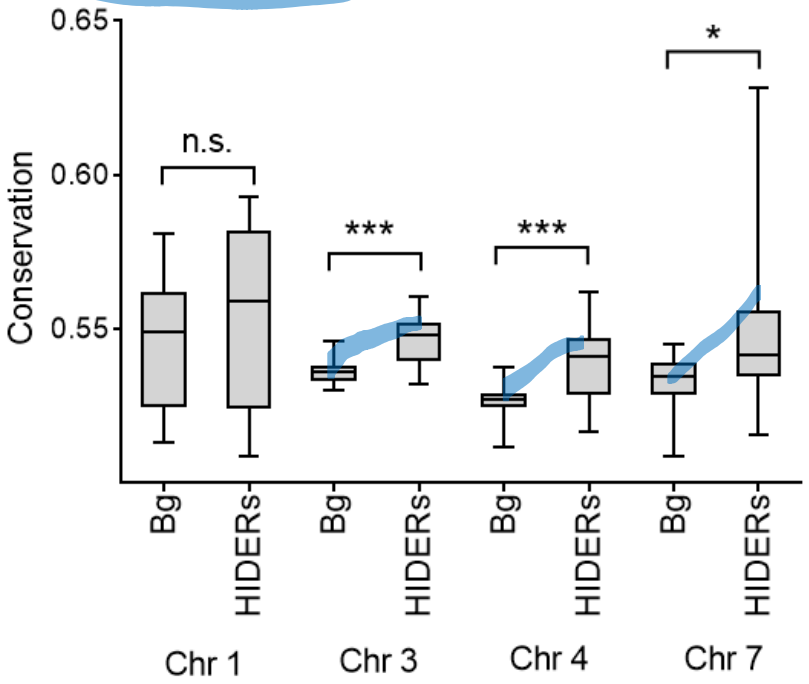


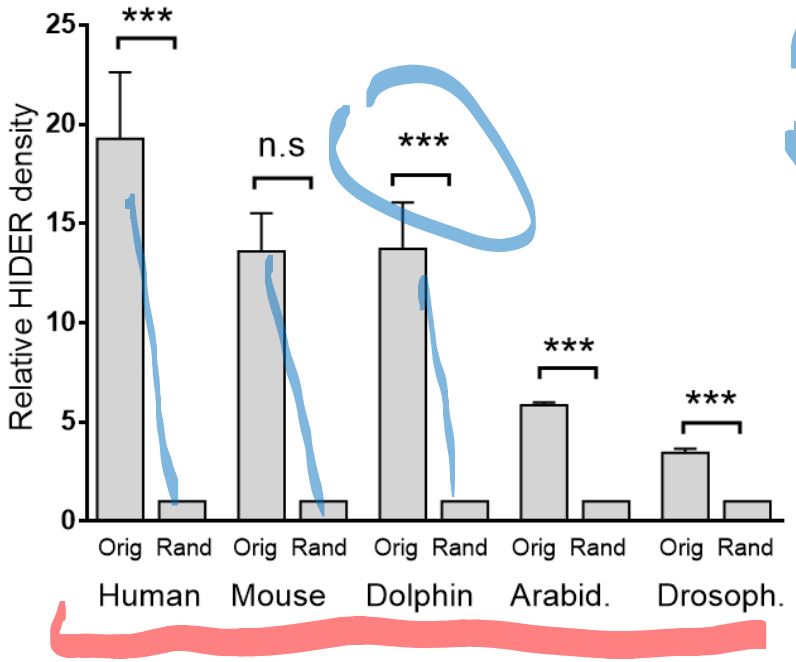
Repetitive patterns of proton wires are enriched in conserved regions

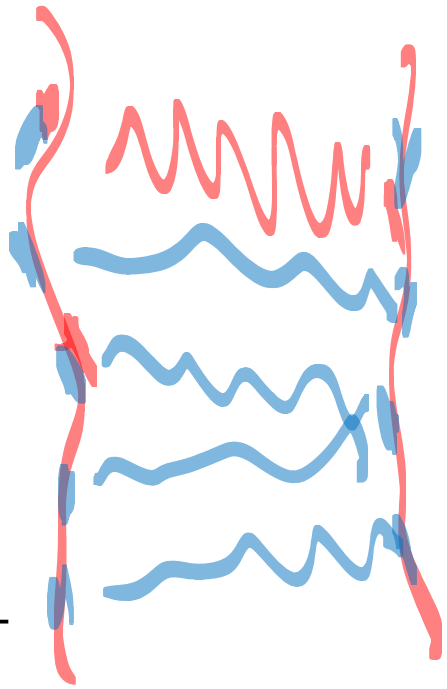
Rempel 2020 PMID: 32712047

Repetitive patterns of proton wires are enriched by evolution in all tested species





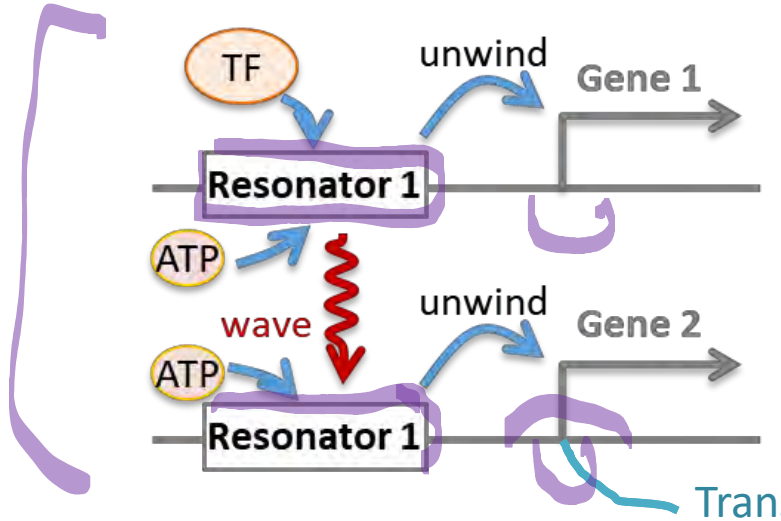




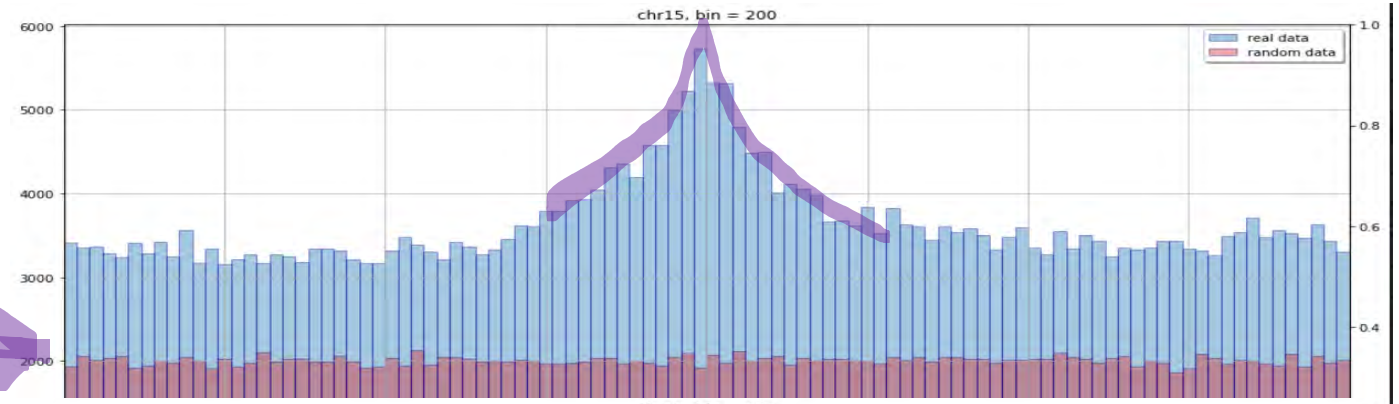
Repetitive patterns of proton wires are enriched in conserved regions

Rempel 2020 PMID: 32712047

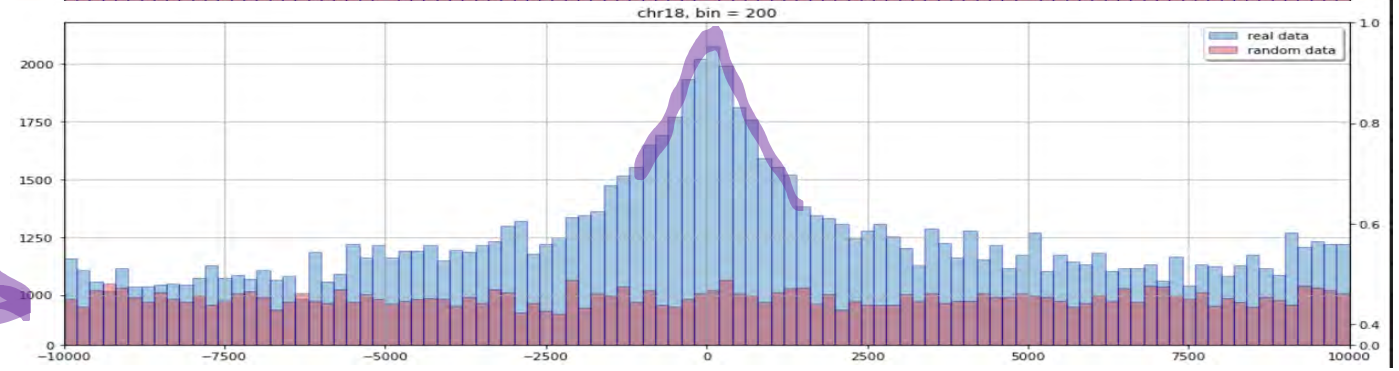
Repetitive patterns of proton wires (HIDERs) colocalize with gene transcription starts.



CHR15



CHR18

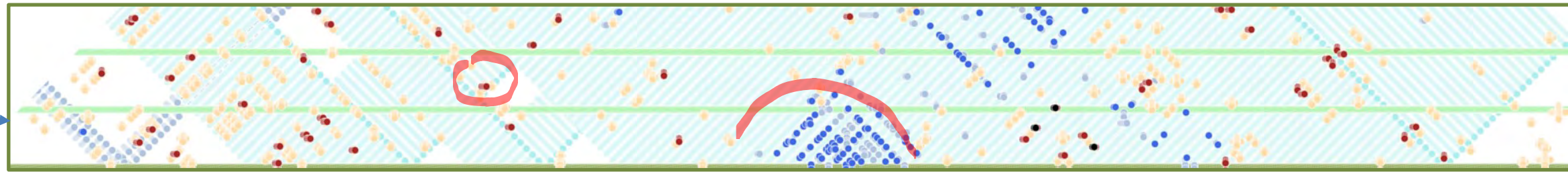


Does the nucleosome read DNA as a VCR head?

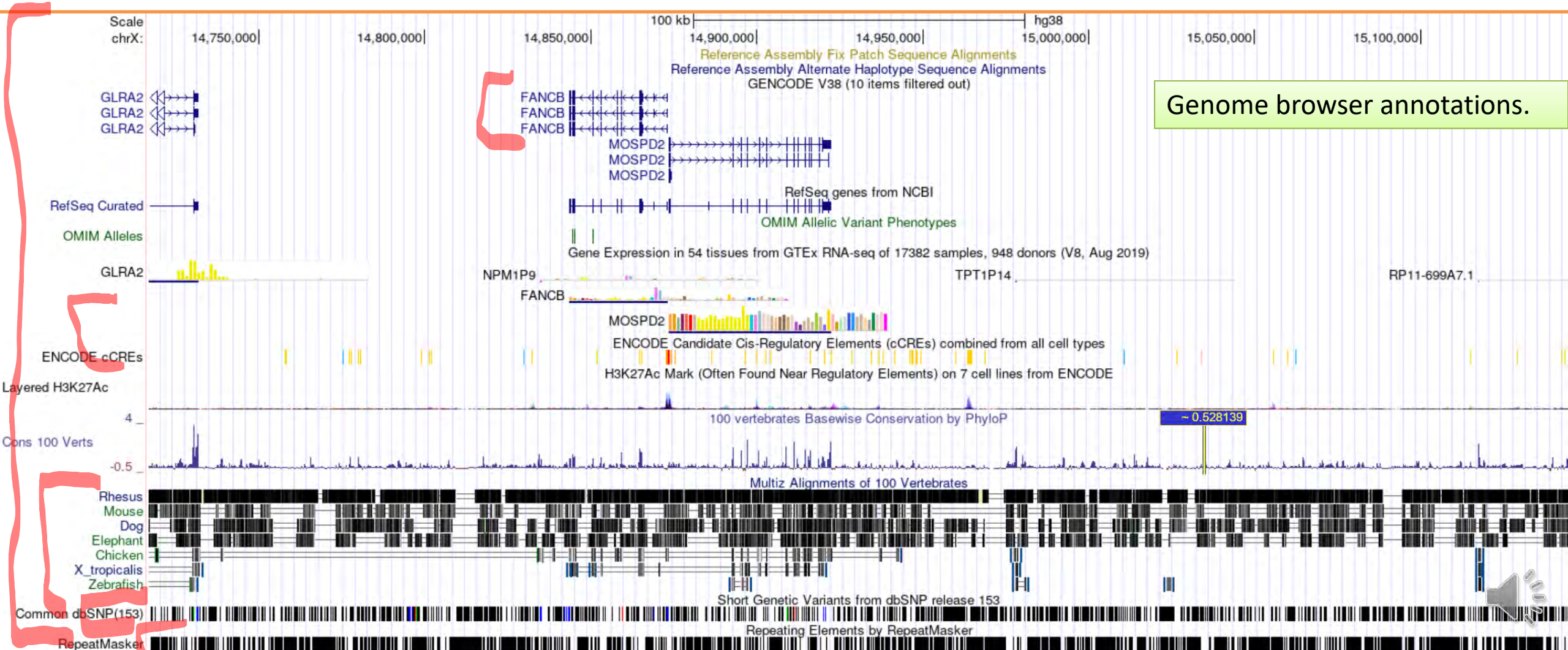
A Dotplot map of proton and electron wires.

How the future analysis may look like

Not yet combined



Genome browser annotations.



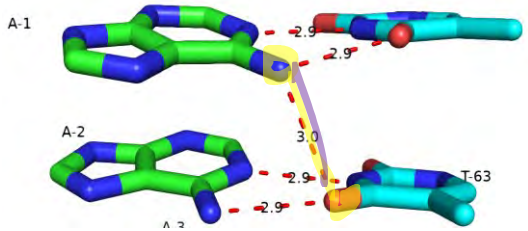
Quantum chemical modeling of proton wires

Comparison of different methods of prediction

How flexible is B-form?

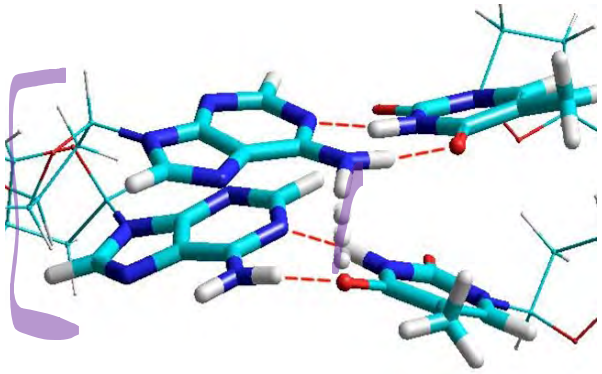
AA

AG



stereometric

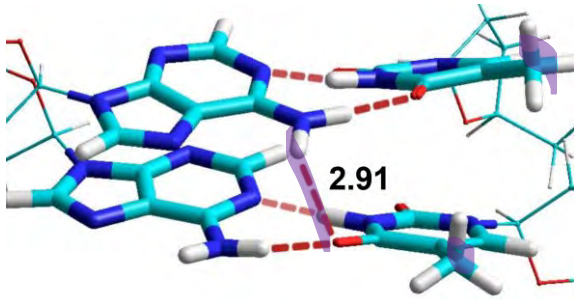
by distance



quantum

chemical

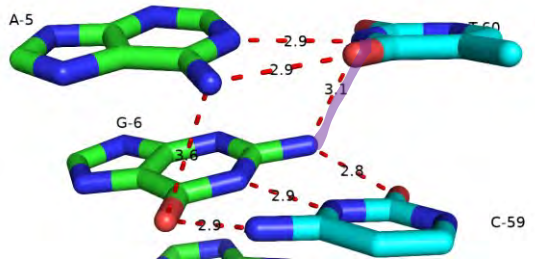
flexible model

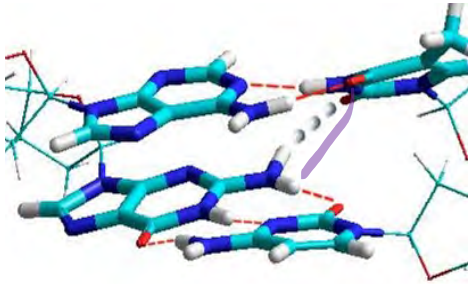


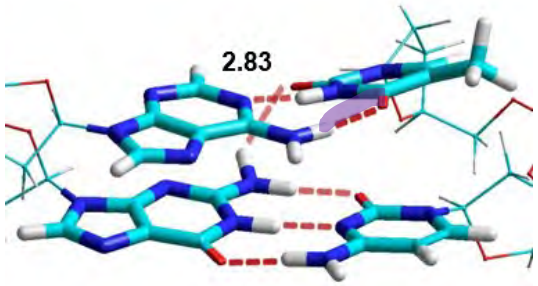
quantum

chemical

B form







complete agreement

partial agreement

Quantum chemical modeling methods

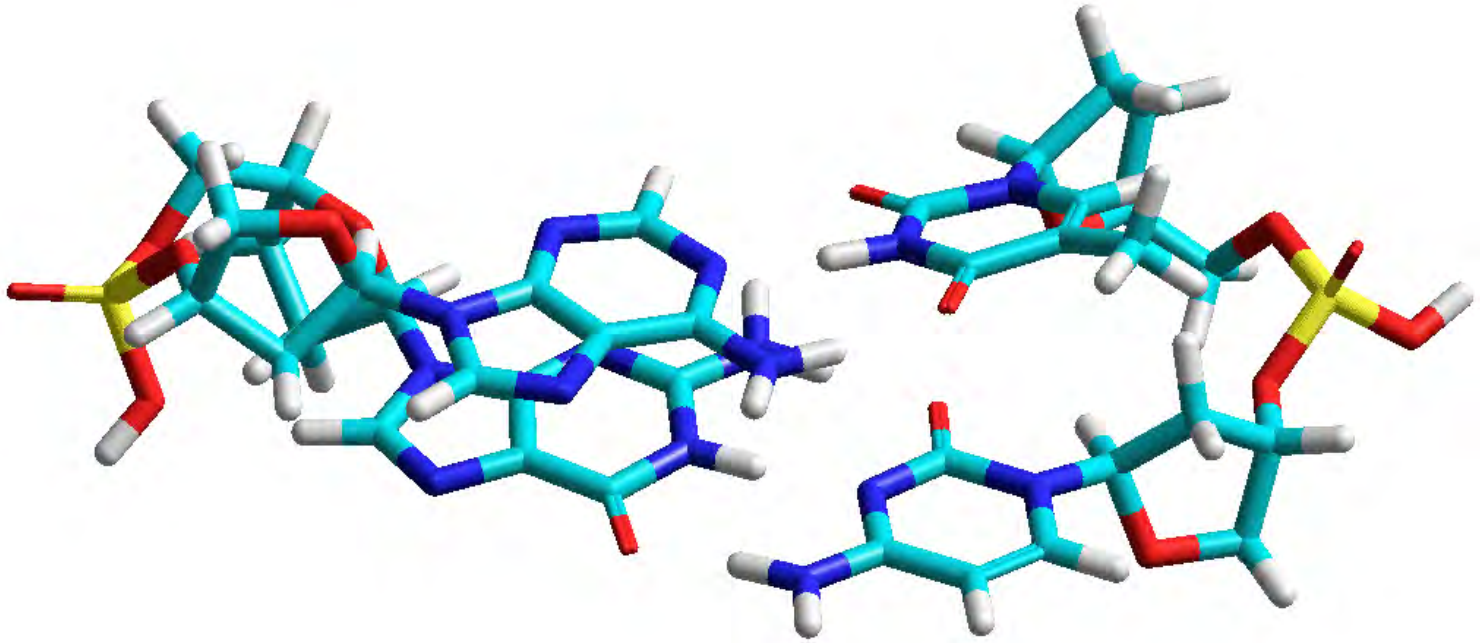
Designed B-DNA using Winmopac 7.21

MOPAC – molecular orbital modeling program

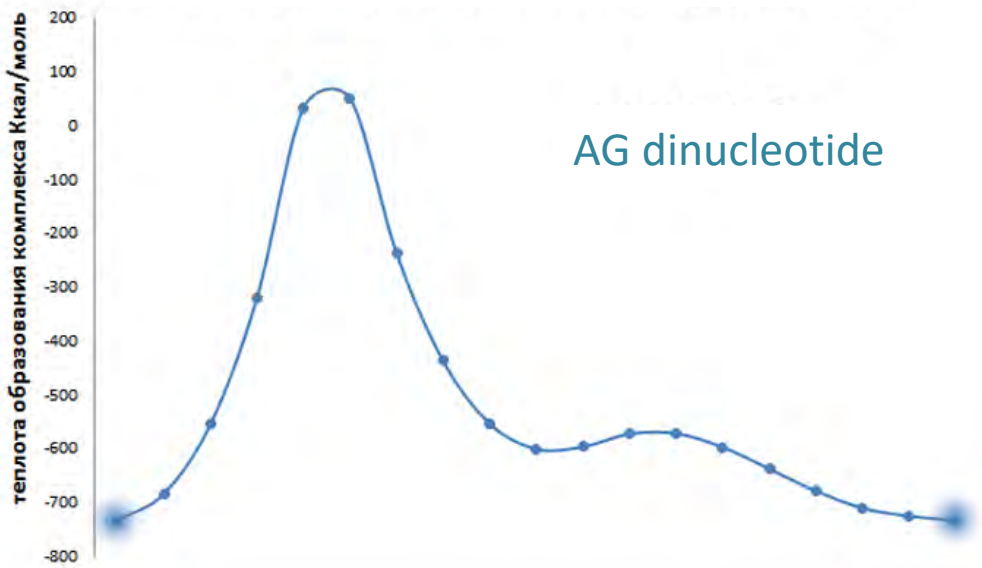
- Method UHF PM6-DH2X
  - is widely used for modeling macromolecules
  - good agreement with spectrometry and crystallography
  - does half-empirical computation = Ab initio + emprirical
  - does Schrödinger equation computation
- we computed transition energies for tautomeric transitions

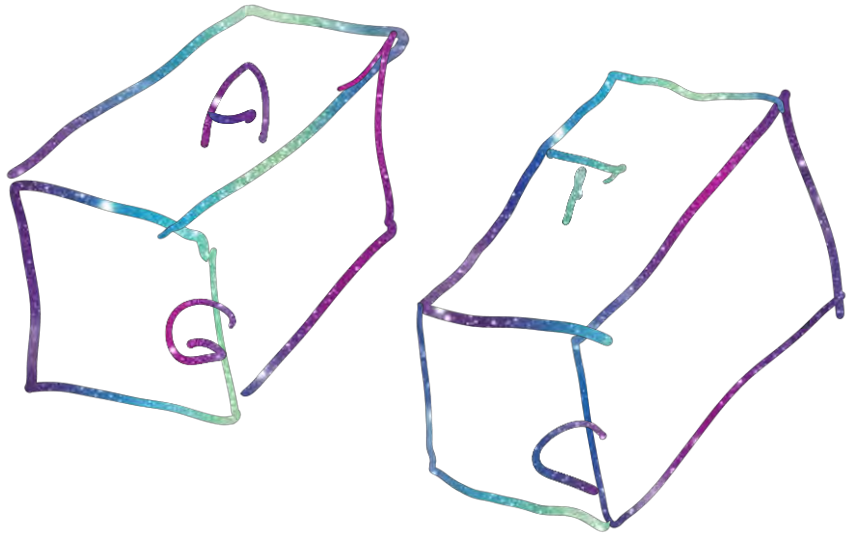
Komarov, Samchenko. "Bi-Stability... Genomic DNA." *Russian Physics Journal* 63.8 (2020)

Closed-loop proton jumps obey neutrality requirement

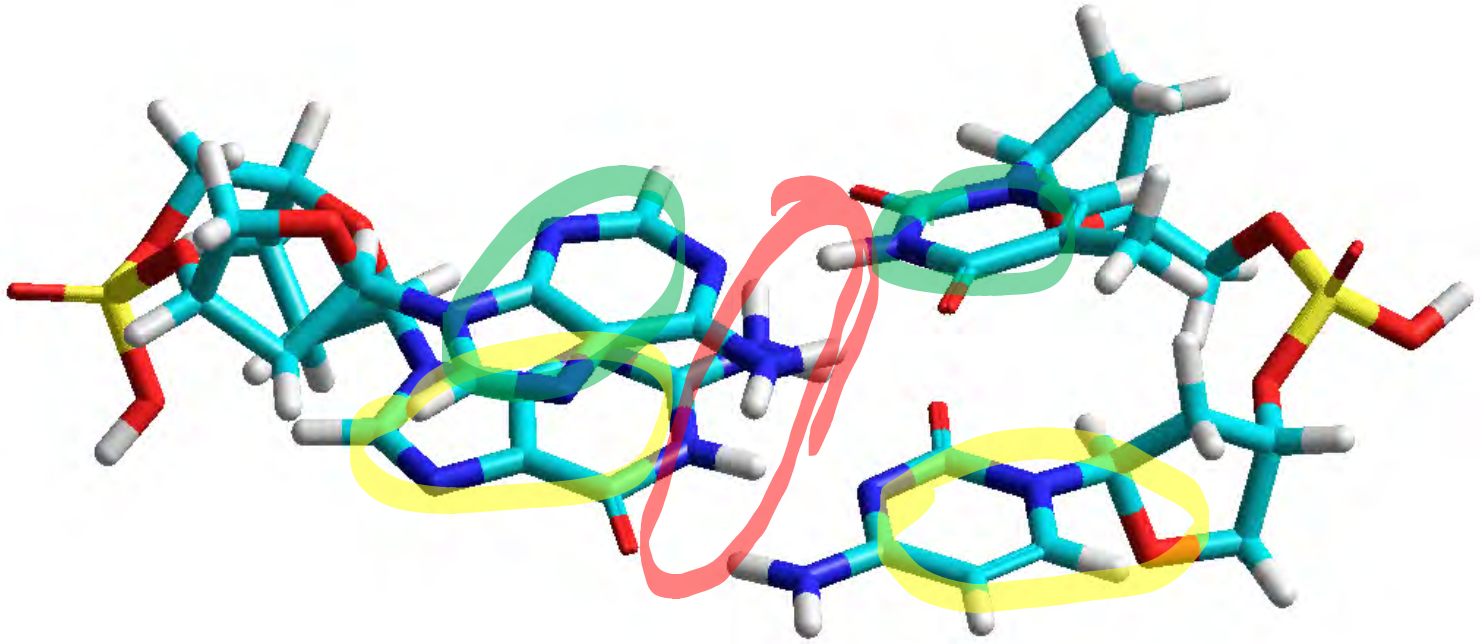


Tautomer transition energy

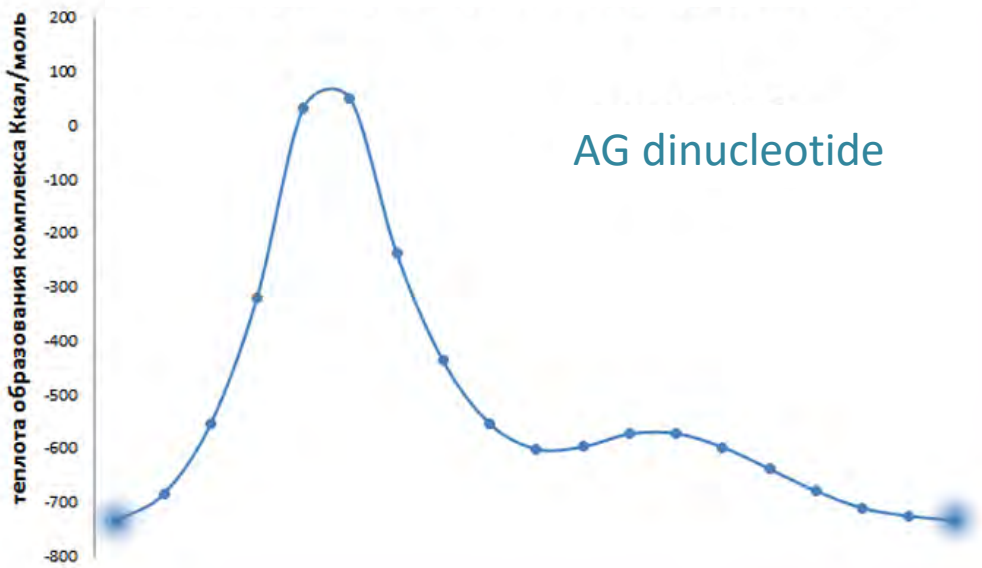




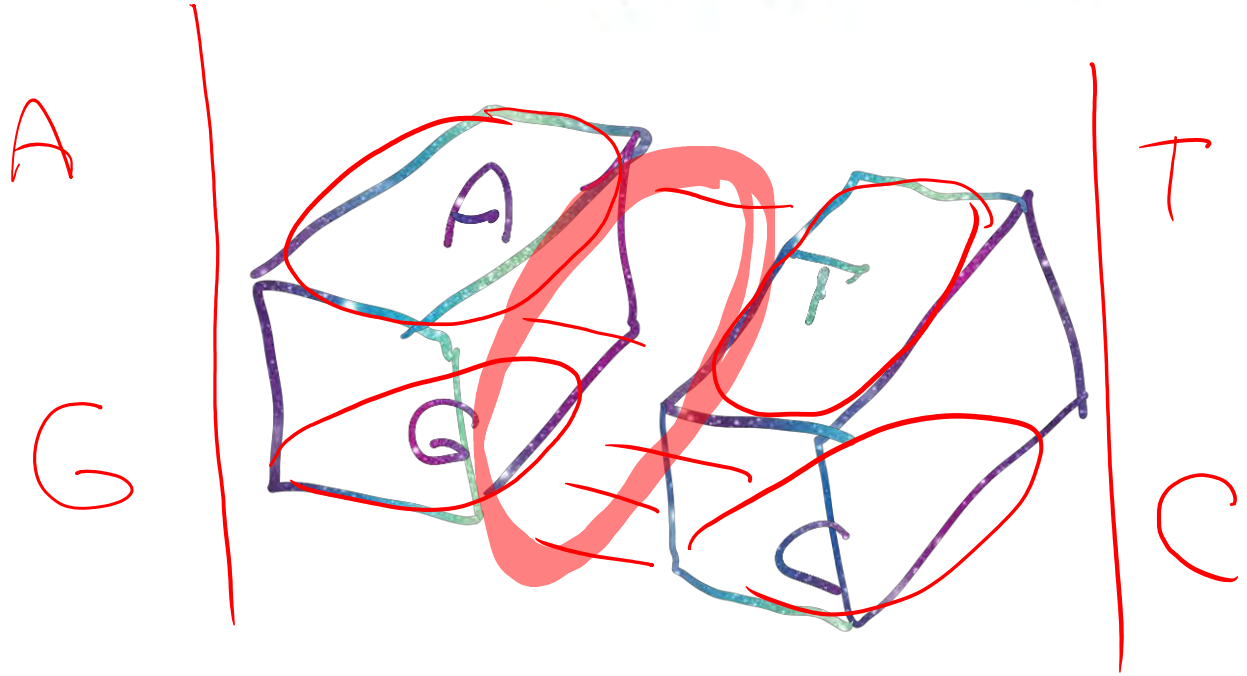
Closed-loop proton jumps obey neutrality requirement



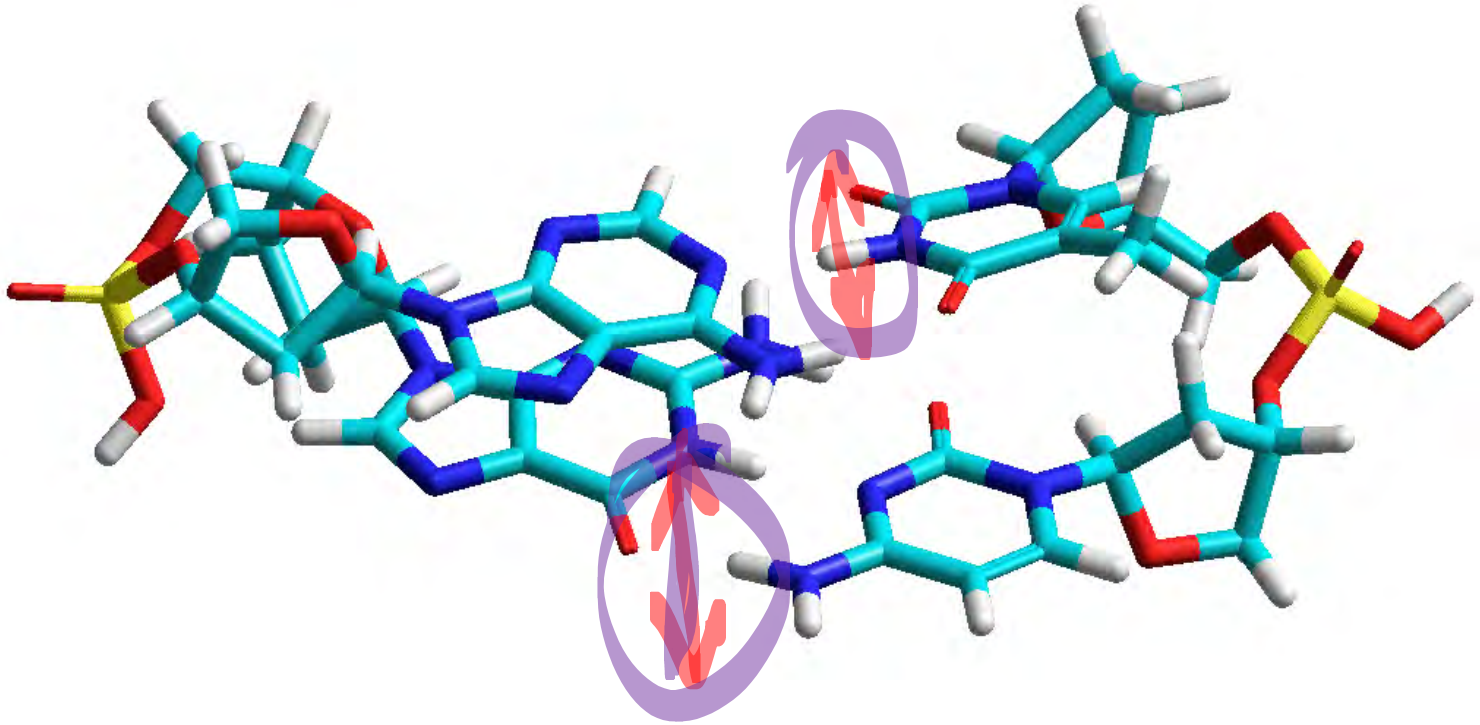
Tautomer transition energy

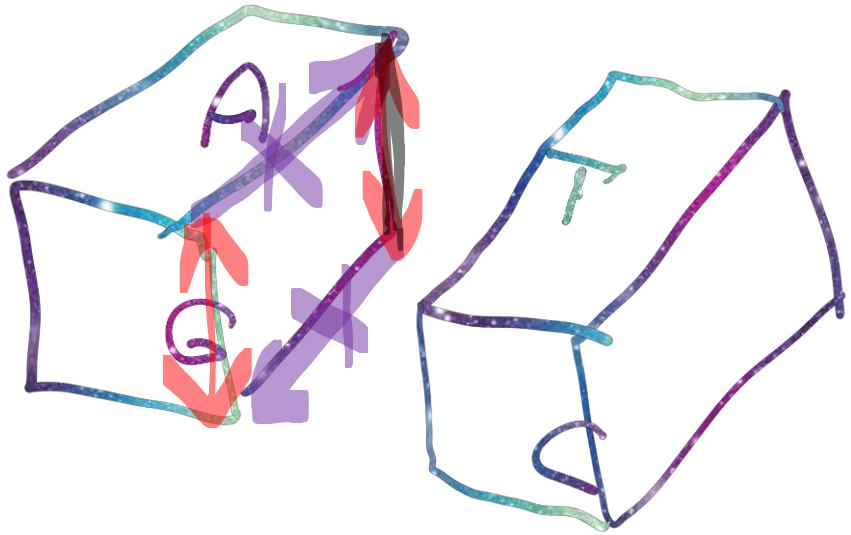


AG dinucleotide

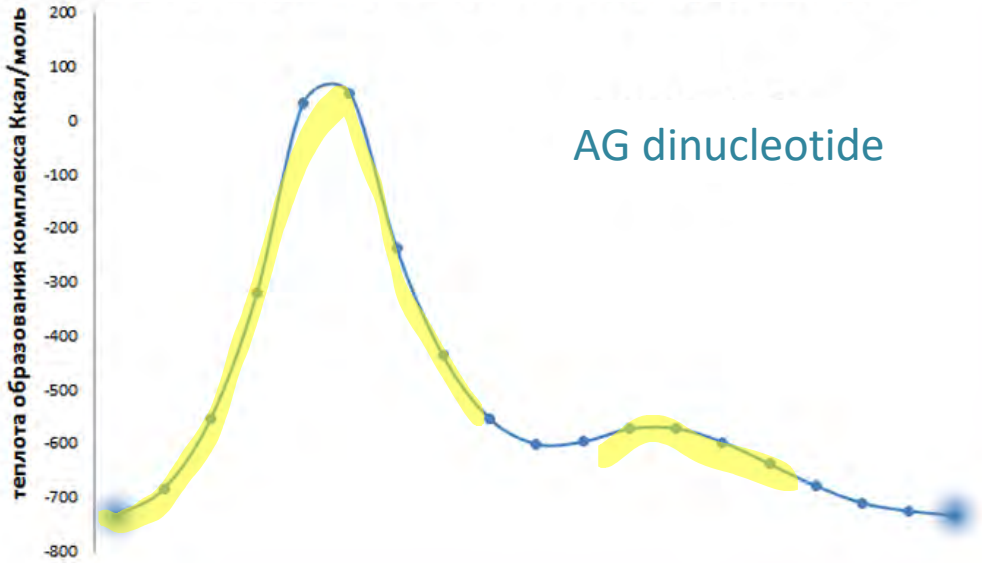


Closed-loop proton jumps obey neutrality requirement

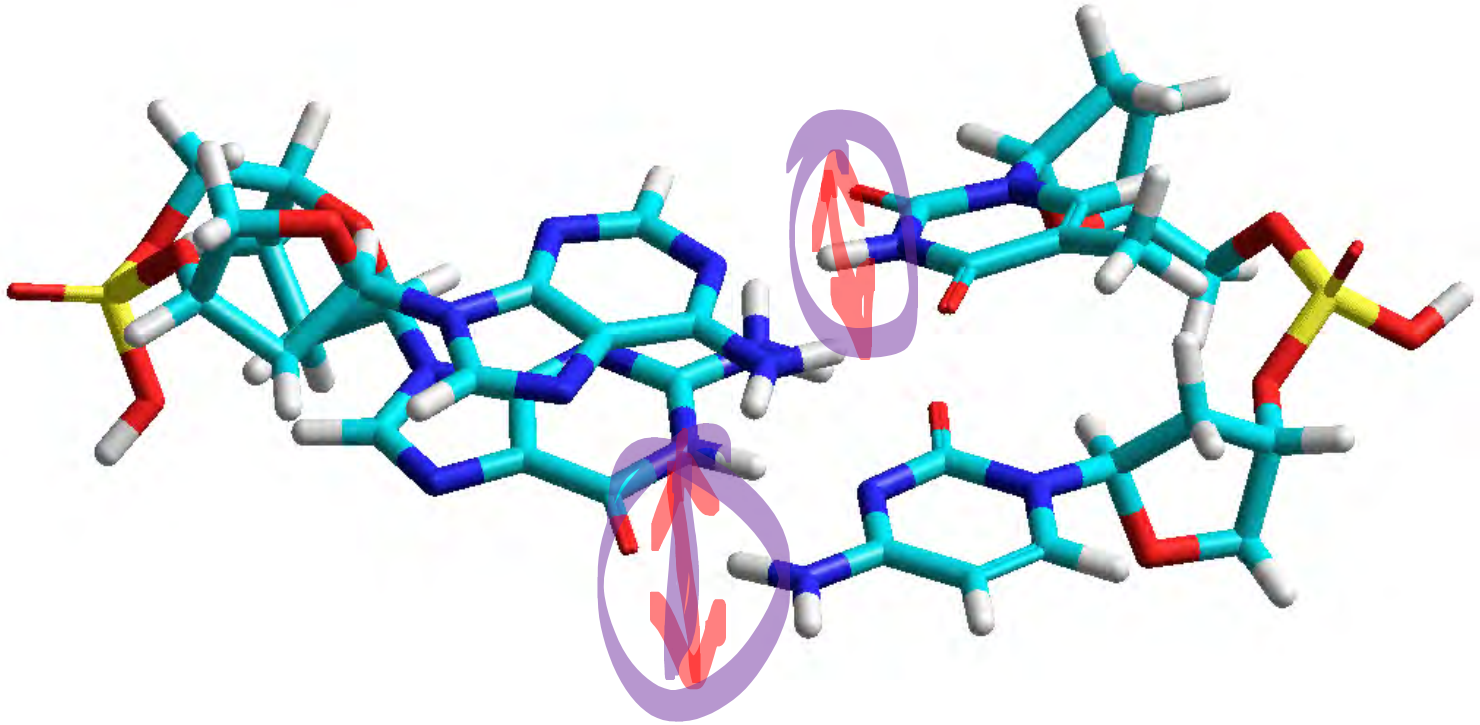


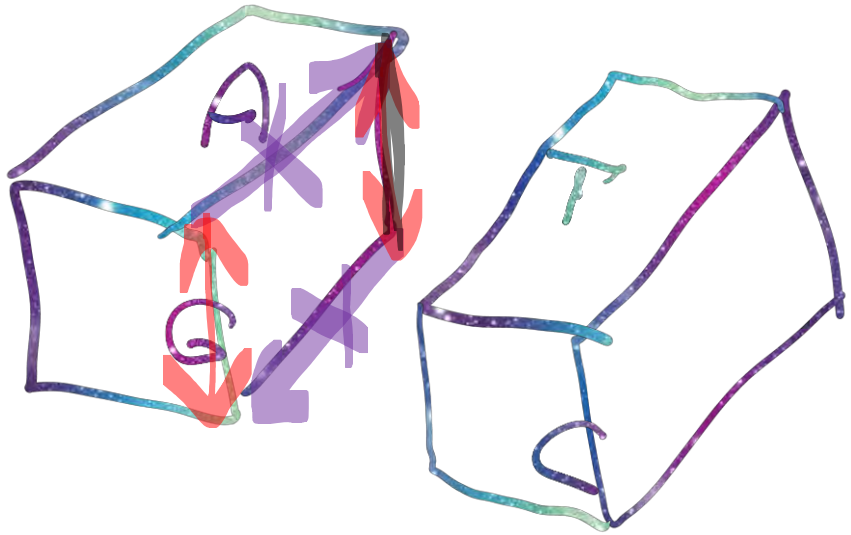


Tautomer transition energy

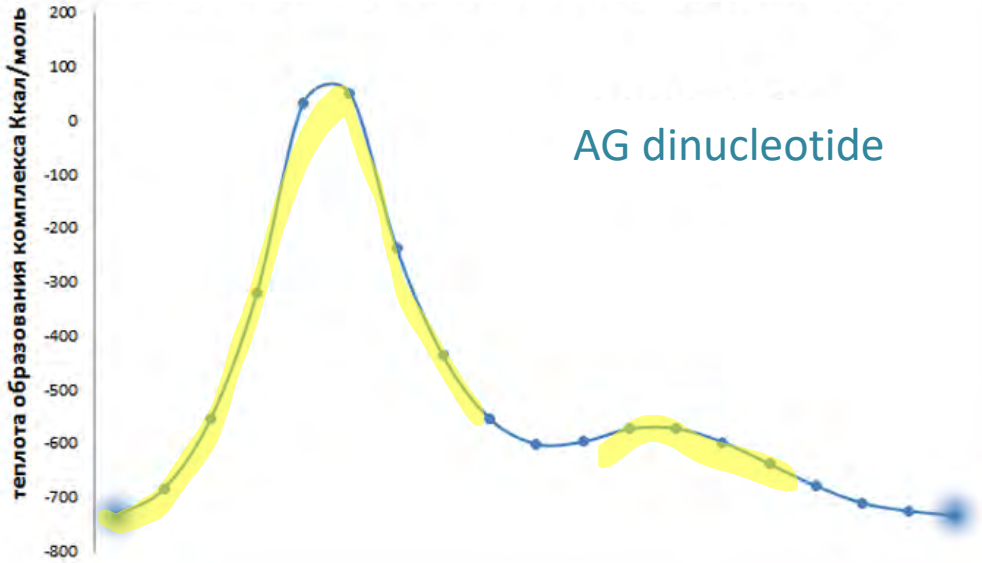


Closed-loop proton jumps obey neutrality requirement

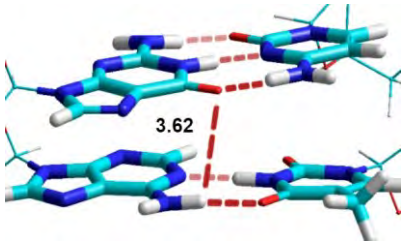




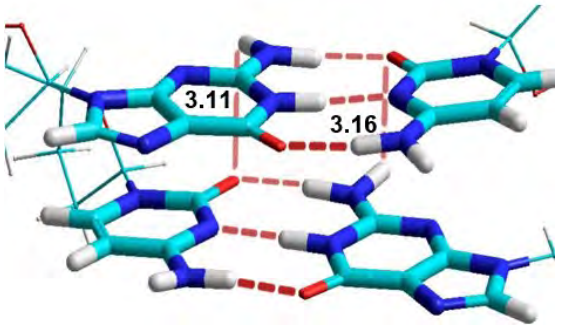
Tautomer transition energy



Dinucleotides have different longitudinal hydrogen bonds



GA



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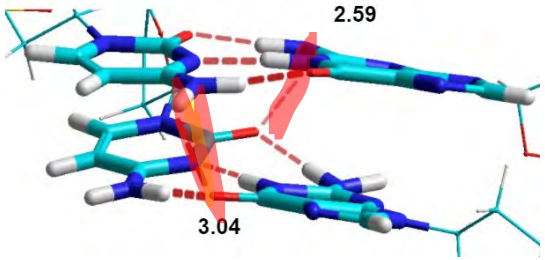
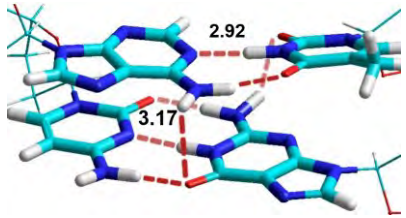


CC



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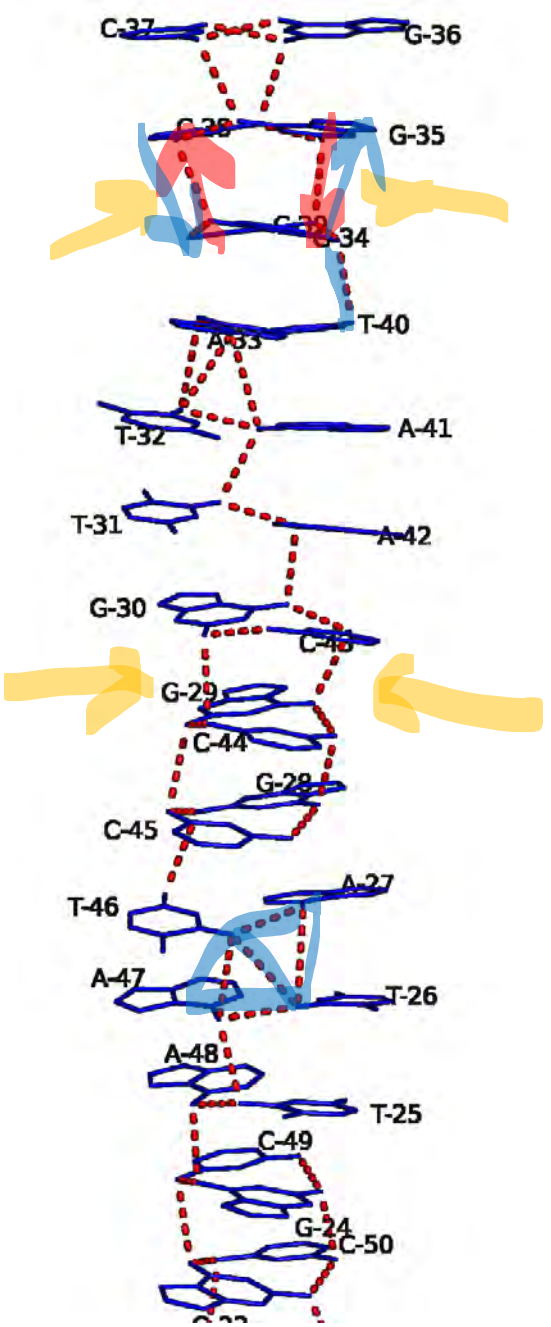

Nonrandomness of mutations

Evolution favors longer purine chains

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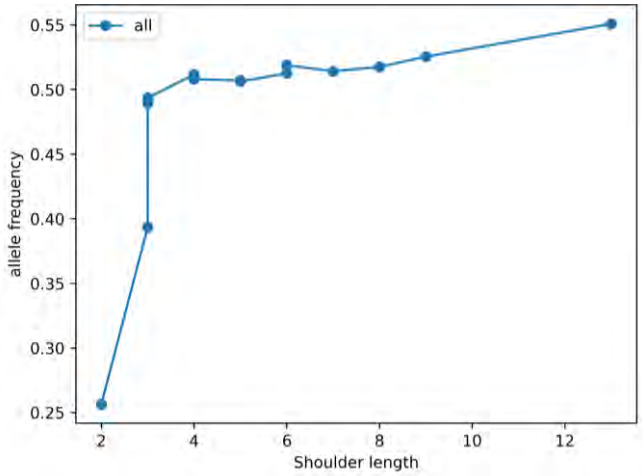
GWAS – genome wide association studies
SNP – single nucleotide polymorphism

1000 volunteers
11M SNPs – Allele frequencies



SNP1

CGGGAGGAGGAAGAAGGAGT - **83%**

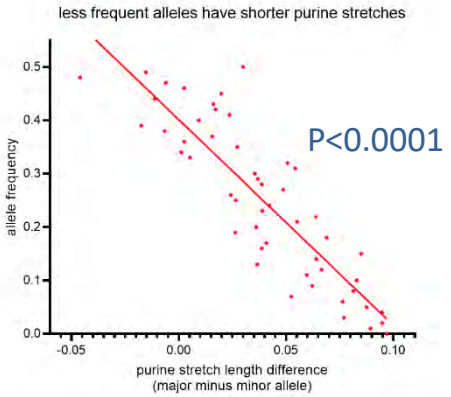
evolution

CGGGAGGAGGAACAAGGAGT - 17%

SNP2

CAGAGGT - 28%

CAGTGGT - **72%**



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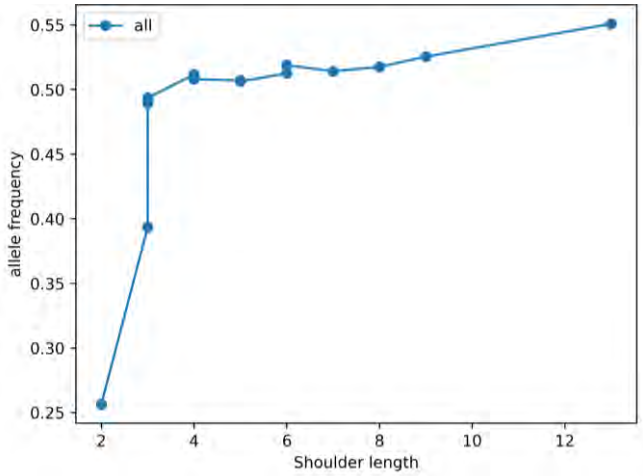

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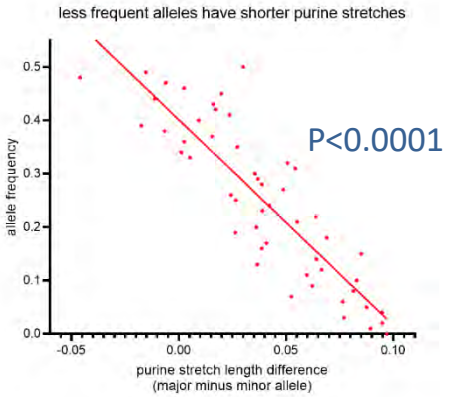

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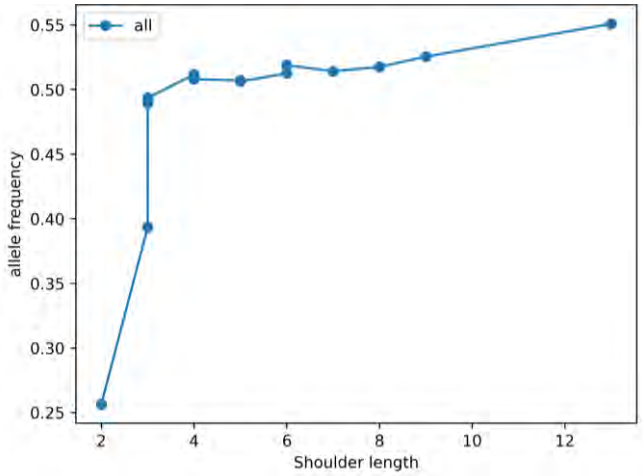

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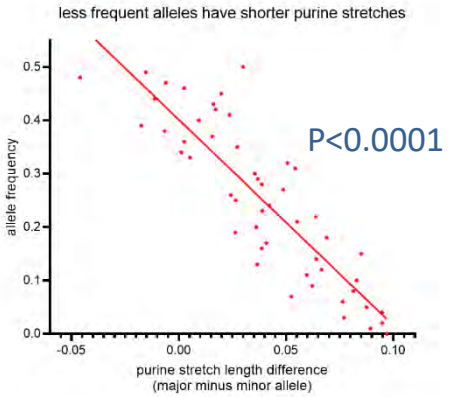

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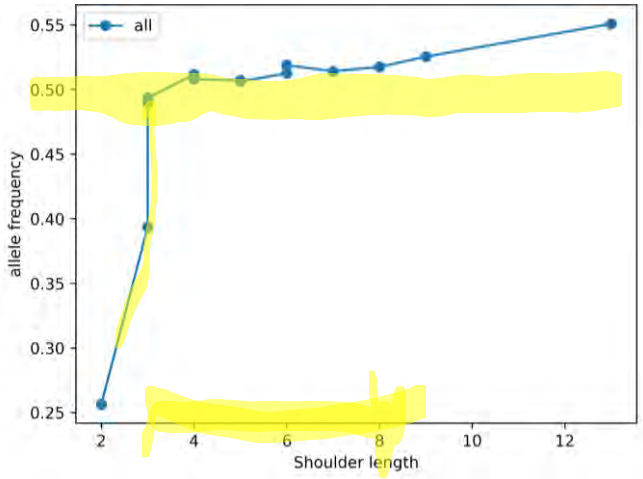

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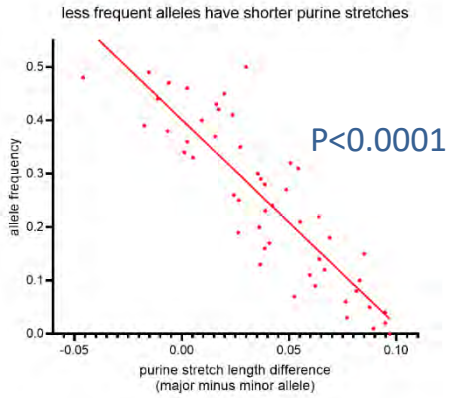

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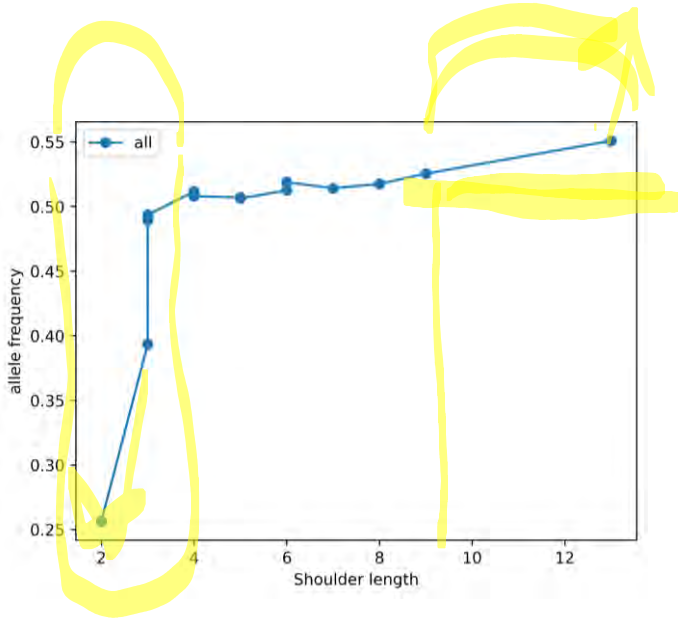

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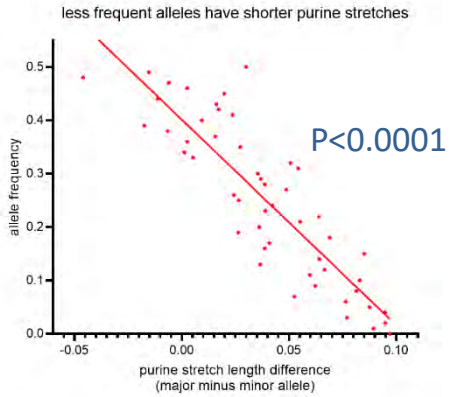


Longer purine stretches evolve longer and shorter stretches evolve shorter

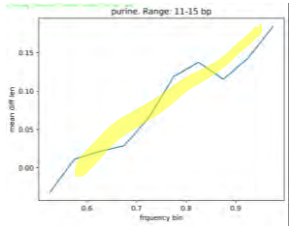
Suggesting biological function of longer stretches – oscillators

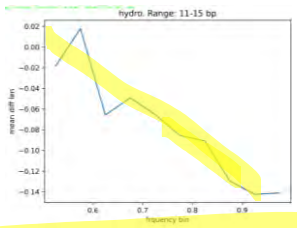
Purine stretches in other biological species plus proton chains

Electron chains (purines)

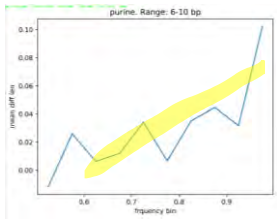
Proton chains

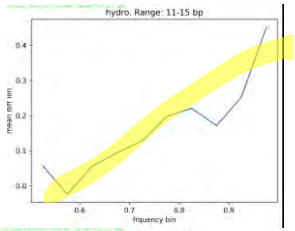
Human



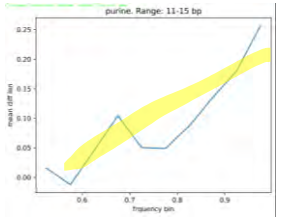


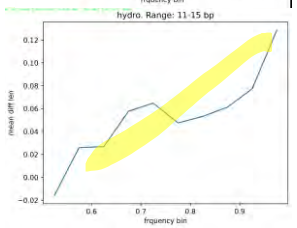
Bird



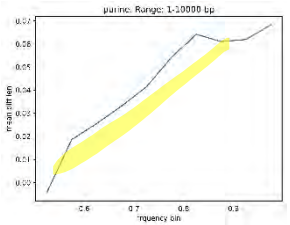


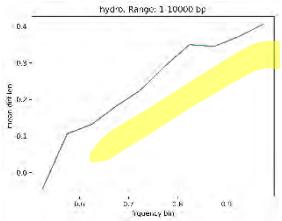
Fish

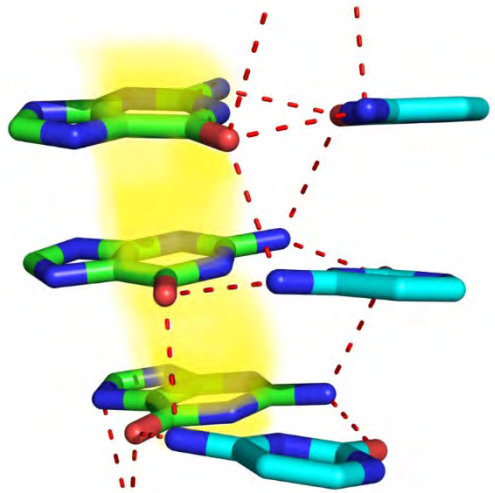




Plant



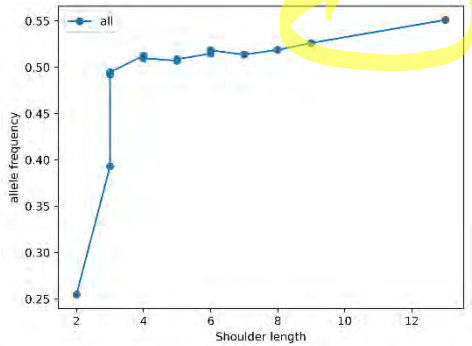




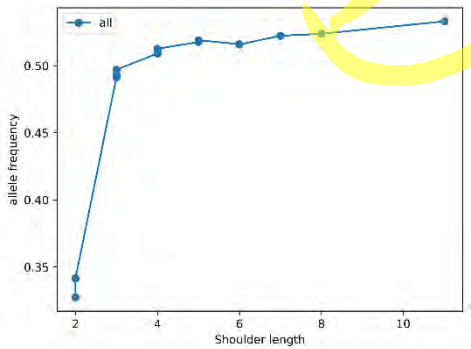
Rempel 2020 PMID: 32712047

Evolutionary pressure to elongate purine chains

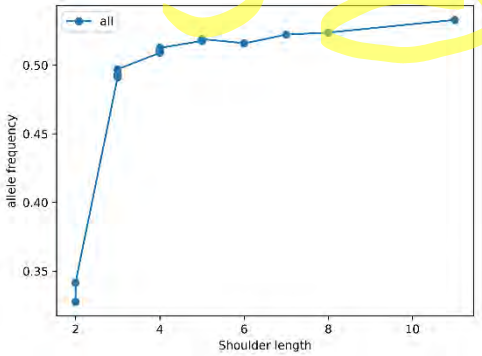
Human



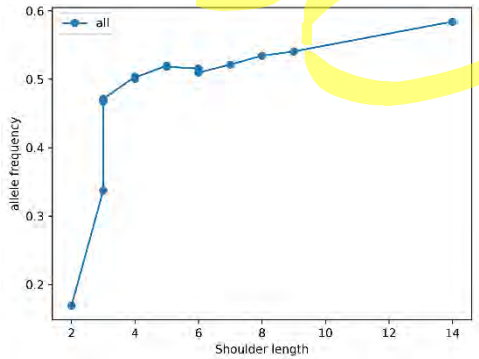
Fish (salmon)



Bird (Great Tit)



Plant (cocoa)



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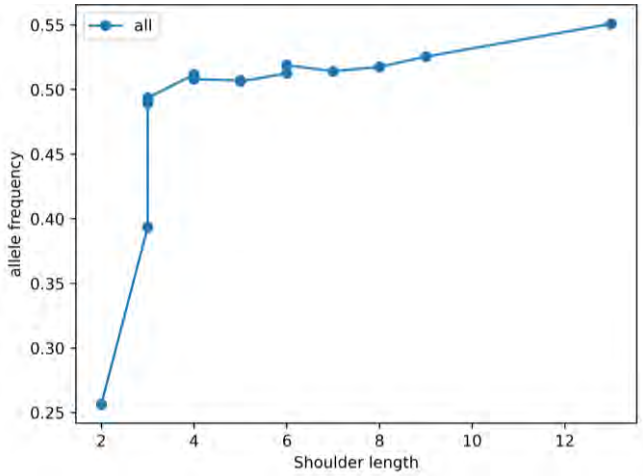
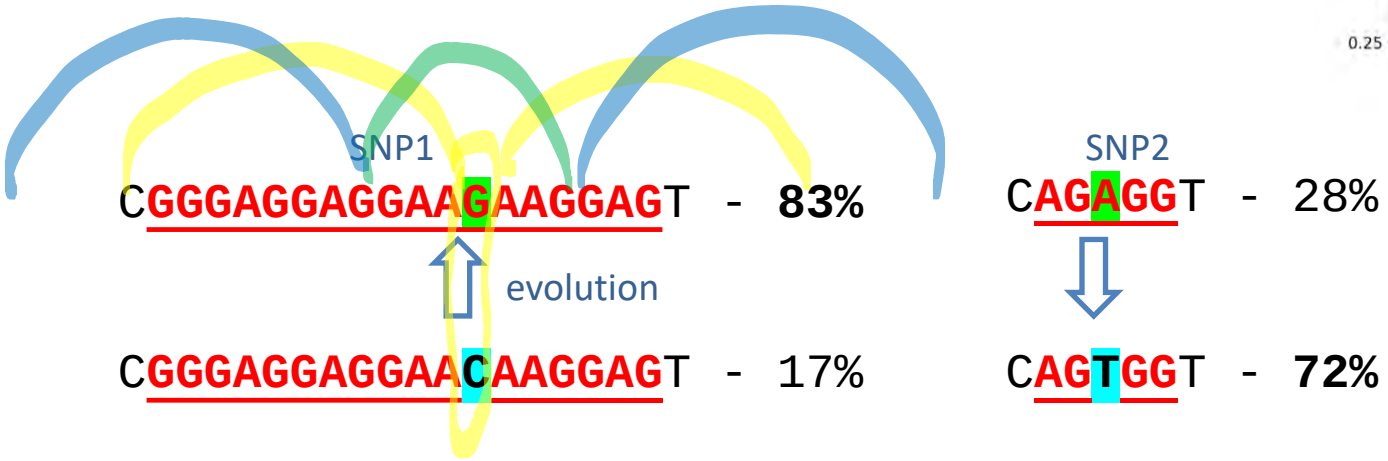
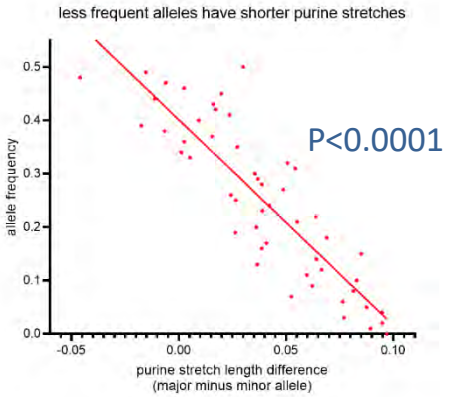
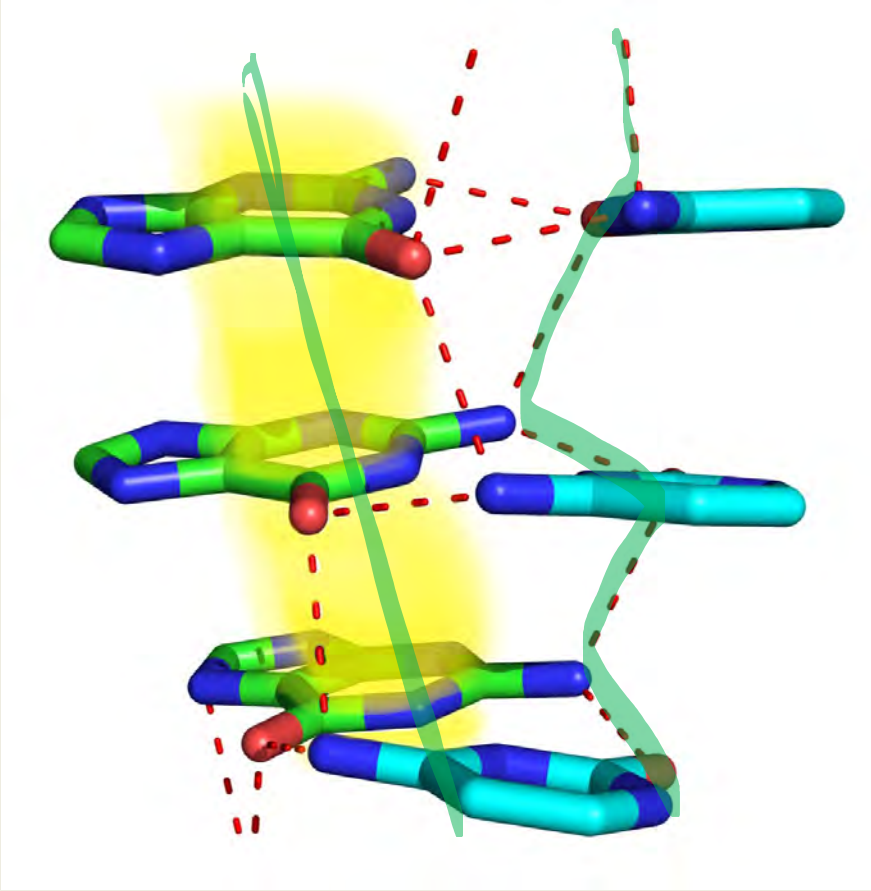






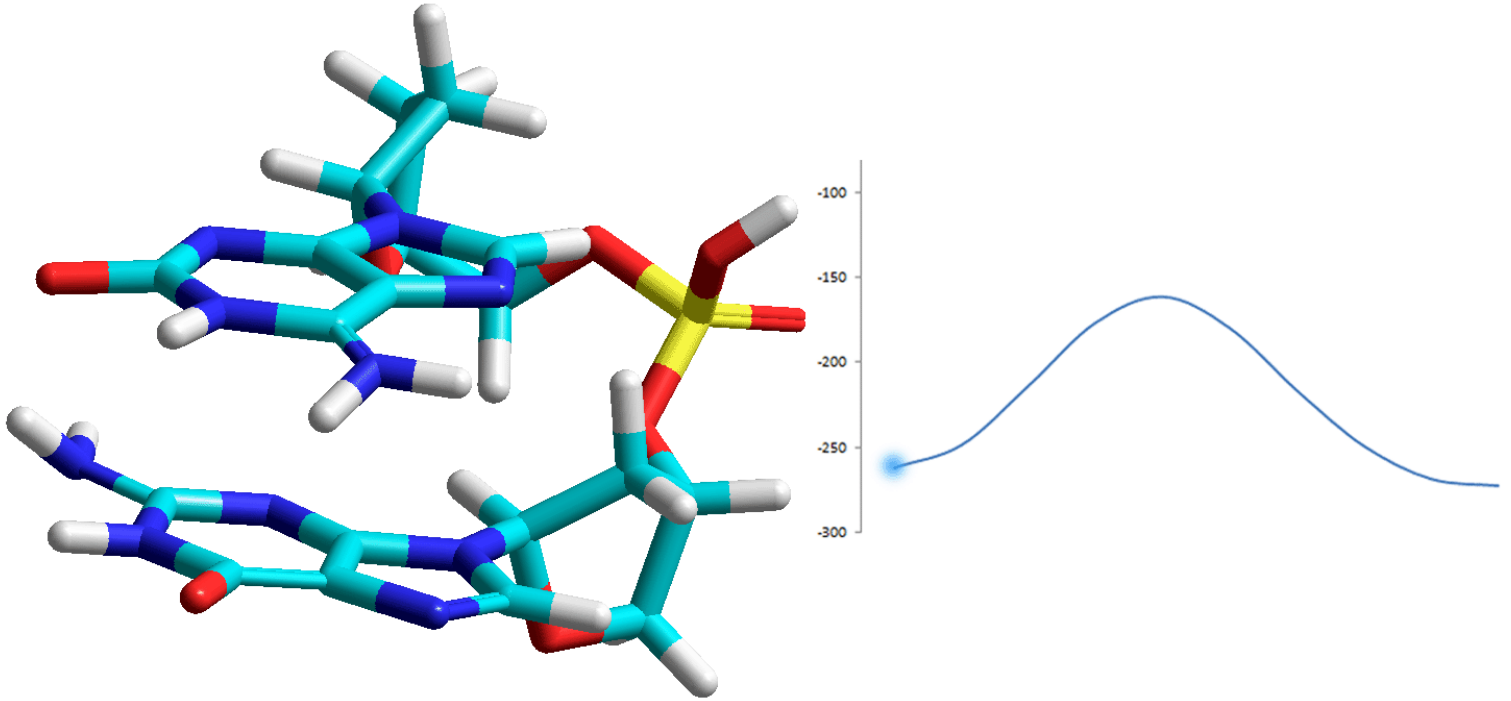
Longer purine stretches evolve longer and shorter stretches evolve shorter

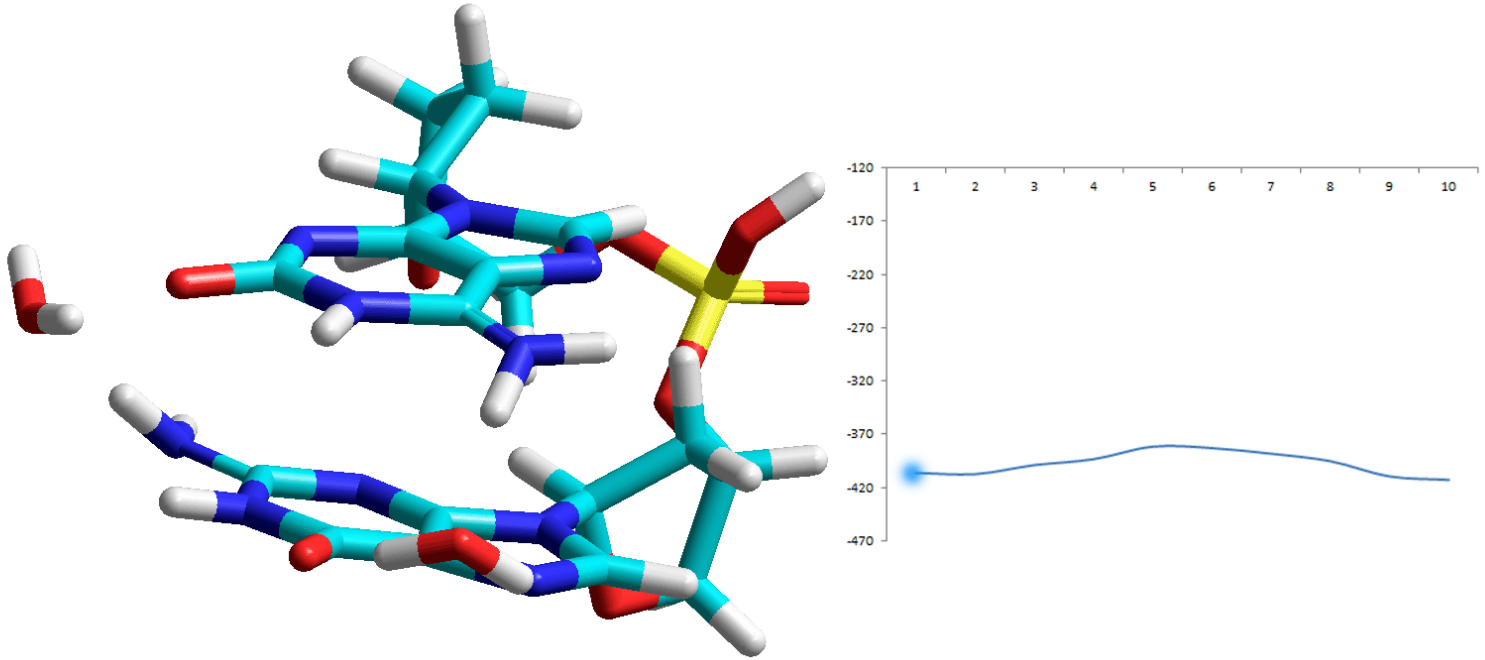
Suggesting biological function of longer stretches – oscillators



Water structures in DNA groves

Does water mediate longitudinal proton jumping in DNA?





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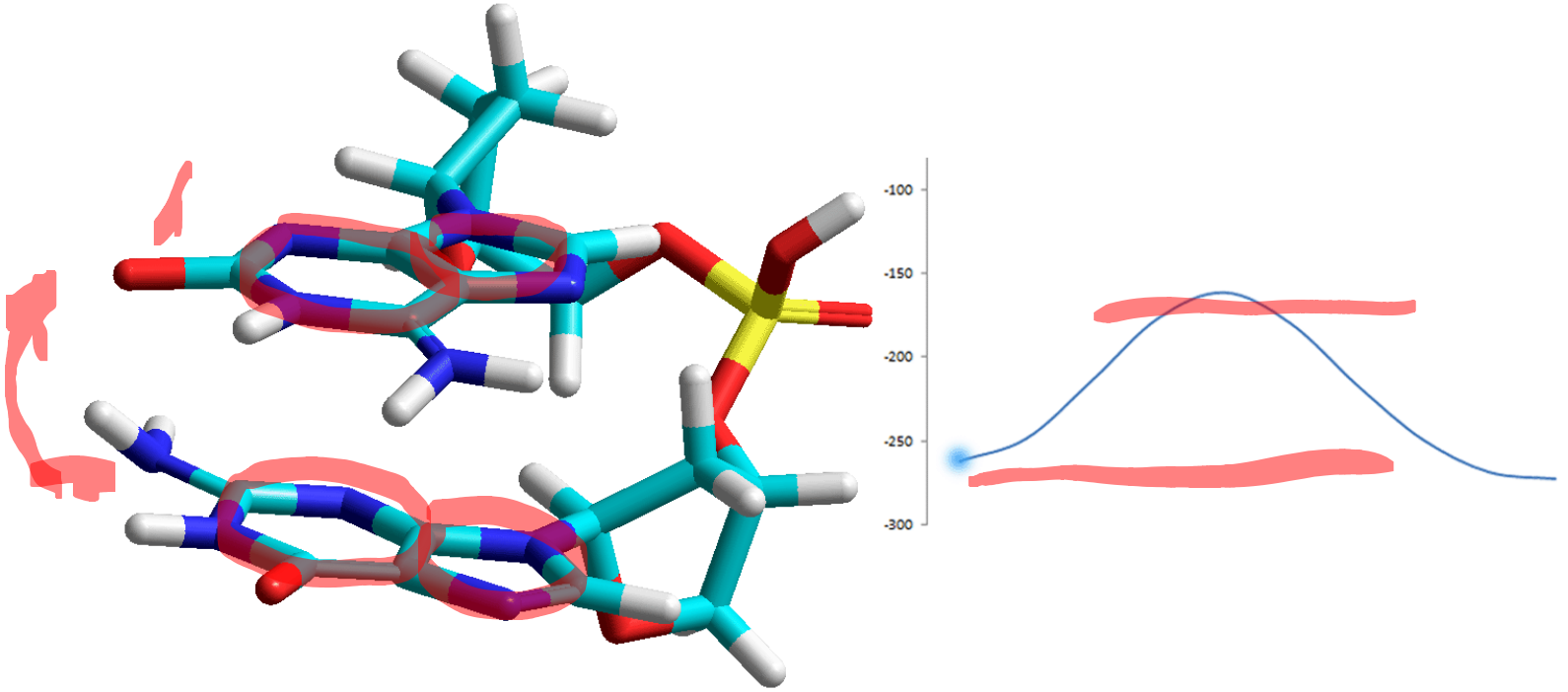
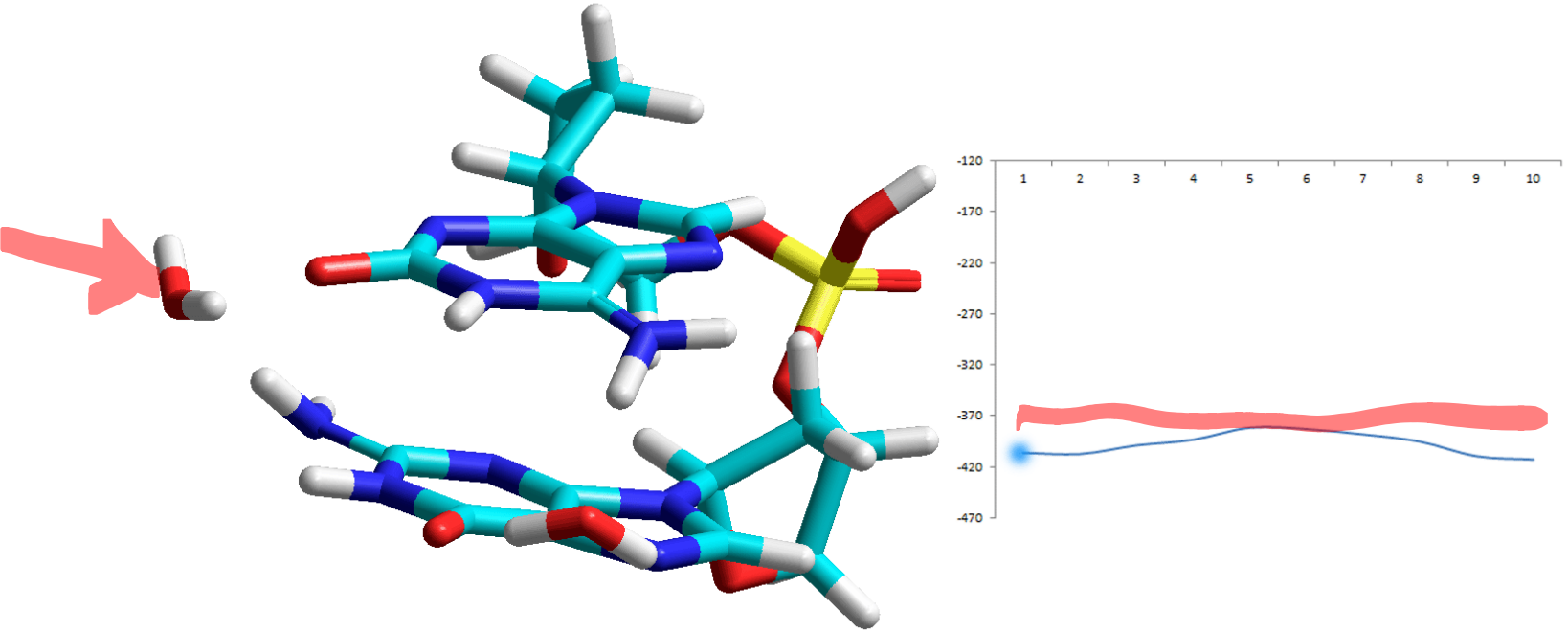
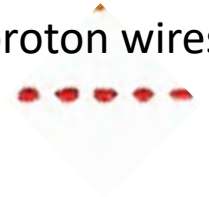


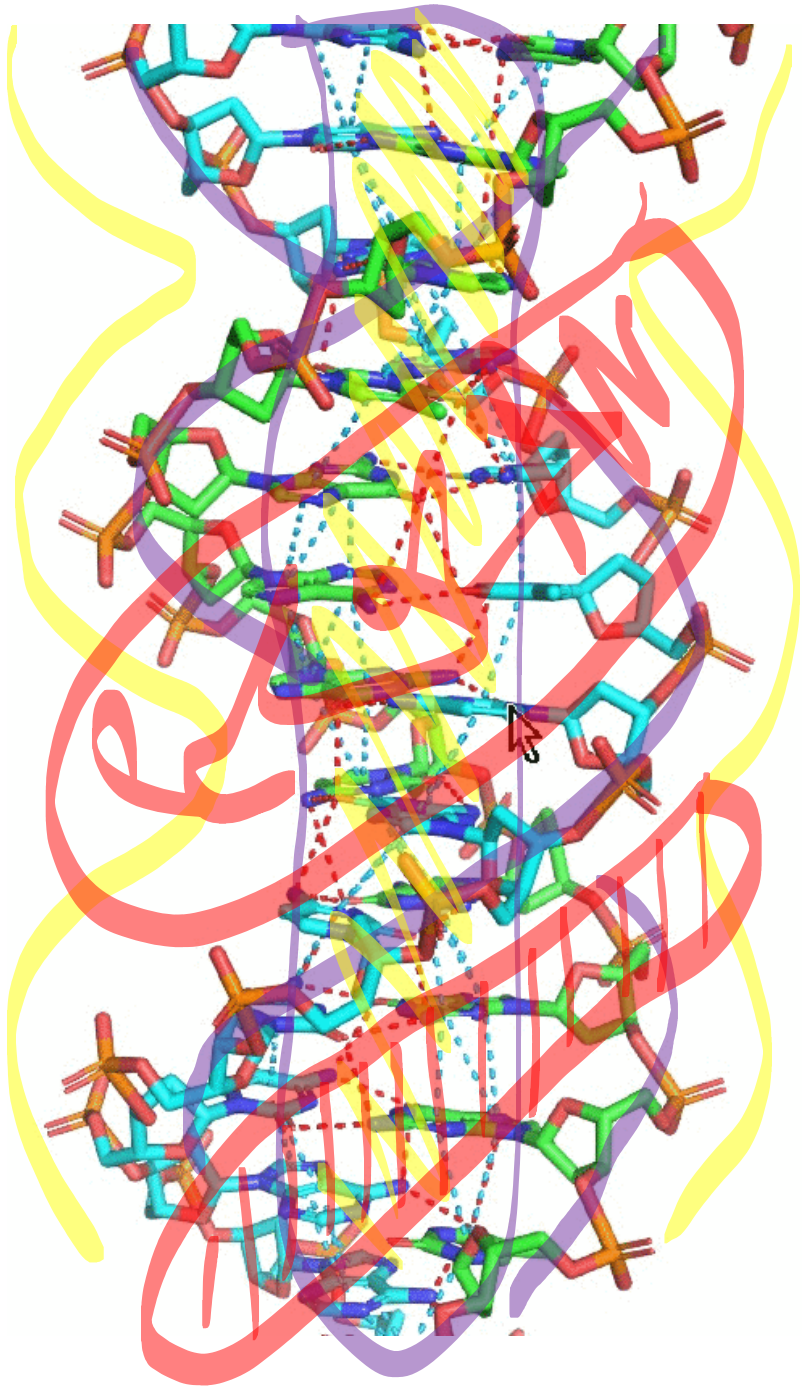


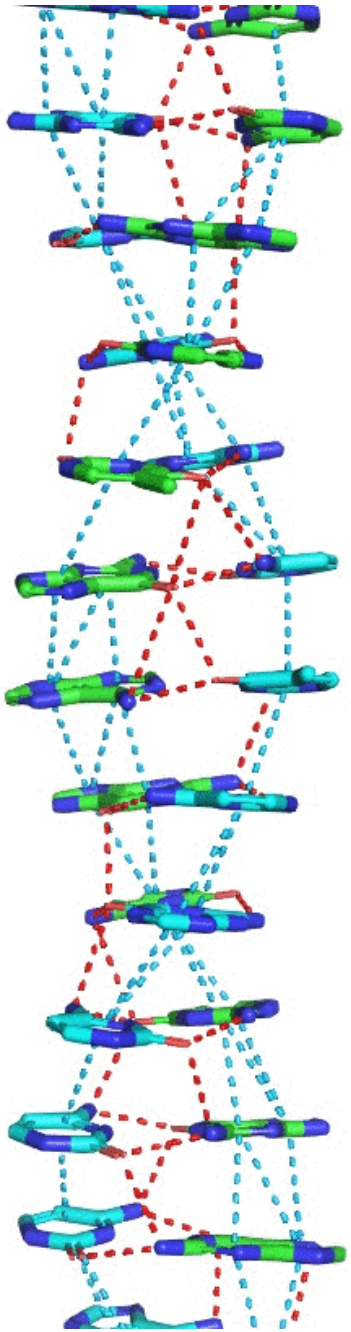
3.7A cutoff
for h-bonds

electron wires

proton wires







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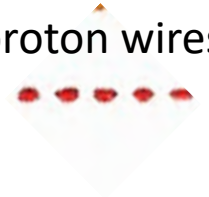

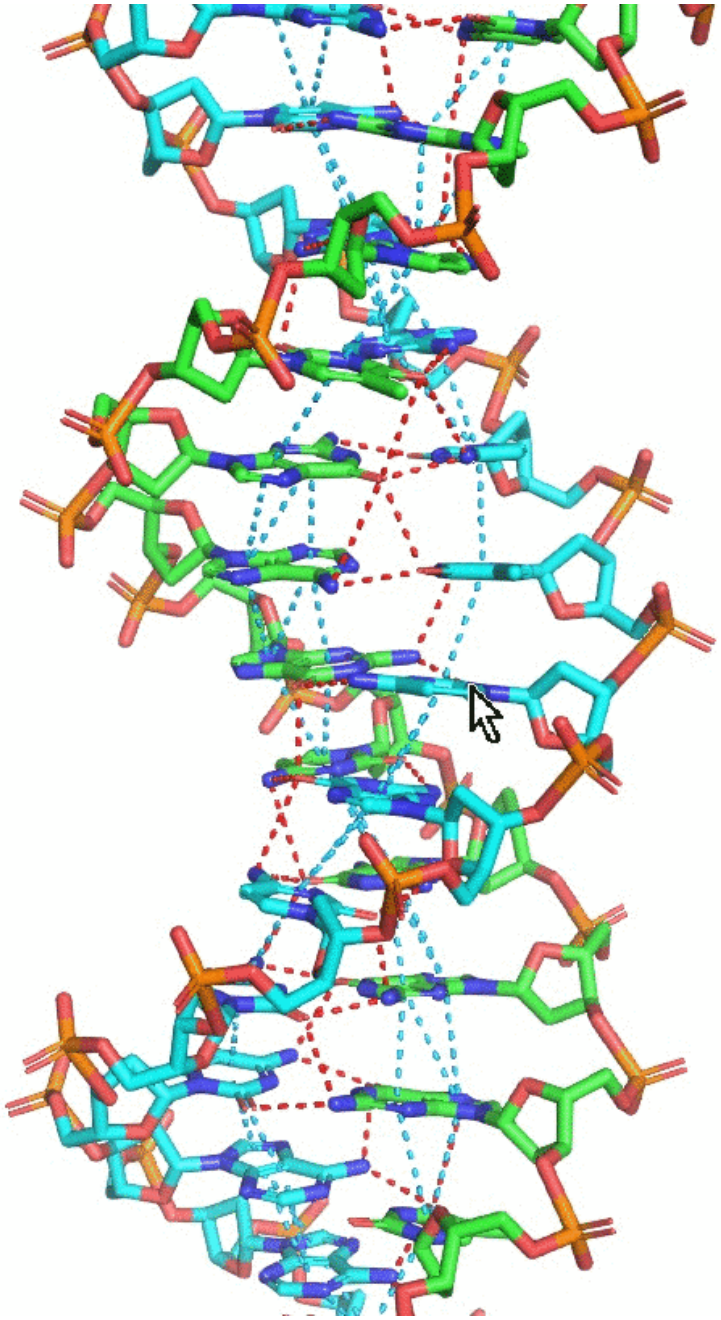

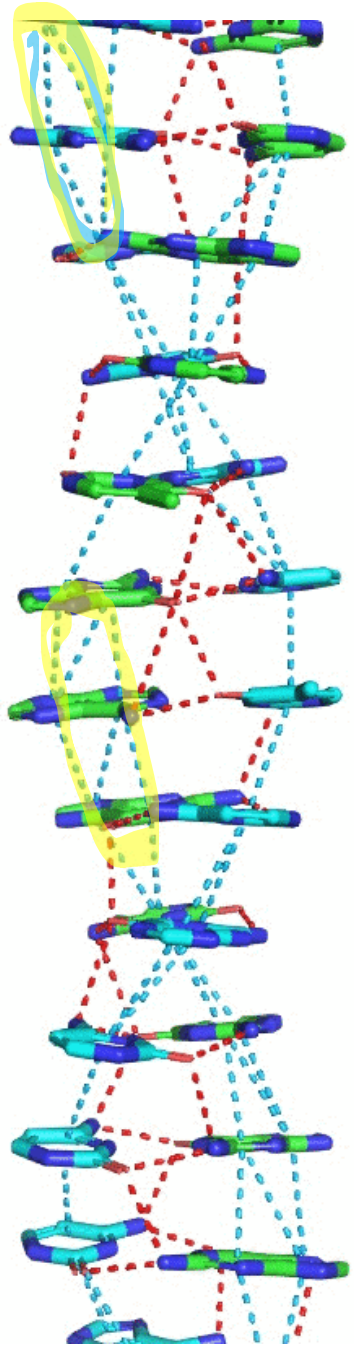

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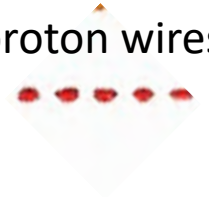

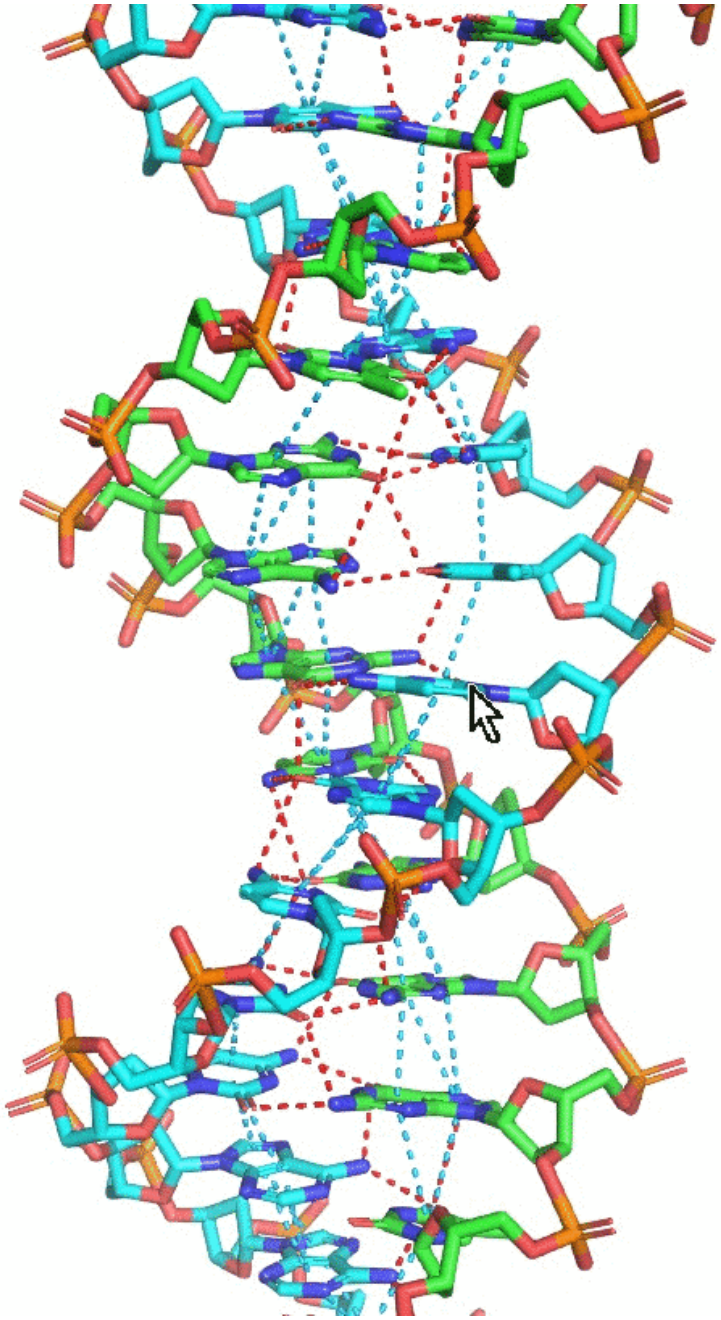

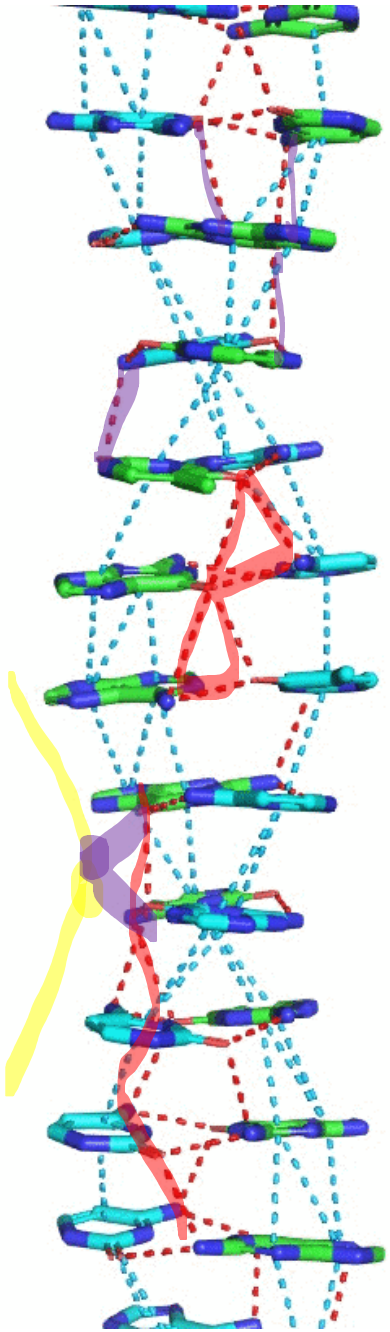

7.5A cutoff
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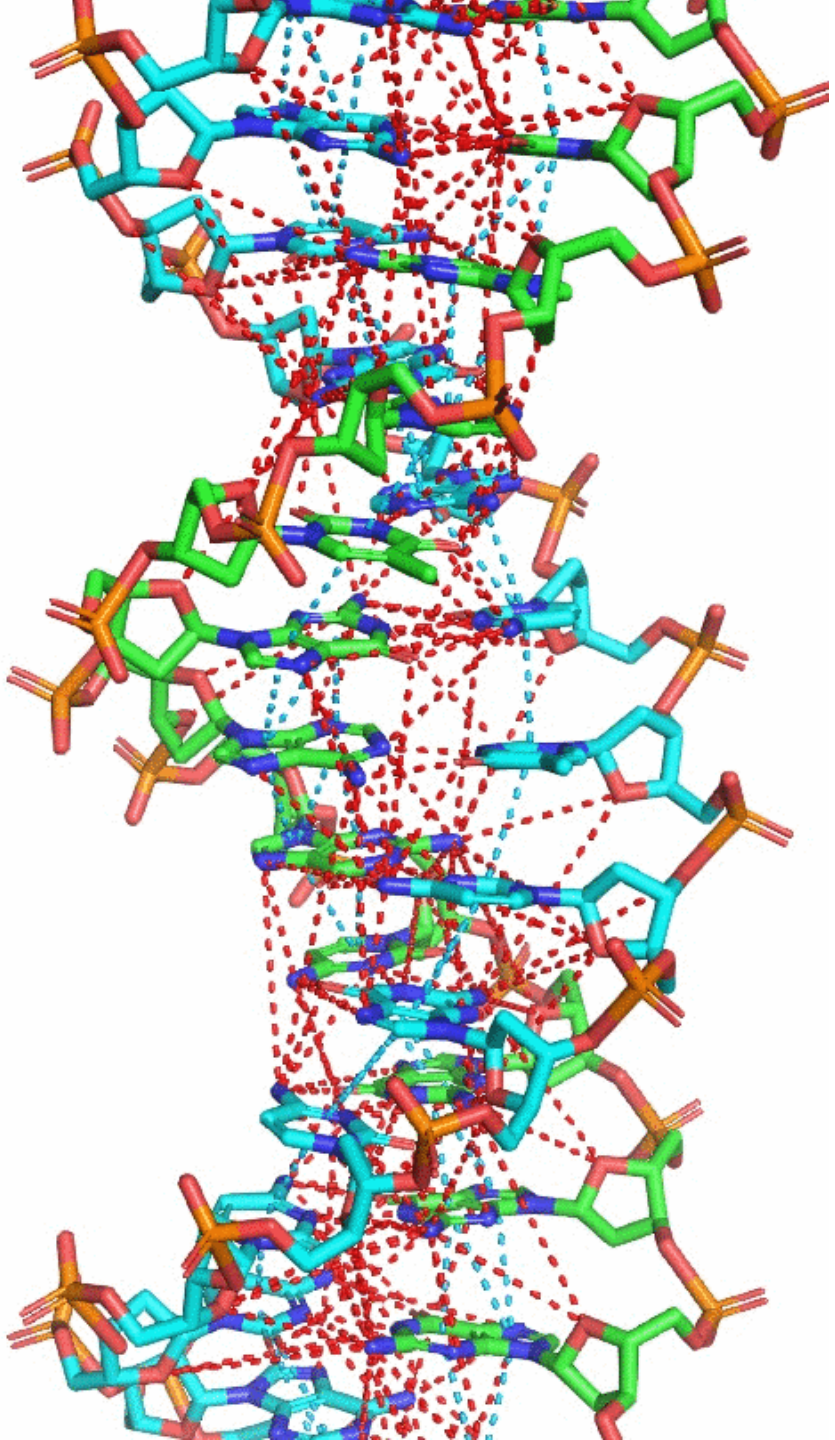

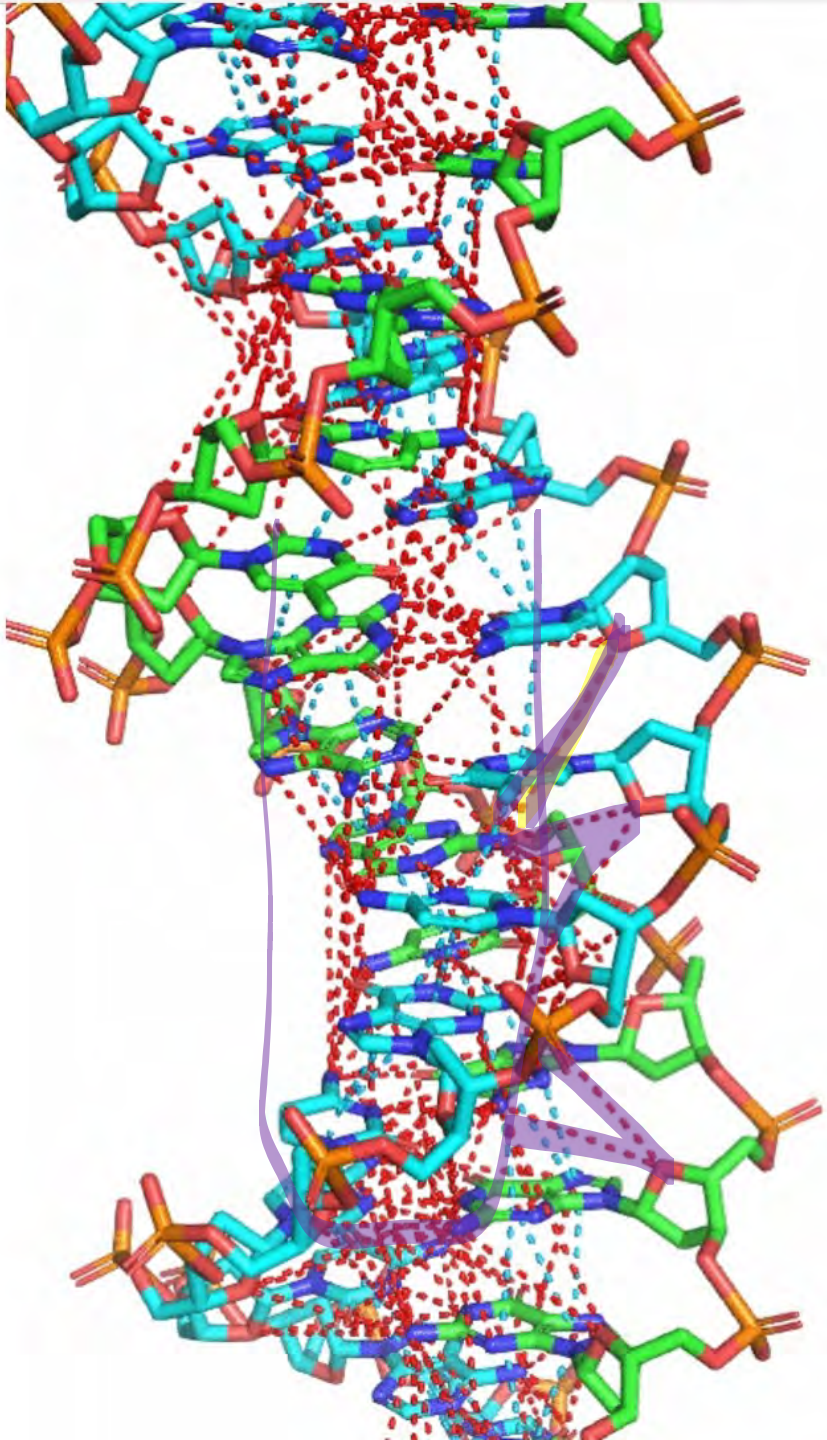

10A cutoff
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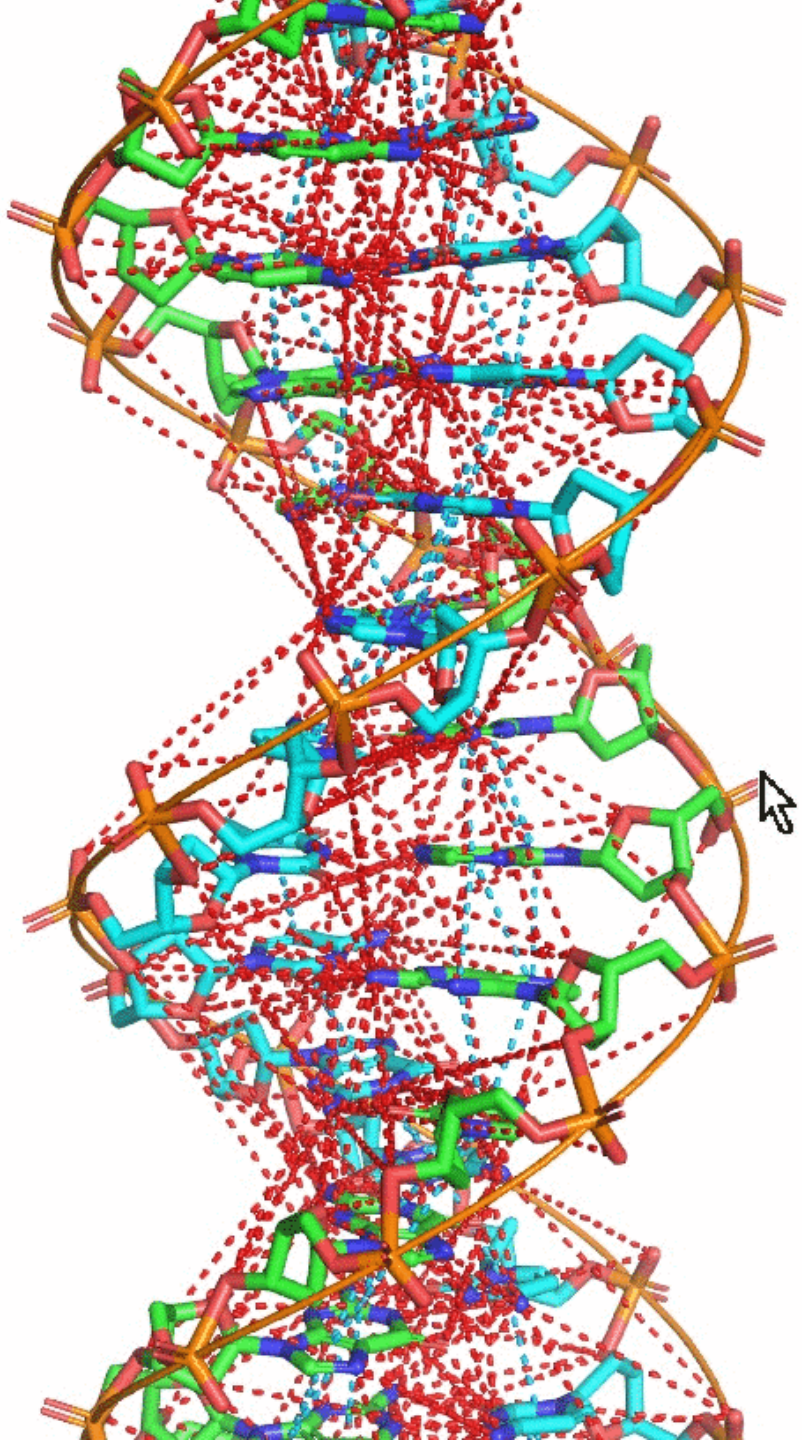

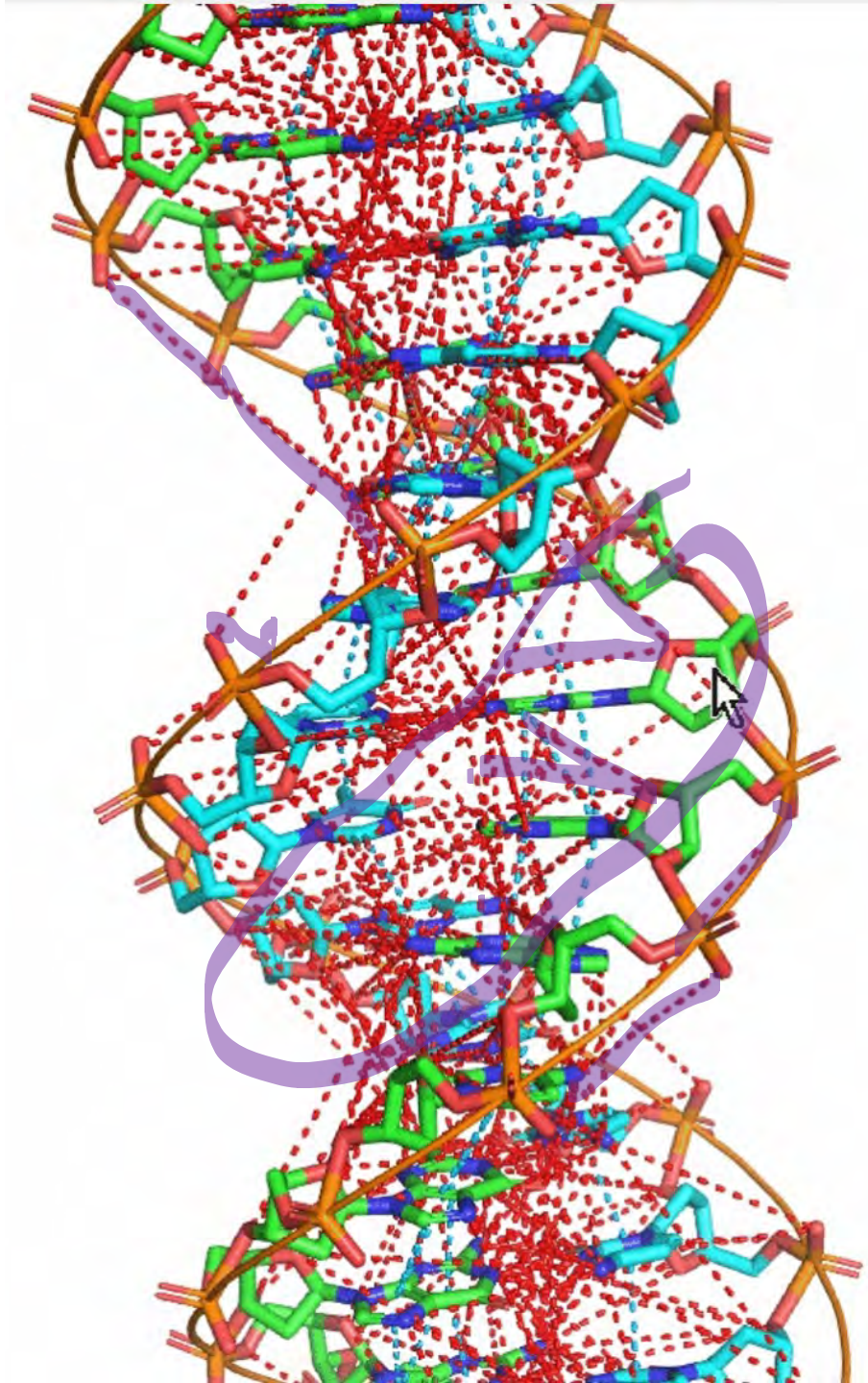

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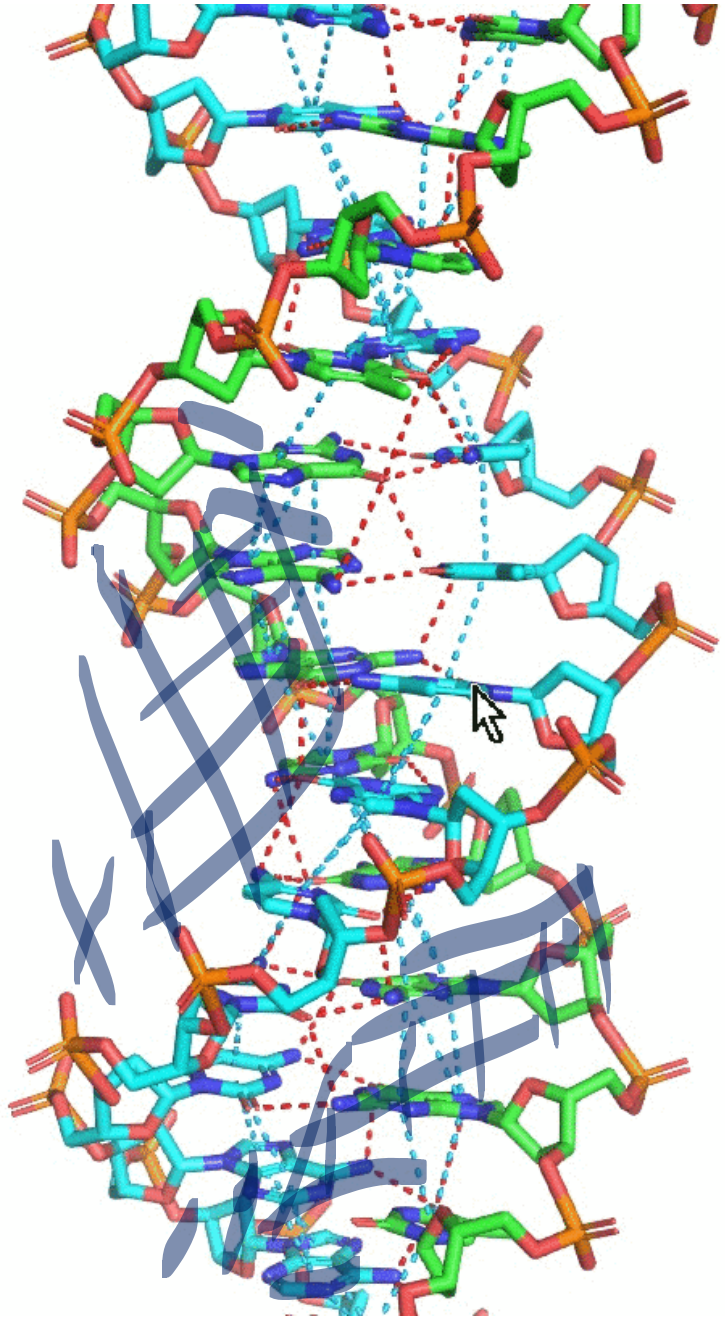
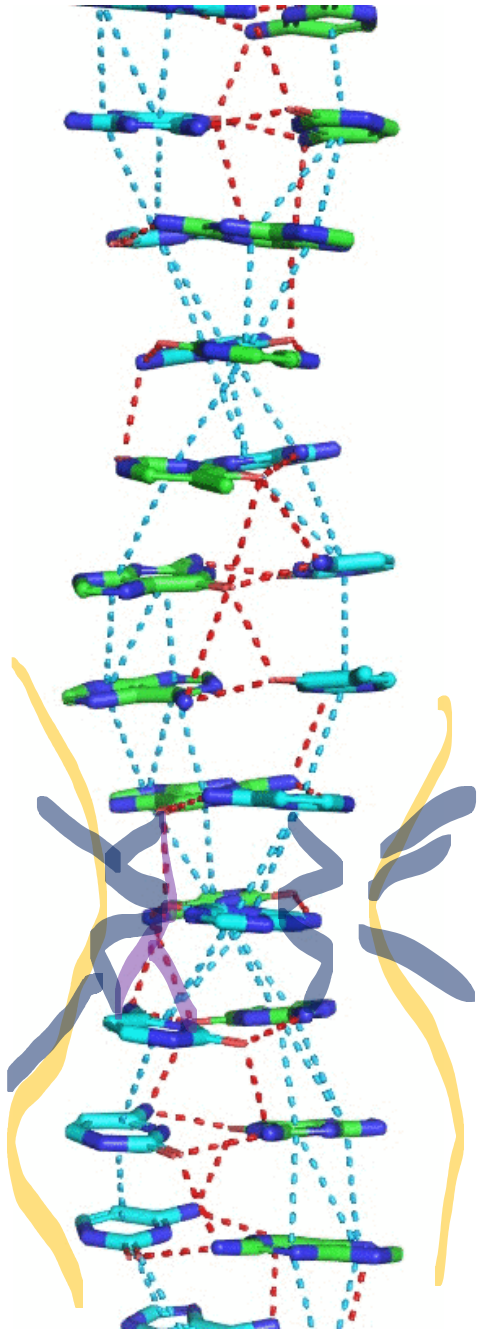
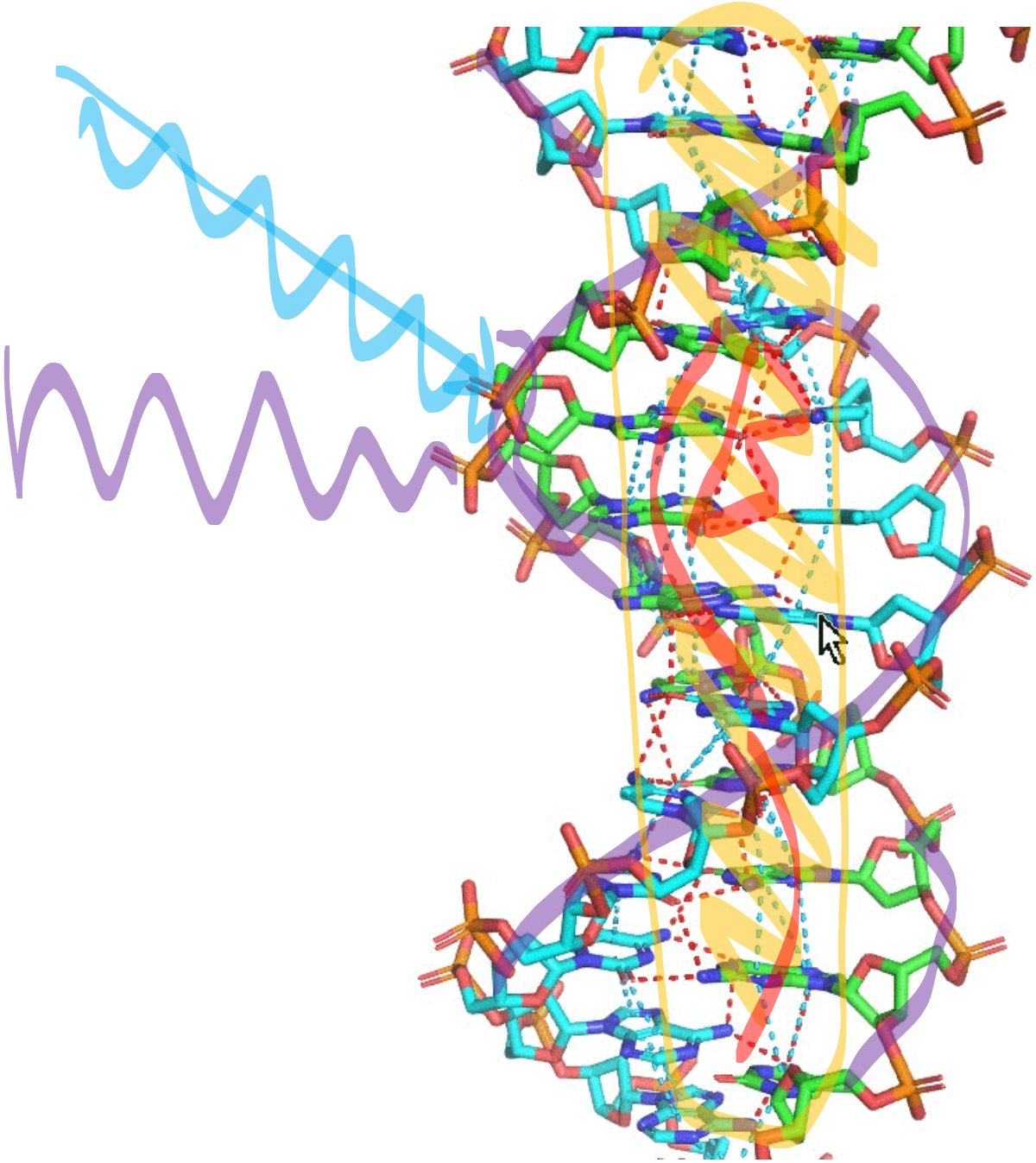
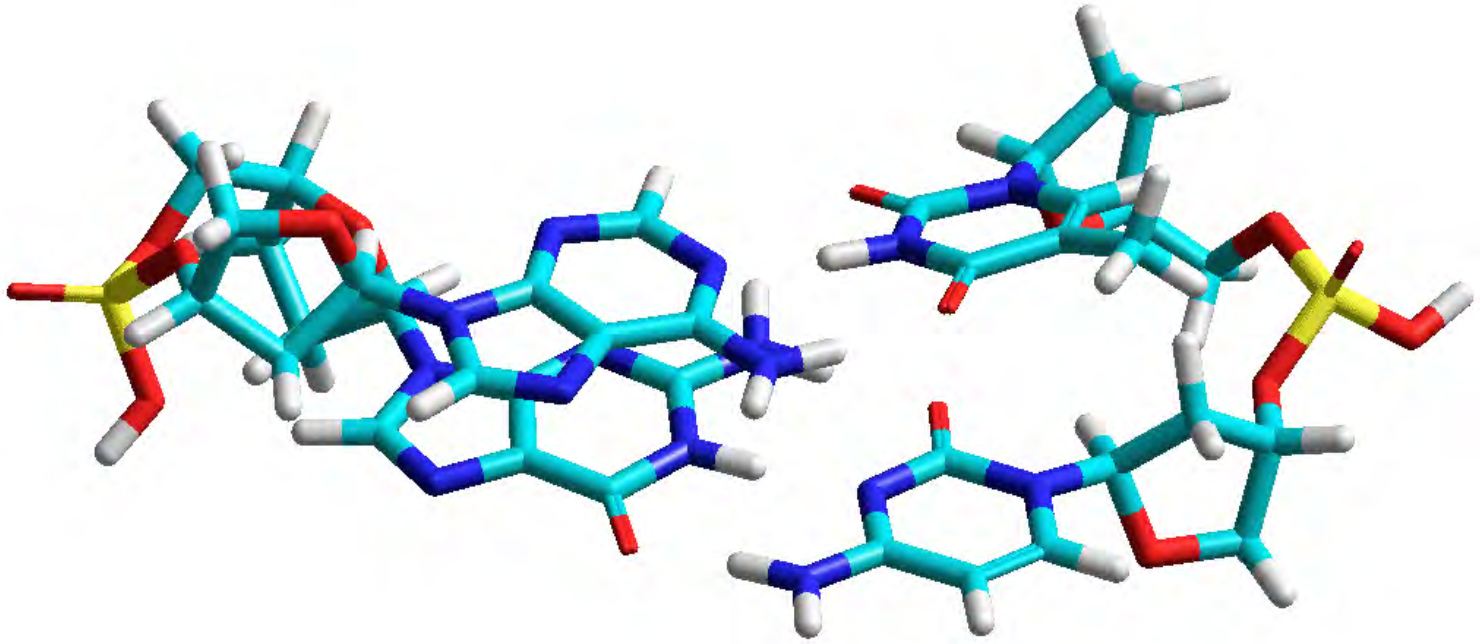




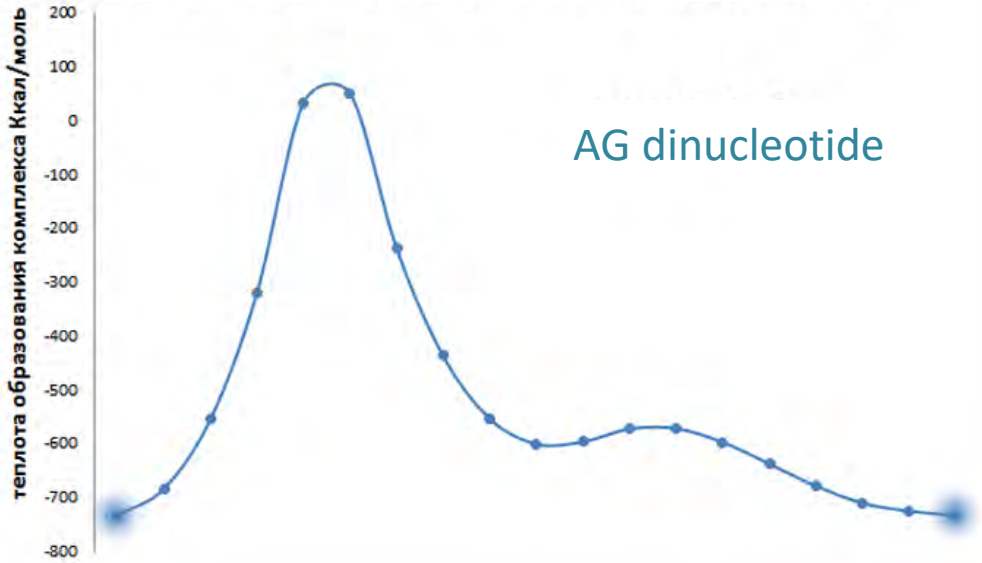
What is the physical nature of DNA resonance?



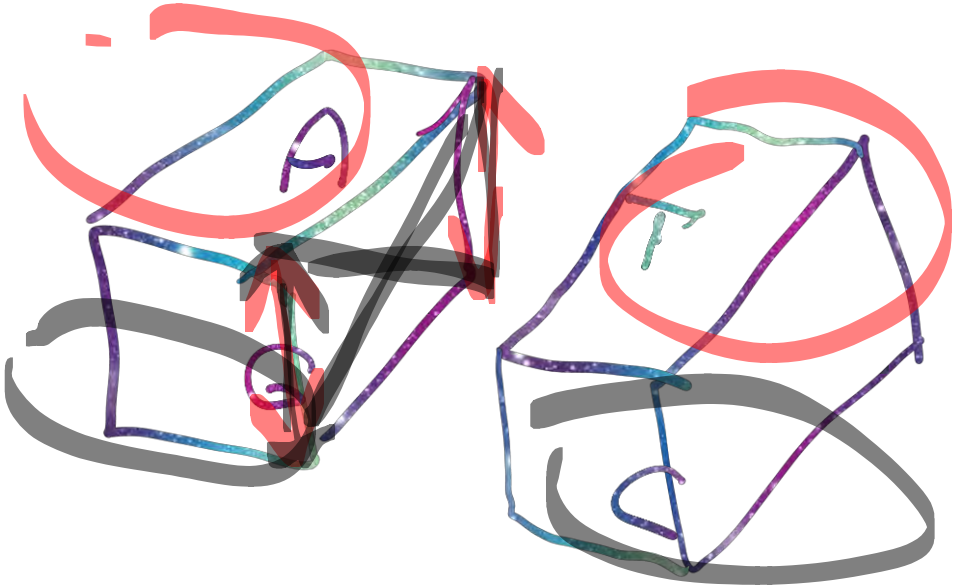
Closed-loop proton jumps obey neutrality requirement

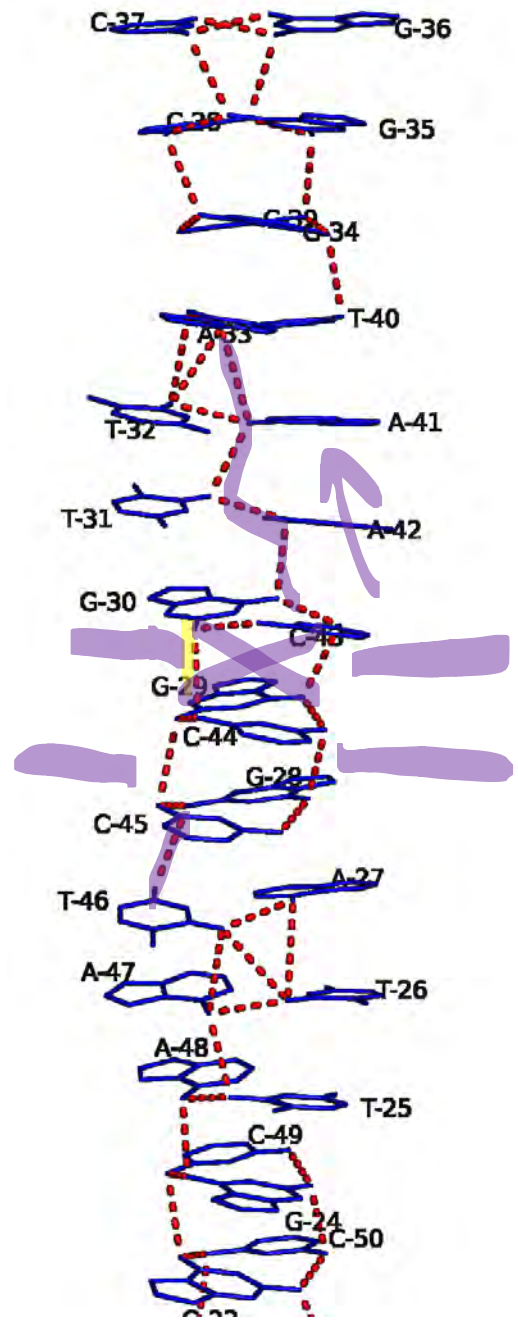


Tautomer transition energy

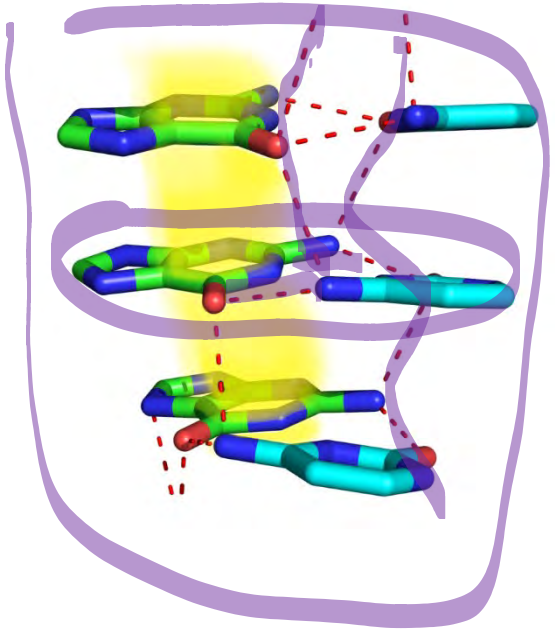


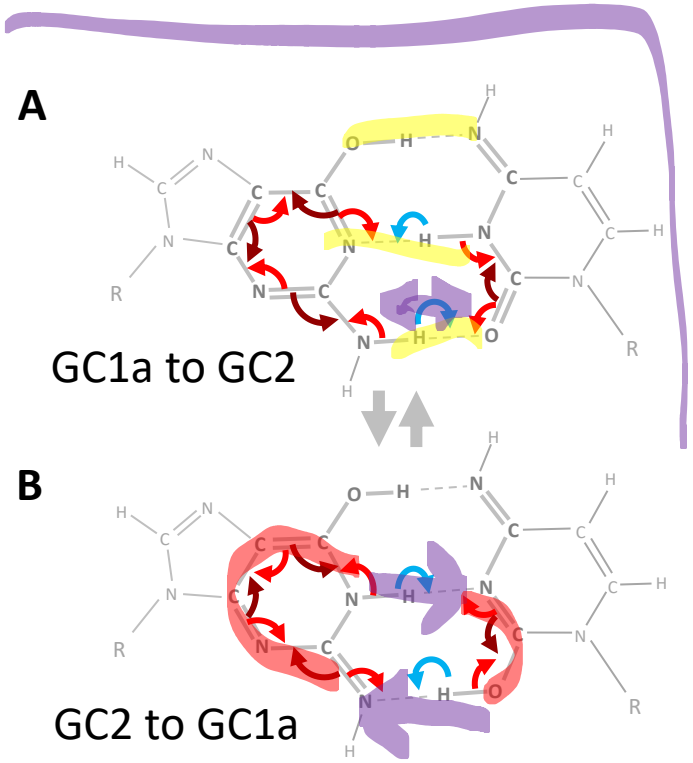
AG dinucleotide

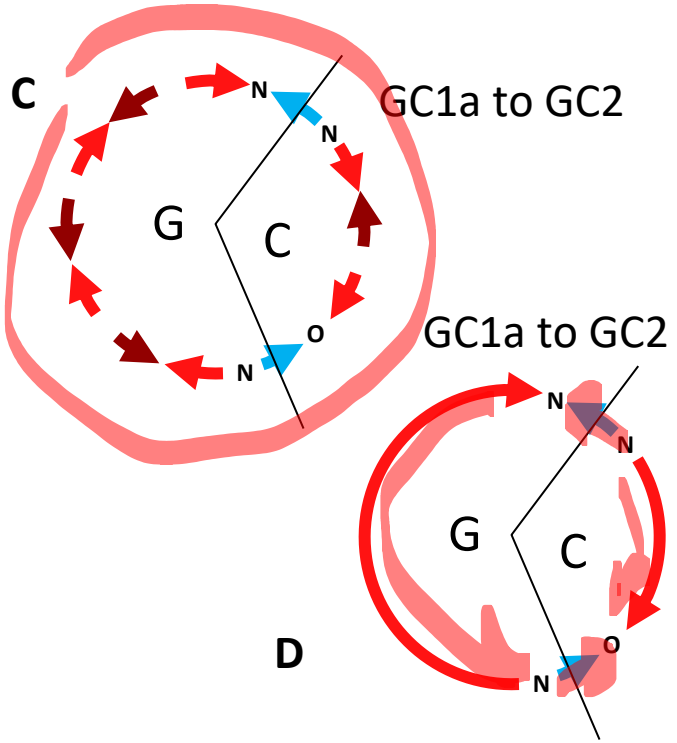



C-37
G-36
G-35
G-34
T-40
A-33
T-32
A-41
T-31
A-42
G-30
G-29
C-44
G-28
C-45
A-27
T-46
A-47
T-26
A-48
T-25
C-49
G-24
C-50

Oscillations of protons in tautomers and the requirement of neutrality

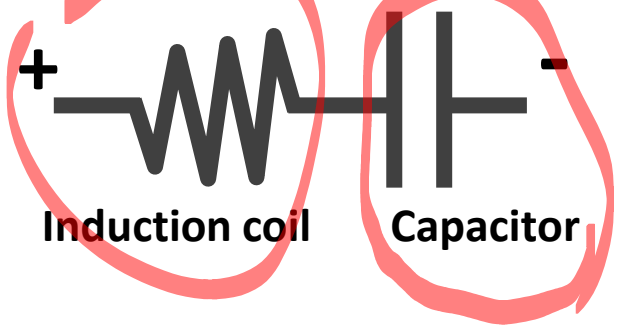


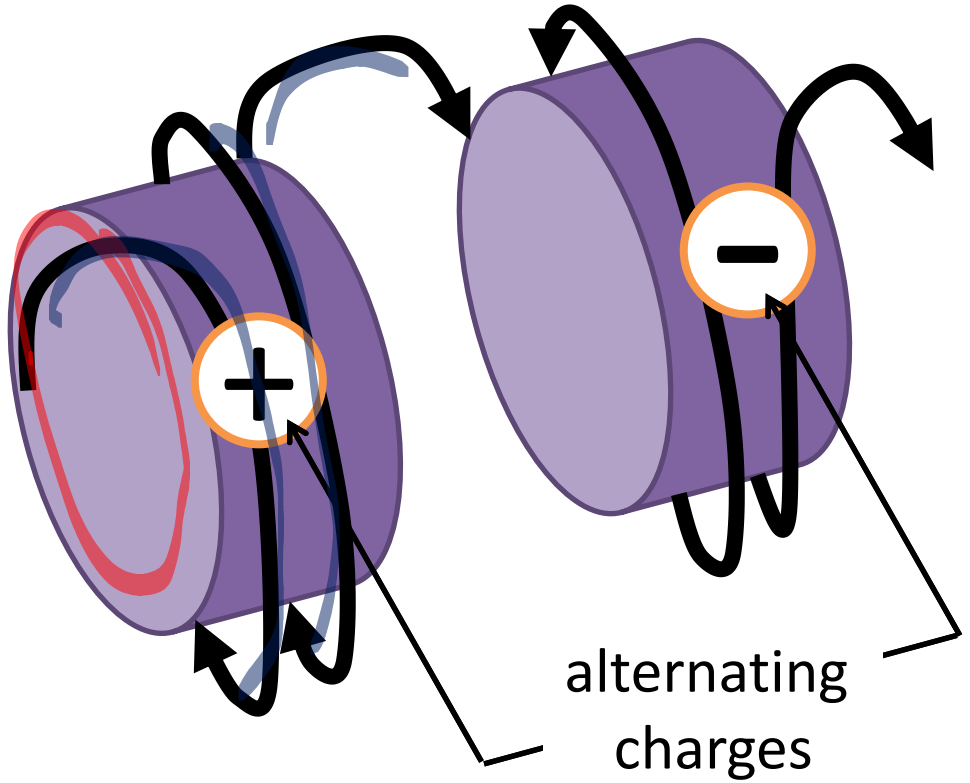




The dinucleosome as an LC circuit

Traditional electronic oscillator

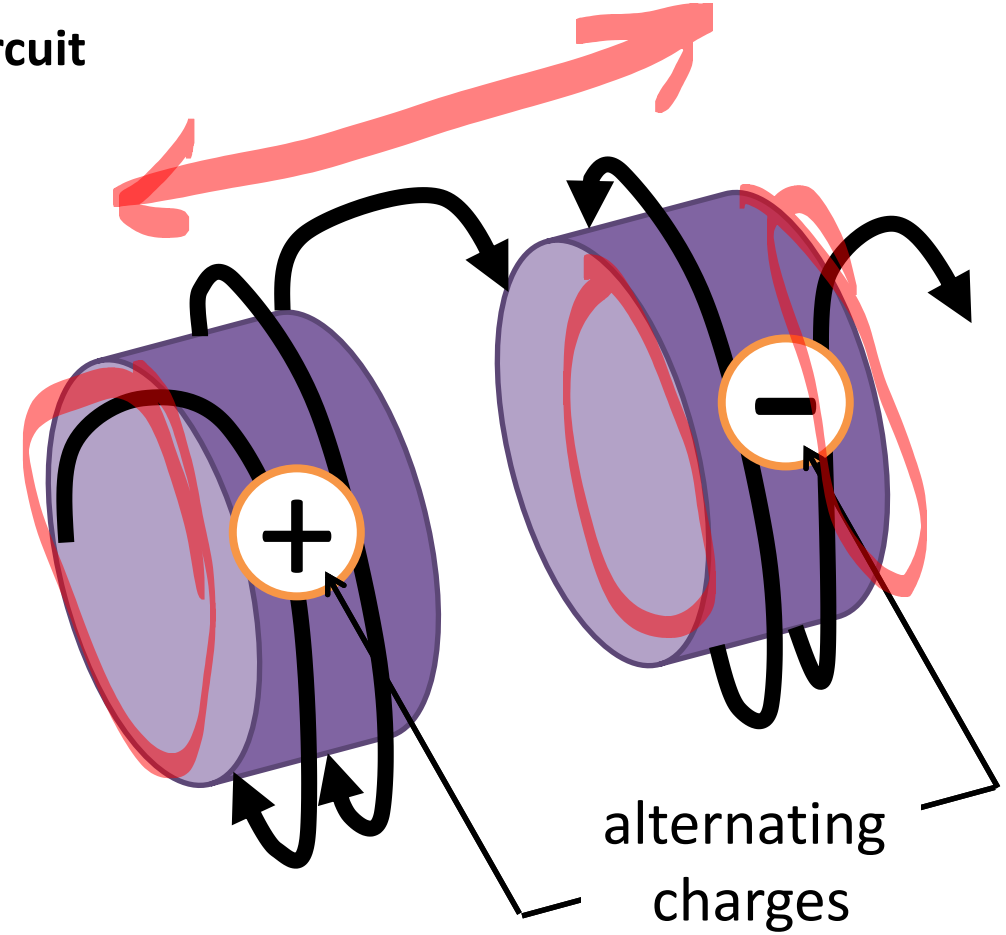




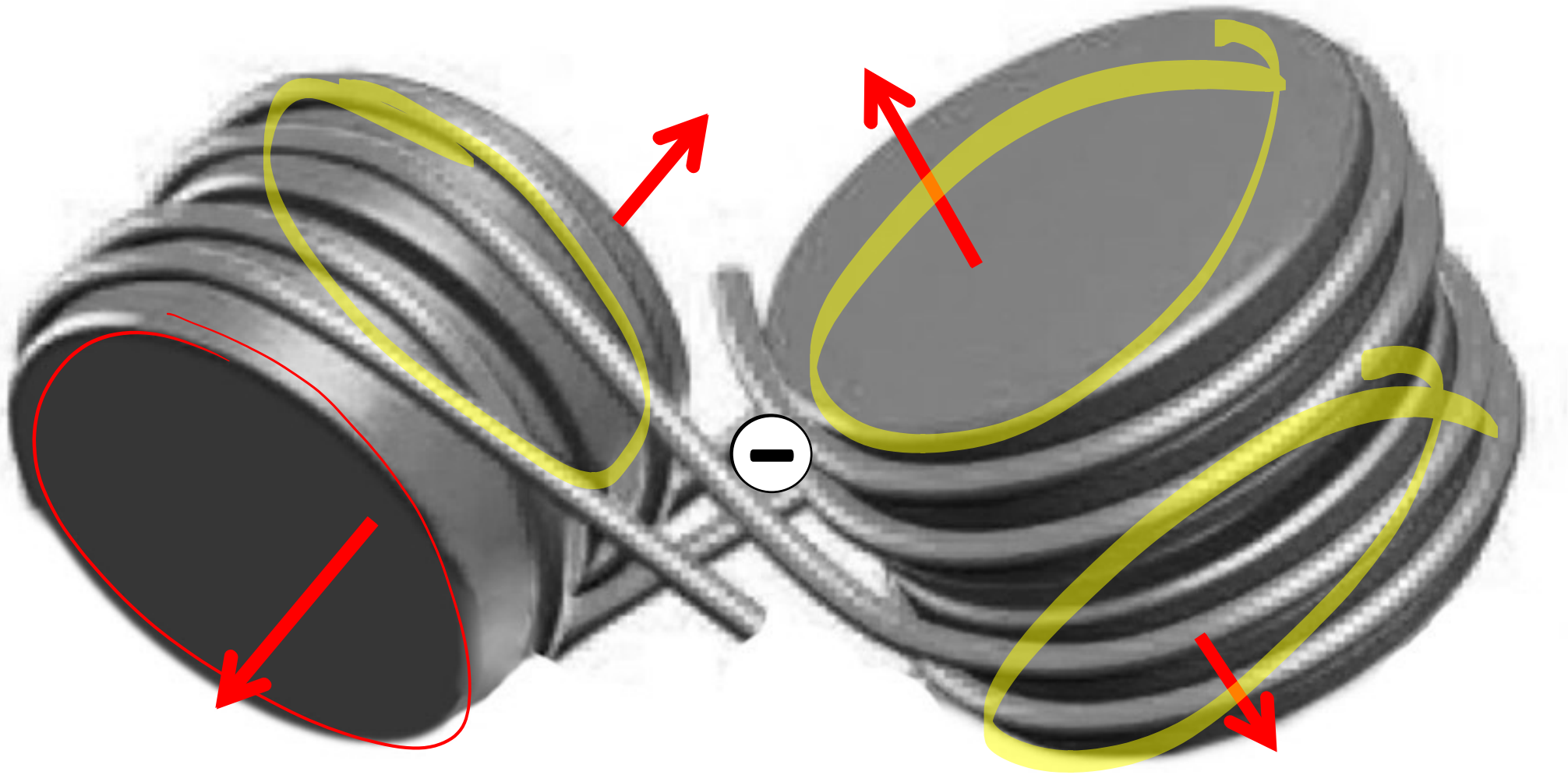
The dinucleosome as an LC circuit

Traditional electronic oscillator

Induction coil **Capacitor**

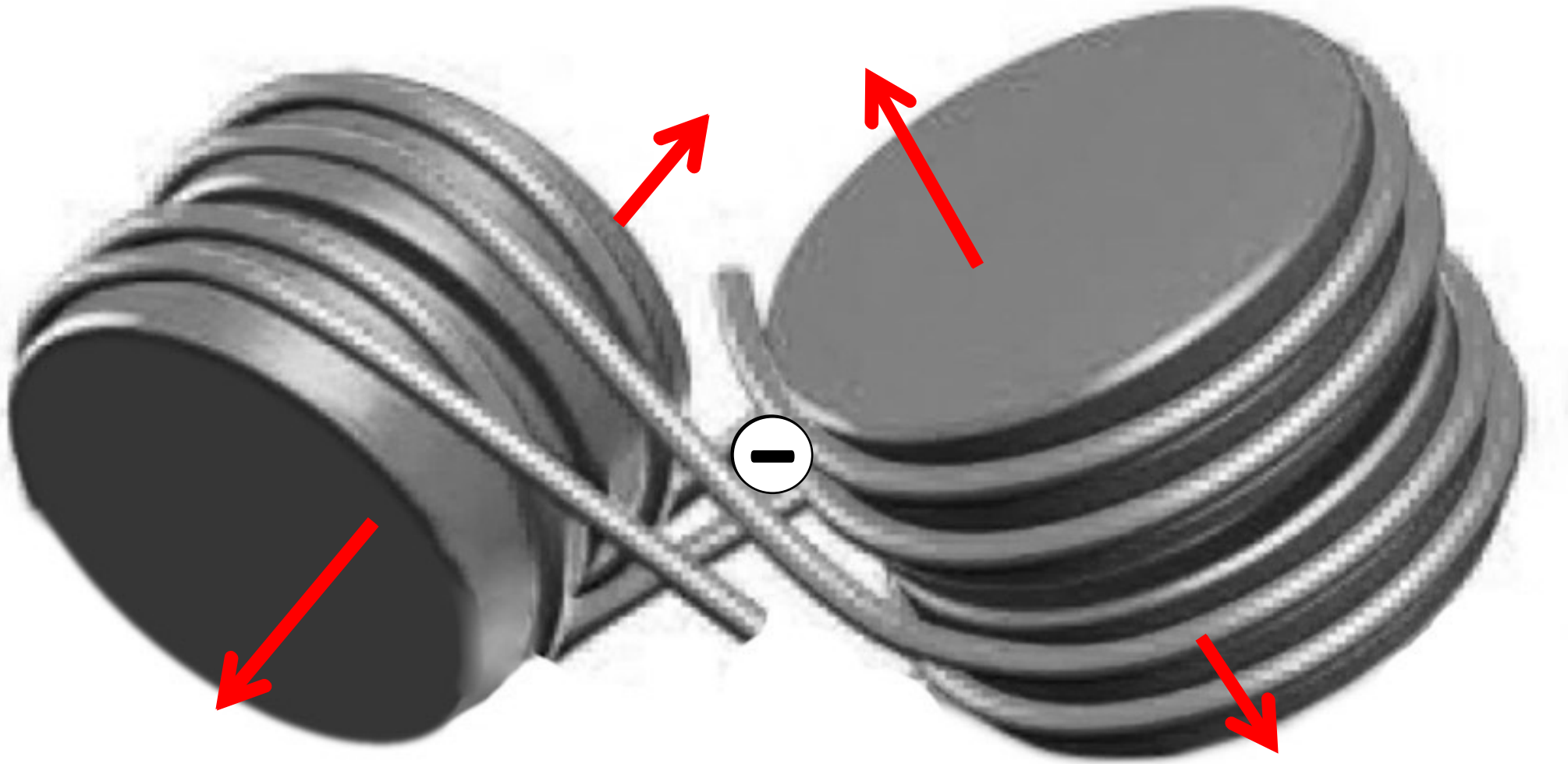


A model of charge oscillations in tetranucleosomes

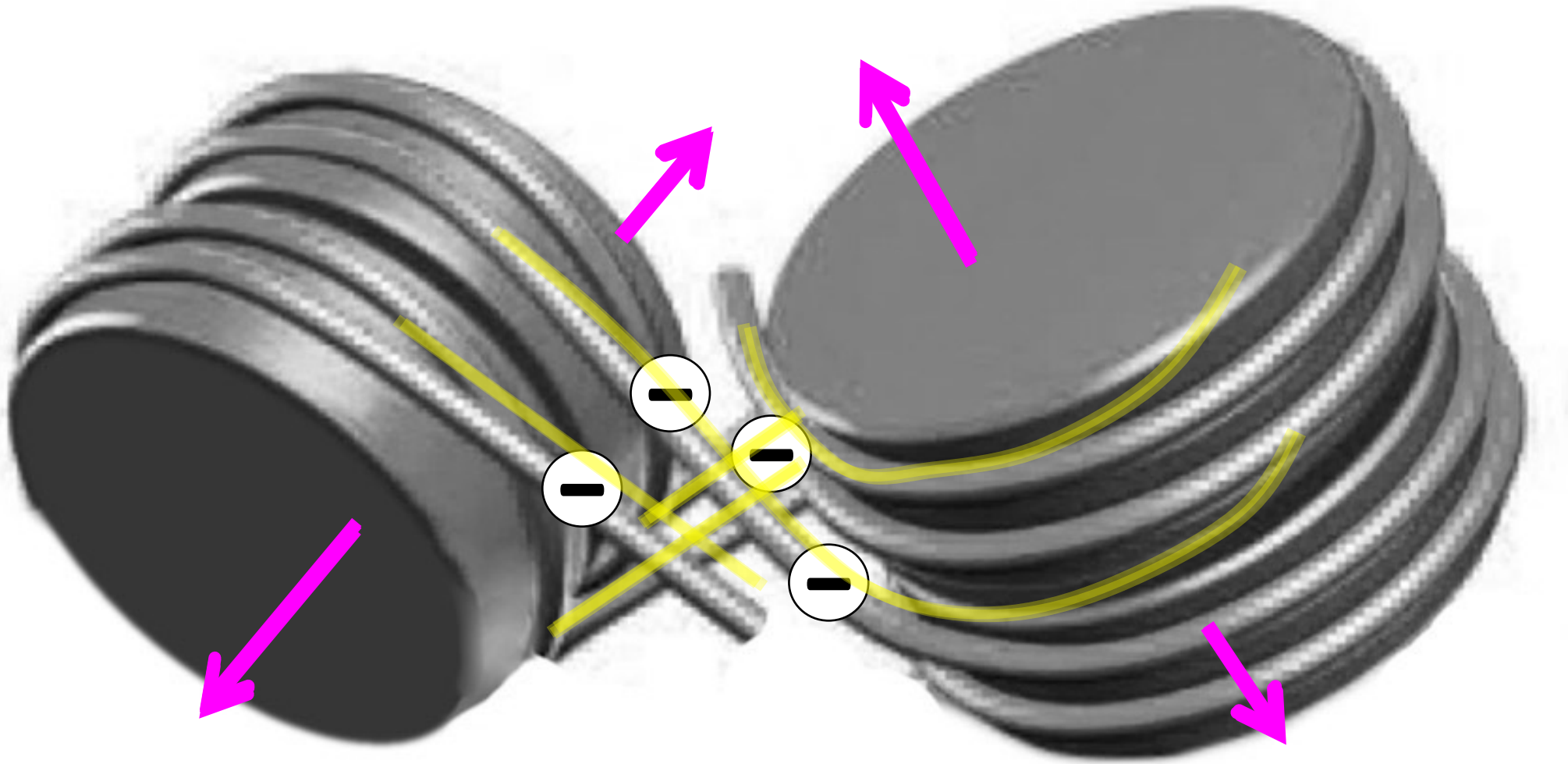


Rempel 2017
PMID: 29294317

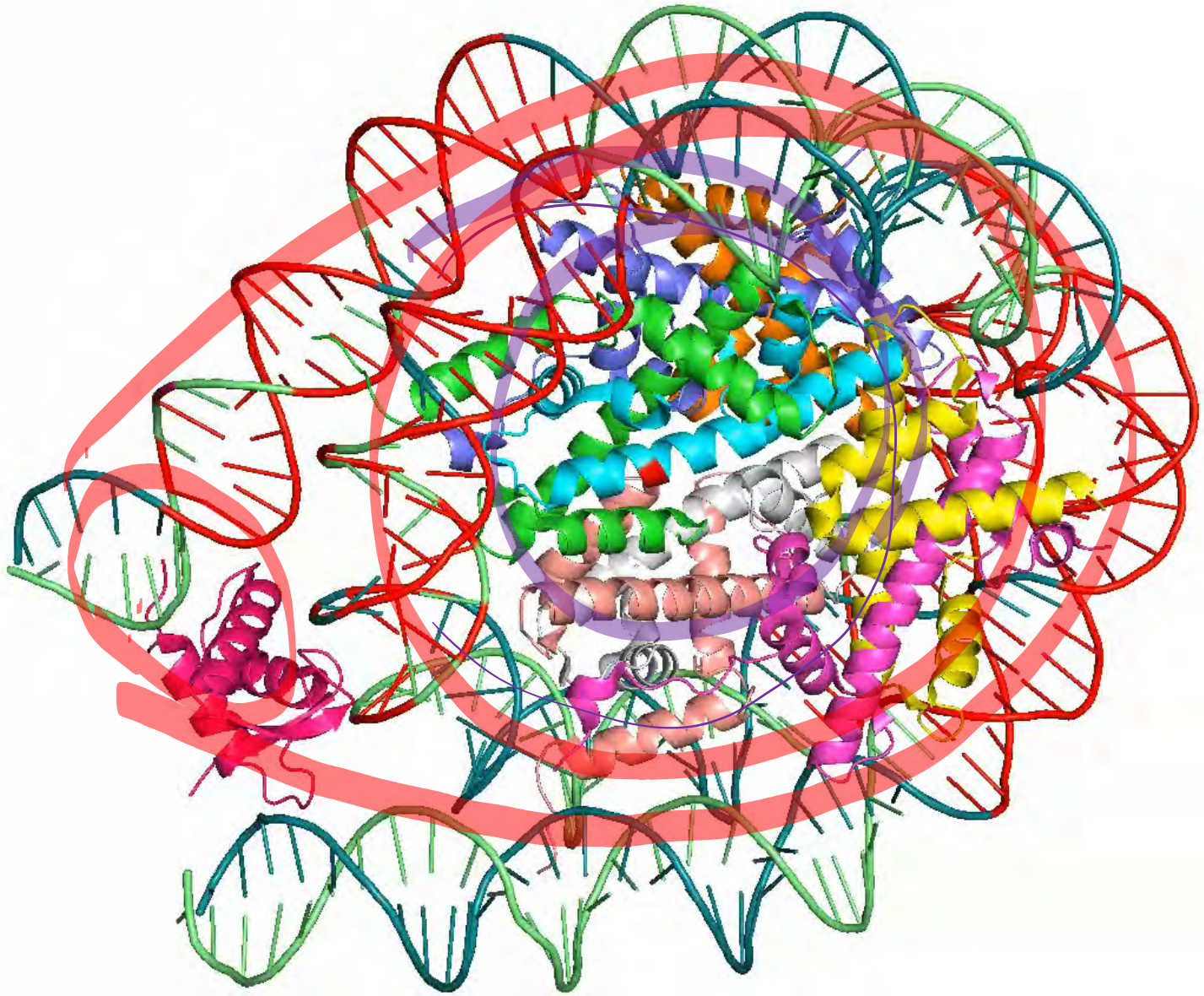
A model of charge oscillations in tetranucleosomes



Rempel 2017
PMID: 29294317



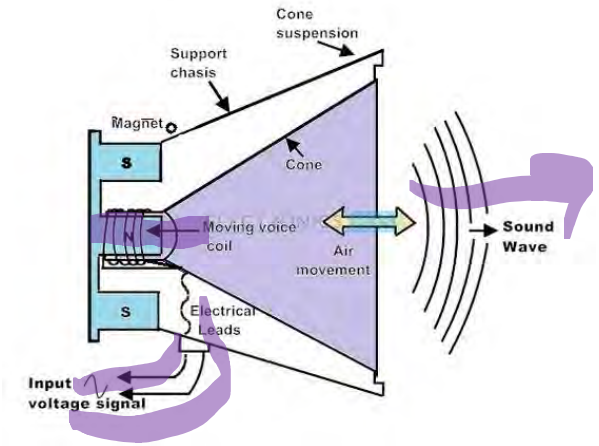
Rempel 2017
PMID: 29294317



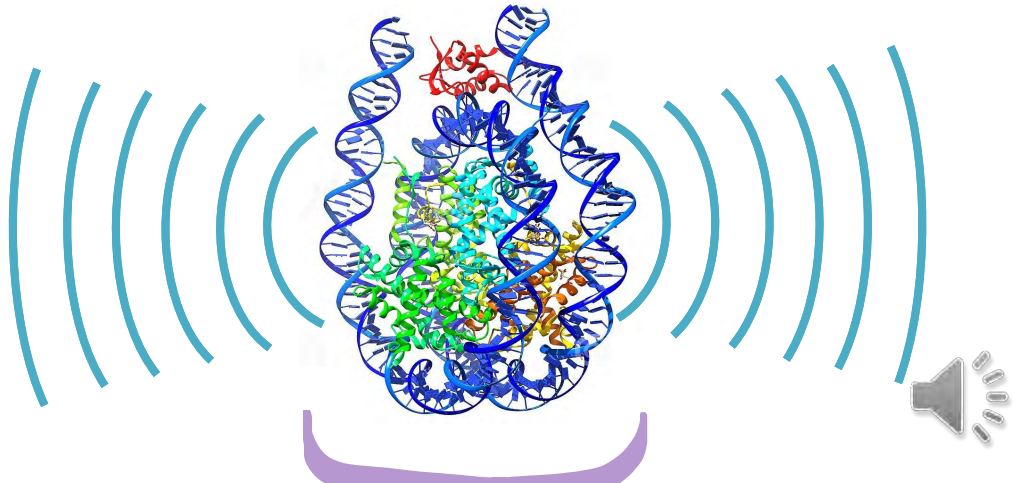
1.6

light wavelength	frequency	sound wavelength	
1.5 mm	150 GHz	10 nm	nucleosome diameter
3.6 mm	63 GHz	24 nm	tetranucleosome width
3.7 mm	60 GHz	25 nm	millimeer wave therapy frequency
4.2 mm	53 GHz	28 nm	mm wave therapy, chromatin fiber diam.
5.3 mm	42 GHz	36 nm	millimeer wave therapy frequency
7.5 mm	30 GHz	50 nm	millimeer wave therapy frequency
1.5 cm	15 GHz	100 nm	Alu repetitive element, 300 bp
3.74 cm	6 GHz	250 nm	millimeer wave therapy frequency
15 cm	1.5 GHz	1.0 um	mitochondrion length
30 cm	753 MHz	2.0 um	Line repetitive element, 6 kbp
1.0 m	214 MHz	7 um	mammalian nucleus
3.0 m	75 MHz	20 um	mamallian cell
75 m	3 MHz	500 um	ultrasound imaging frequency
224 m	1 MHz	1.5 mm	ultrasound imaging frequency
2.2 km	100 kHz	1.5 cm	many biological objects
22 km	10 kHz	15 cm	chromosome length
224 km	1 kHz	1.5 m	human height
299 km	750 Hz	2 m	human height and genome length
12742 km	18 Hz	85 m	Earth diameter
28637 km	7.83 Hz	192 m	Schumann resonance frequency

Electroacoustic conversion of wavelengths. Currently, the shortest described wavelength for ultrasound is 250 nm, so the shorter wavelengths are shown in grey as tentative



nucleosome as a speaker



light				sound		
wavelength		frequency		wavelength		
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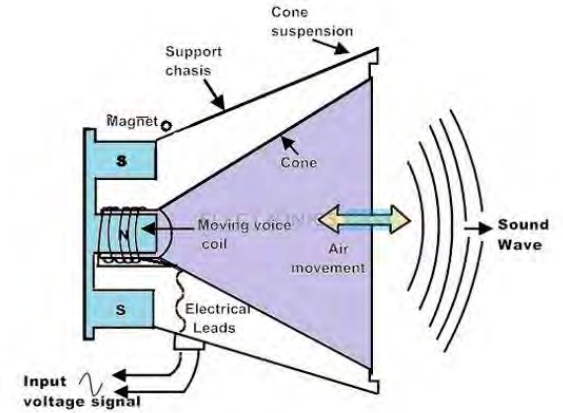
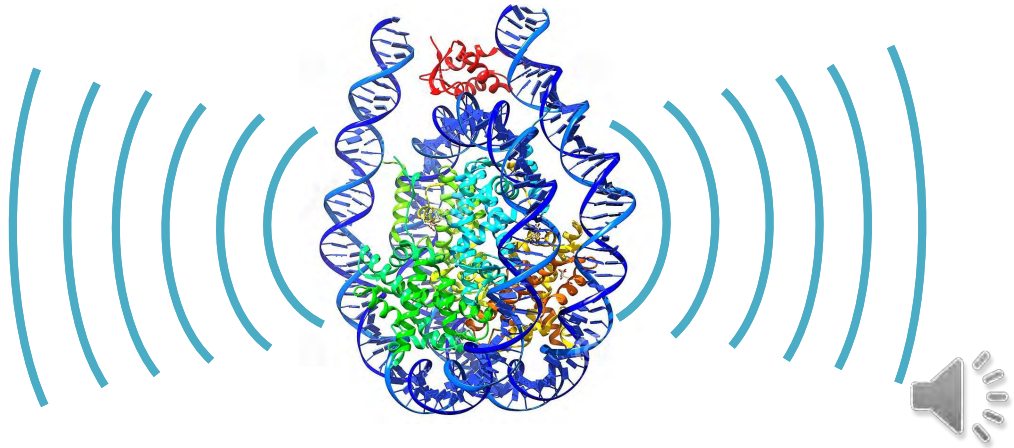


nucleosome as a speaker



Nucleosome as a speaker

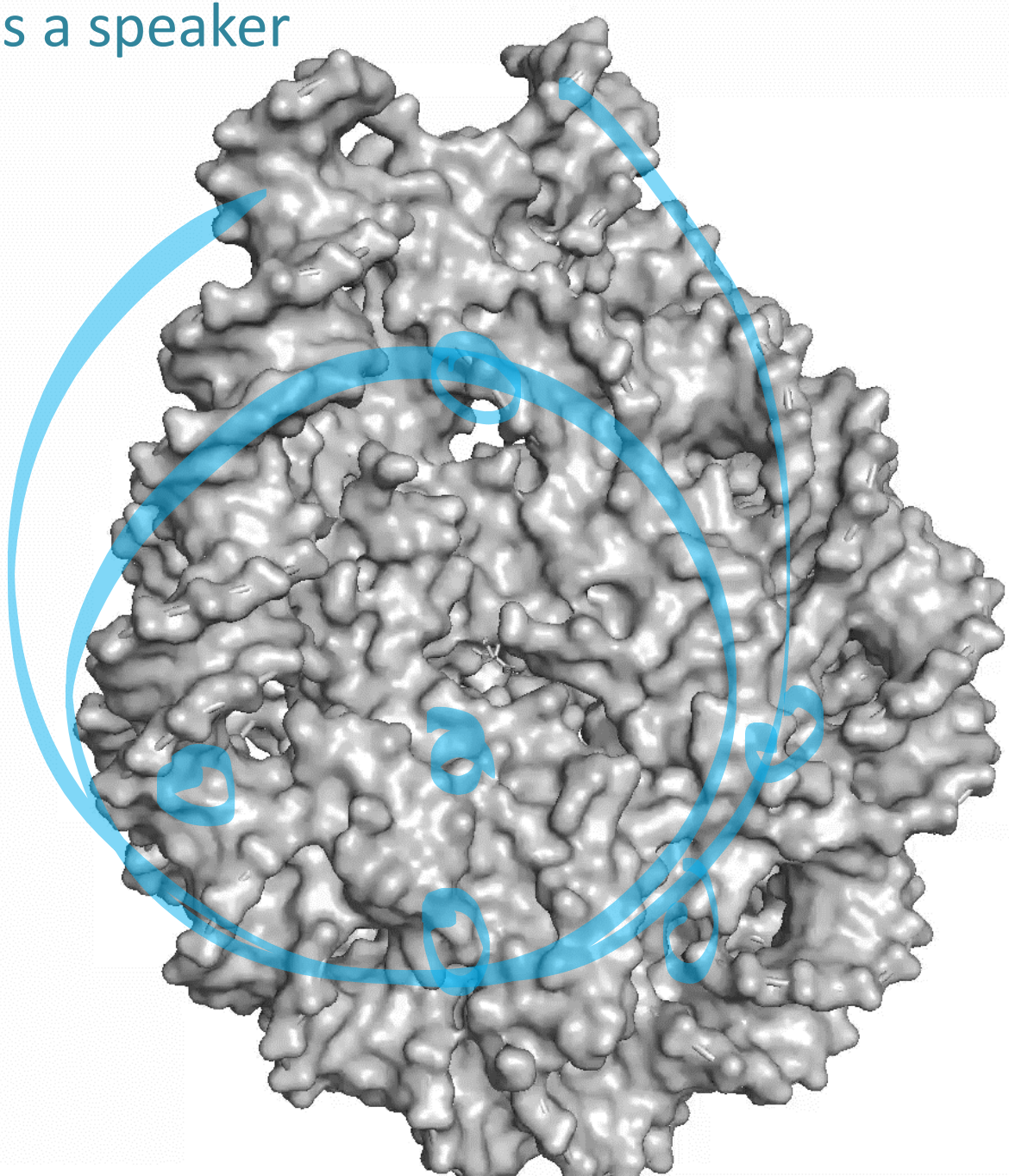
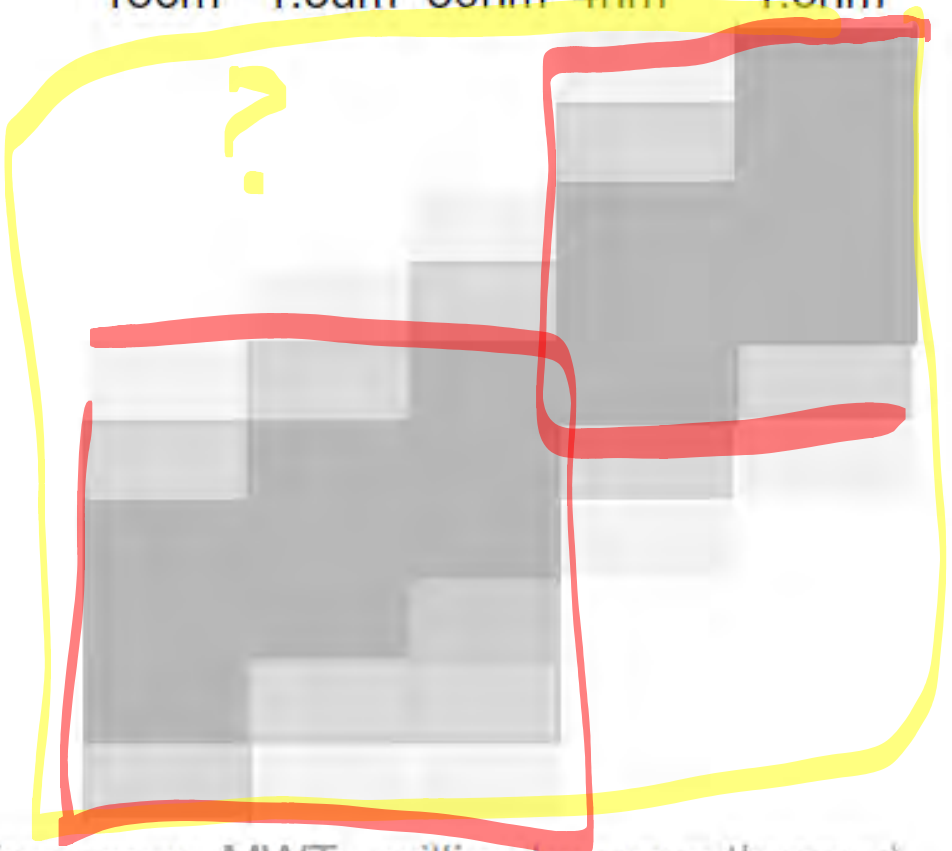
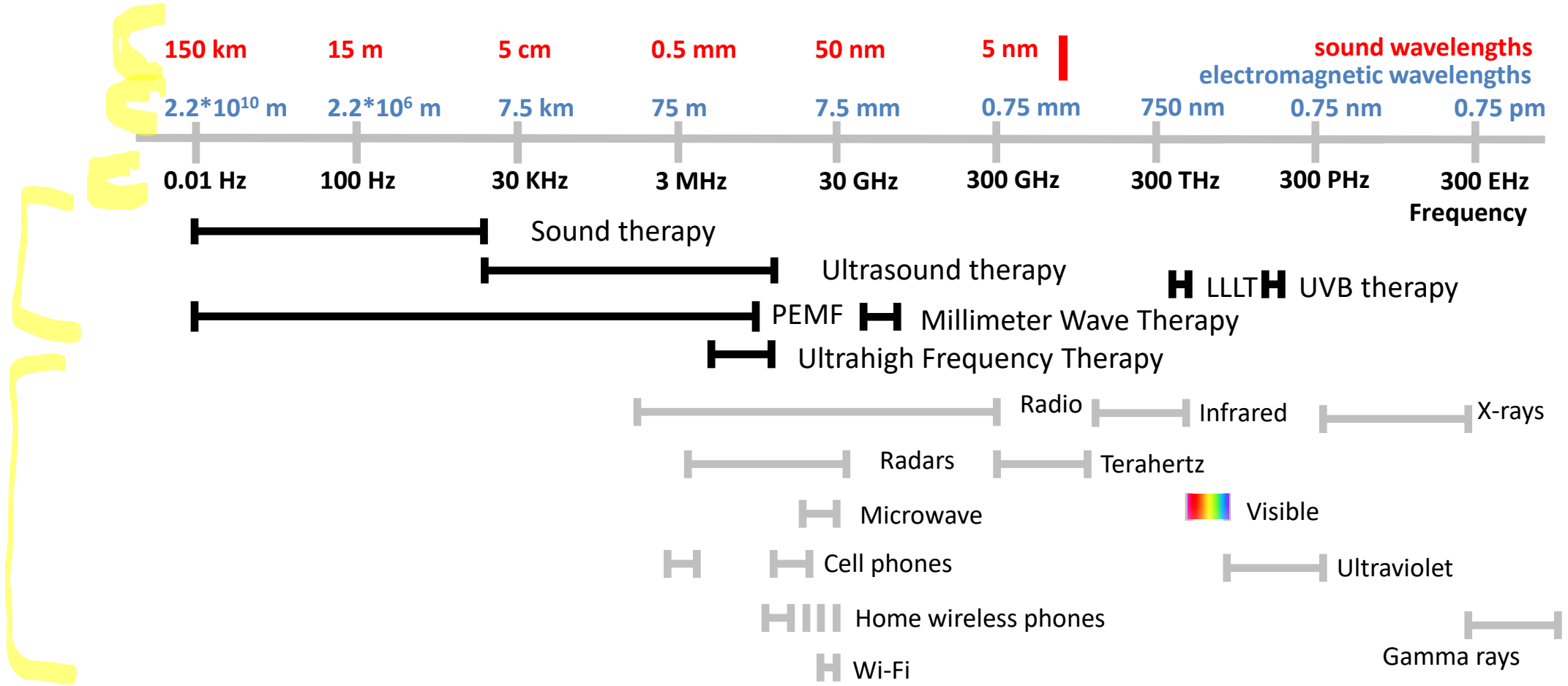


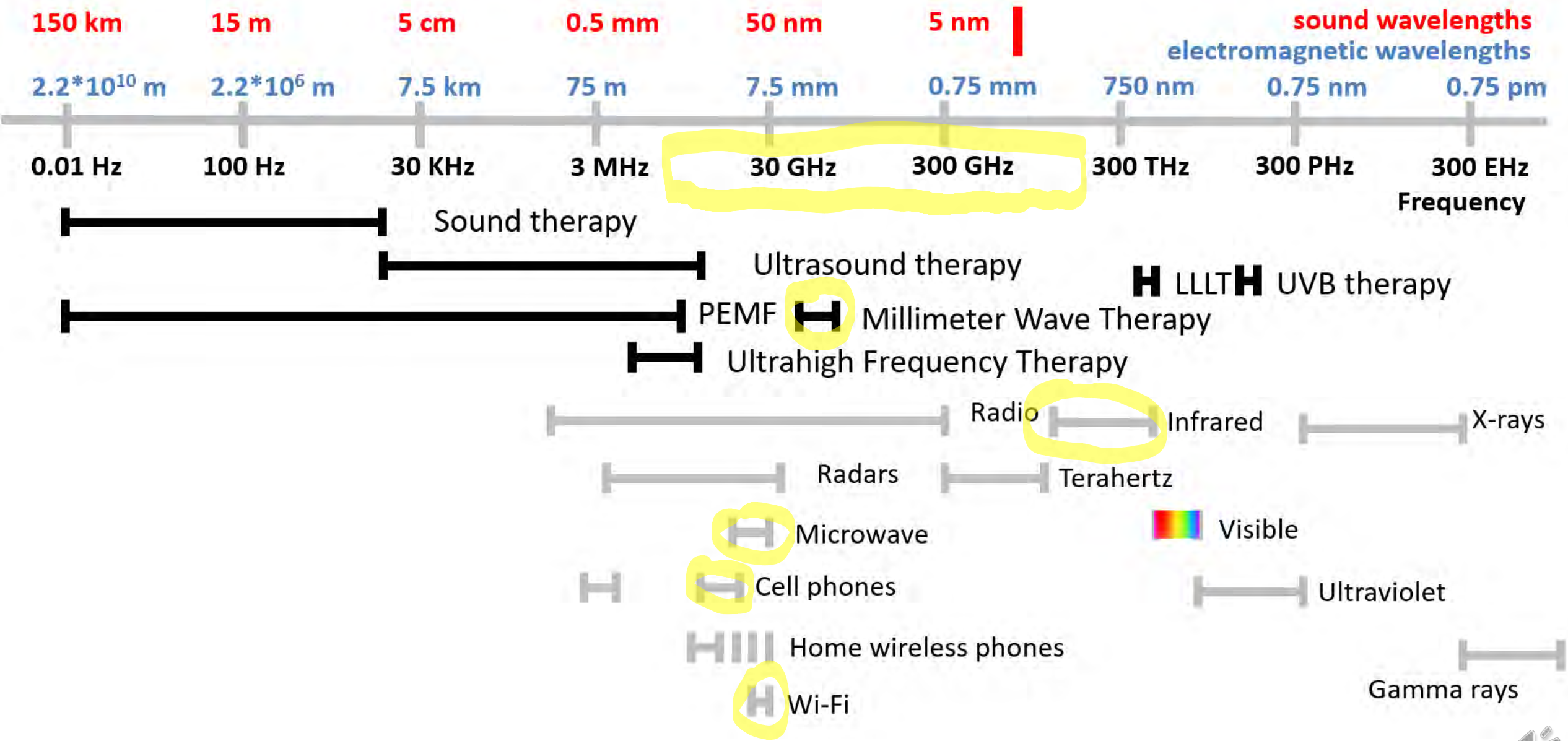
Table [Wavelengths]: A very approximate prediction of resonance wavelengths of genomic repeats

Repeat unit length		Periodic	Type	wavelength	PEMF	UHF	MWT	LLLT	UVB
				light	37km	0.3m	7mm	800nm	300nm
				sound	186m	1.5um	30nm	4nm	1.5nm
1	bp	0.3 nm	y	simple					
2	bp	0.7 nm	y	simple					
3	bp	1.0 nm	y	simple					
4	bp	1.3 nm	y	simple					
6	bp	2.0 nm	y	telomeric					
171	bp	57 nm	y	centromeric					
260	bp	86 nm	n	MIR					
300	bp	100 nm	n	Alu					
1000	bp	332 nm	n	Mariner					
6000	bp	1992 nm	n	LINE1					



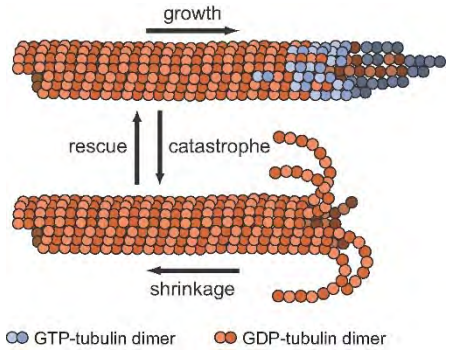
(UHF - ultra high frequency, MWT - millimeter wave therapy)

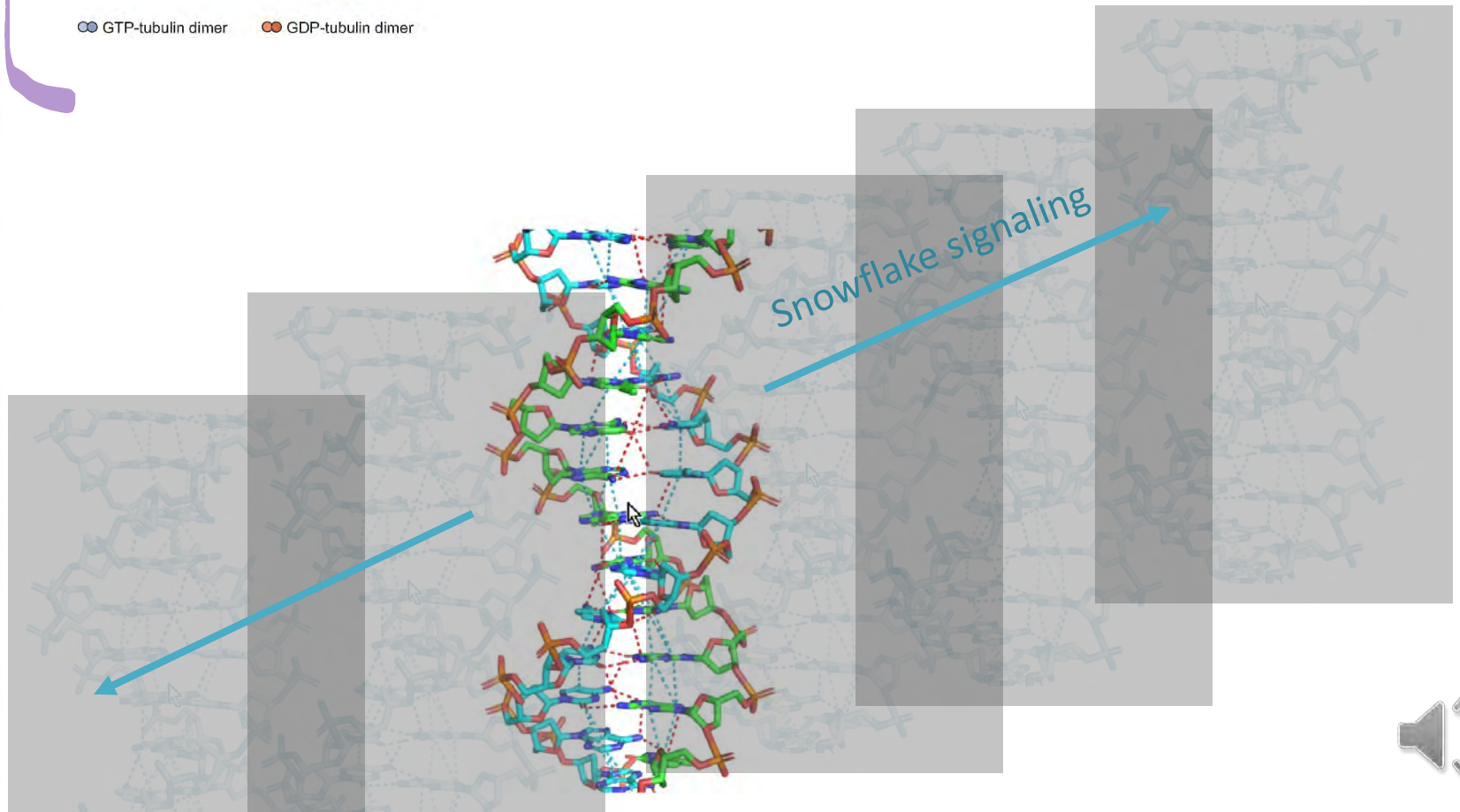

150 km
15 m
5 cm
0.5 mm
50 nm
5 nm
sound wavelengths
electromagnetic wavelengths
2.2*10^10 m
2.2*10^6 m
7.5 km
75 m
7.5 mm
0.75 mm
750 nm
0.75 nm
0.75 pm
0.01 Hz
100 Hz
30 KHz
3 MHz
30 GHz
300 GHz
300 THz
300 PHz
300 EHz
Frequency
Sound therapy
Ultrasound therapy
LLLT
UVB therapy
PEMF
Millimeter Wave Therapy
Ultrahigh Frequency Therapy
Radio
Infrared
X-rays
Radars
Terahertz
Microwave
Visible
Cell phones
Ultraviolet
Home wireless phones
Wi-Fi
Gamma rays


150 km
15 m
5 cm
0.5 mm
50 nm
5 nm
sound wavelengths
electromagnetic wavelengths
2.2*10^10 m
2.2*10^6 m
7.5 km
75 m
7.5 mm
0.75 mm
750 nm
0.75 nm
0.75 pm
0.01 Hz
100 Hz
30 KHz
3 MHz
30 GHz
300 GHz
300 THz
300 PHz
300 EHz
Frequency
Sound therapy
Ultrasound therapy
LLLT
UVB therapy
PEMF
Millimeter Wave Therapy
Ultrahigh Frequency Therapy
Radio
Infrared
X-rays
Radars
Terahertz
Microwave
Visible
Cell phones
Ultraviolet
Home wireless phones
Wi-Fi
Gamma rays

Snowflake type of signaling (crystal pattern propagation)

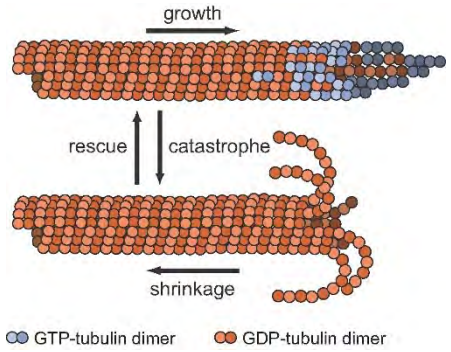
Microtubules

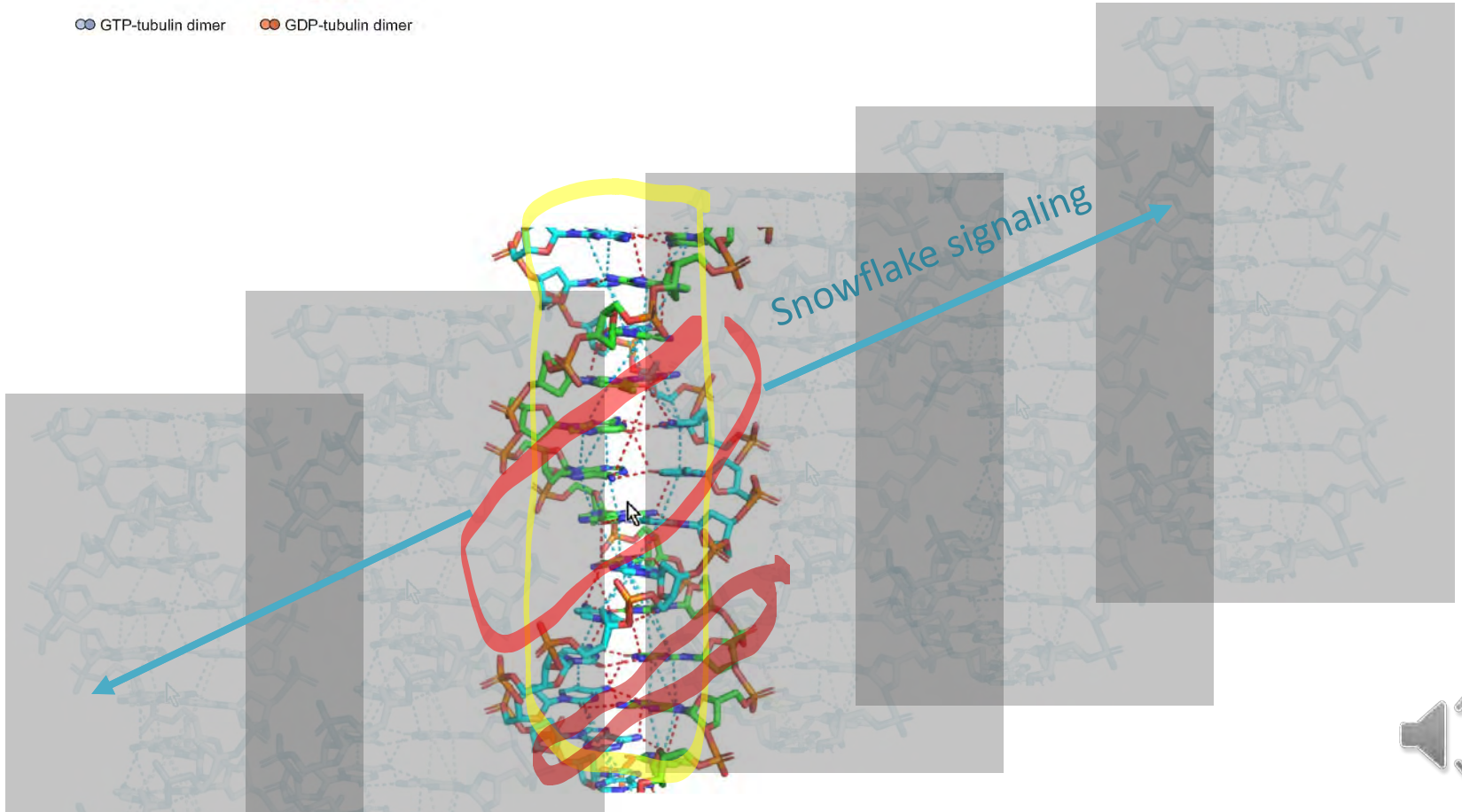




Snowflake type of signaling (crystal pattern propagation)

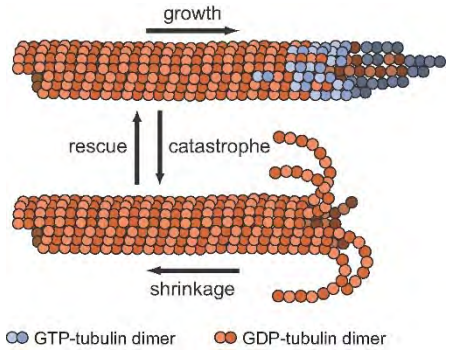
Microtubules





Snowflake type of signaling (crystal pattern propagation)

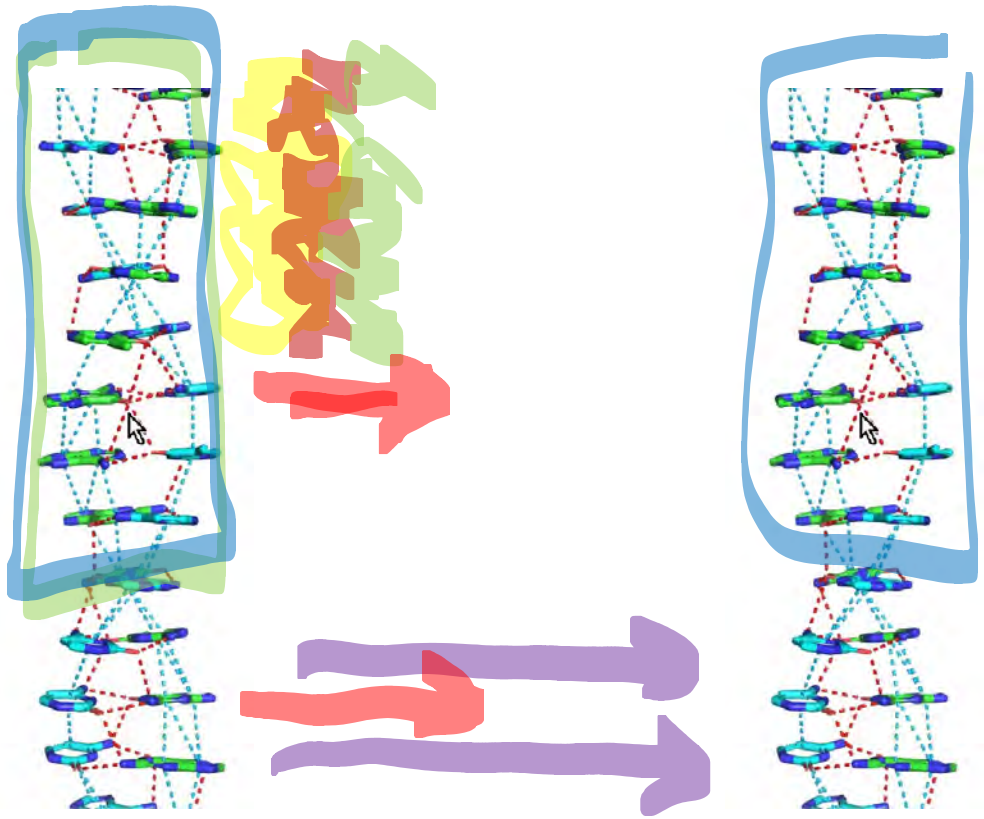
Microtubules



Heat signaling -

Hypothetical resonance signaling via radiant and conductive heat

Coherence transfer - quantum entanglement - spintronics



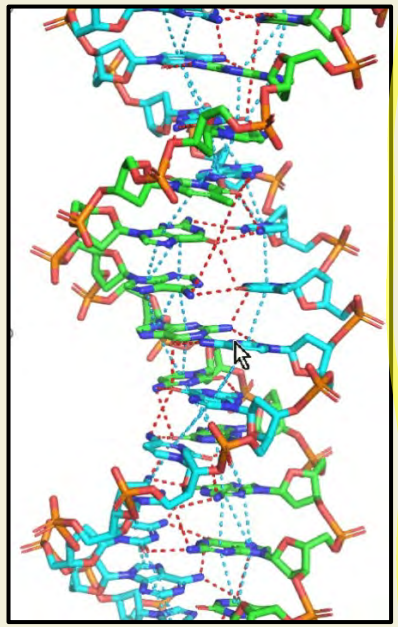
- Sauna
- Moxibustion
- Acupuncture with moxibustion
- Tanning with sunscreen

Ball, Philip. *Beyond weird*. 2020

What is the nature of DNA resonance signaling?

physical in the traditional sense

nonphysical in the traditional sense



can be studied with live sensor models

the experimental study is challenging

can be studied experimentally with traditional devices

physical in the traditional sense

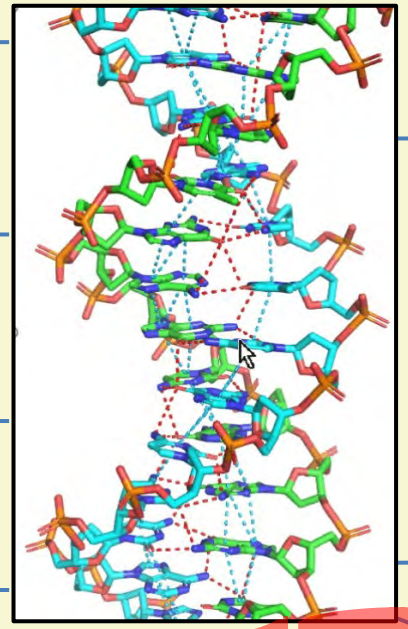
1. electromagnetic signaling

2. electroacoustic signaling

3. snowflake (crystal pattern propagation) signaling

4. Brownian and radiant heat - quantum entanglement - mediated signaling

nonphysical in the traditional sense



local signaling

detected by living things but not devices

nonlocal signaling

5. Subtle signaling (local, sequence-specific based on resonance, agnostic to the nature of the carrier wave)

We are heading towards spectroscopic experiments

We synthesized a series of DNA samples with varied predicted proton chains.

Same composition – varied chain lengths.

>F01w 1 wire 141 bp ea

GGGTTAGGGTTAGGGTTAGGGTTAGGGTTAGGG

TTAGGGTTAGGGTTAGGGTTAGGGTTAGGGTTAGGG

TTAGGGTTAGGGTTAGGGTTAGGGTTAGGGTTAGGG

TTAGGGTTAGGGTTAGGGTTAGGGTTAGGGTTAGGG

>F05w 24 wires, 6 bp ea

GGGATTGGGATTGGGATTGGGATTGGGATTGGG

ATT GGGATTGGGATTGGGATTGGGATTGGGATTGGG

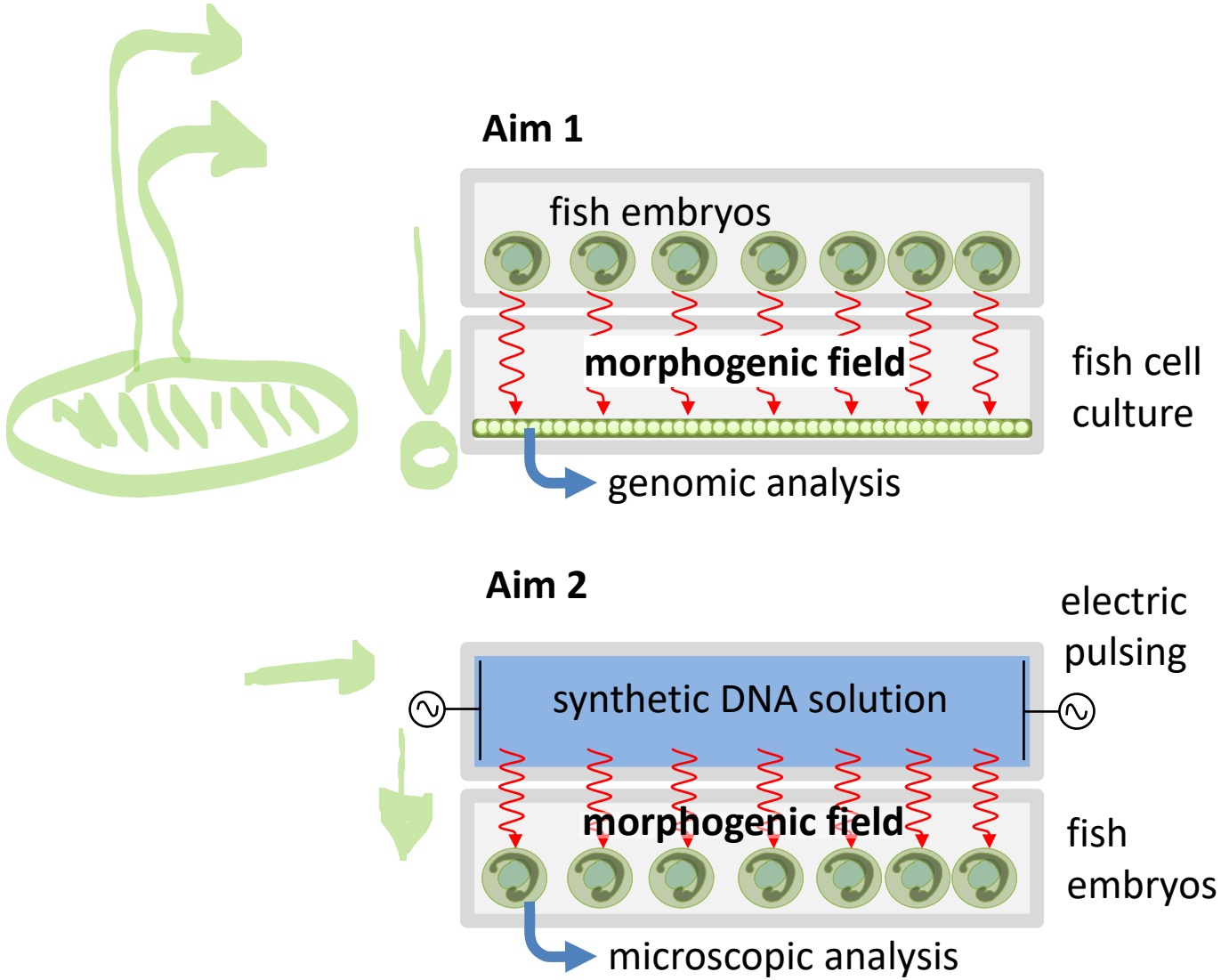
ATT GGGATTGGGATTGGGATTGGGATTGGGATTGGG

ATT GGGATTGGGATTGGGATTGGGATTGGGATTGGG

Spectroscopic measurements

Will the spectrum changes reflect predicted proton chain lengths?

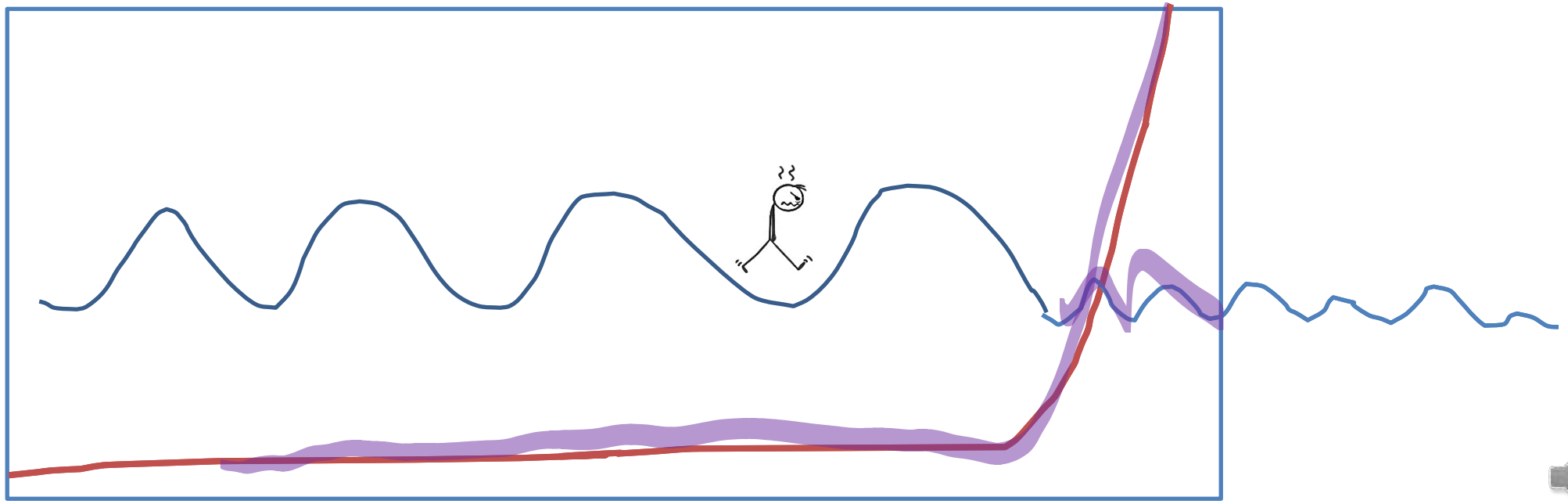
Looking for collaborators


Aim 1
fish embryos
morphogenic field
fish cell culture
genomic analysis
Aim 2
electric pulsing
synthetic DNA solution
morphogenic field
fish embryos
microscopic analysis

Future directions

What can serve as a breakthrough point?

- A model that explains much of the existing genomics data, or
- Independently reproduced evidence of sequence-specific DNA resonance signaling
- A practically useful method



Challenges and future directions of DNA resonance research (wave genetics)

Theory

- To find order in the genome
- To discover agreement between
- DNA resonance models and genomic data
- Incorporate water into models
- Integrate positive and negative charge oscillations
- Integrate chaos theory
- Integrate quantum enganglement

Experiments

- Demonstrate DNA resonance
- Develop easy to reproduce assays
- Have it independently reproduced
- Demonstrate the role of DNA resonance in morphgenesis
- Demonstrate the role of DNA resonance in the work of mind

Applications

- Therapeutic
- Diagnostic
- Brain-computer interface
- Mood, entertainment, meditation
- drug abuse monitoring
- Biotechnological
- Animals, plants, food.

Acknowledgements

Current:

Ivan Savelev
Elena Naumova
Anton Klimov
Alex Samchenko
Alex Voronka
Elena Erdyneyeva

Past:

Nellie Zyryanova
Nikolai Kondratyev
Eugenia Kananykhina
[Vadim Guschin]
Konstantin Kupriyanov
Irina Garanina
Ancha Baranova
Evgenia Kananykhina
Alexei Tovmash
Lev Shishkin
Liliya Yulmetova

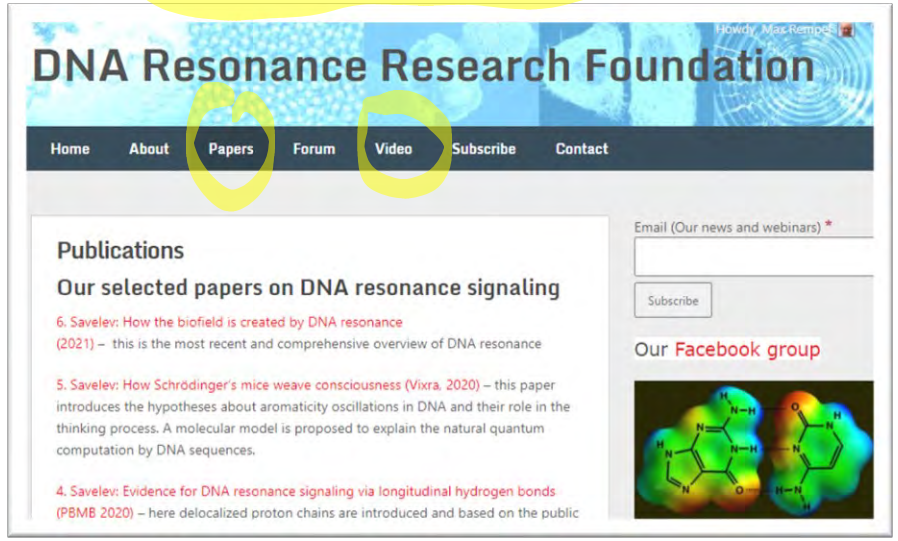
Collaborators:

Richard Alan Miller
Glen Rein
Anna Byalik
Alexandre Vetcher
[Irina Konstantinova]

Collaborations invited:

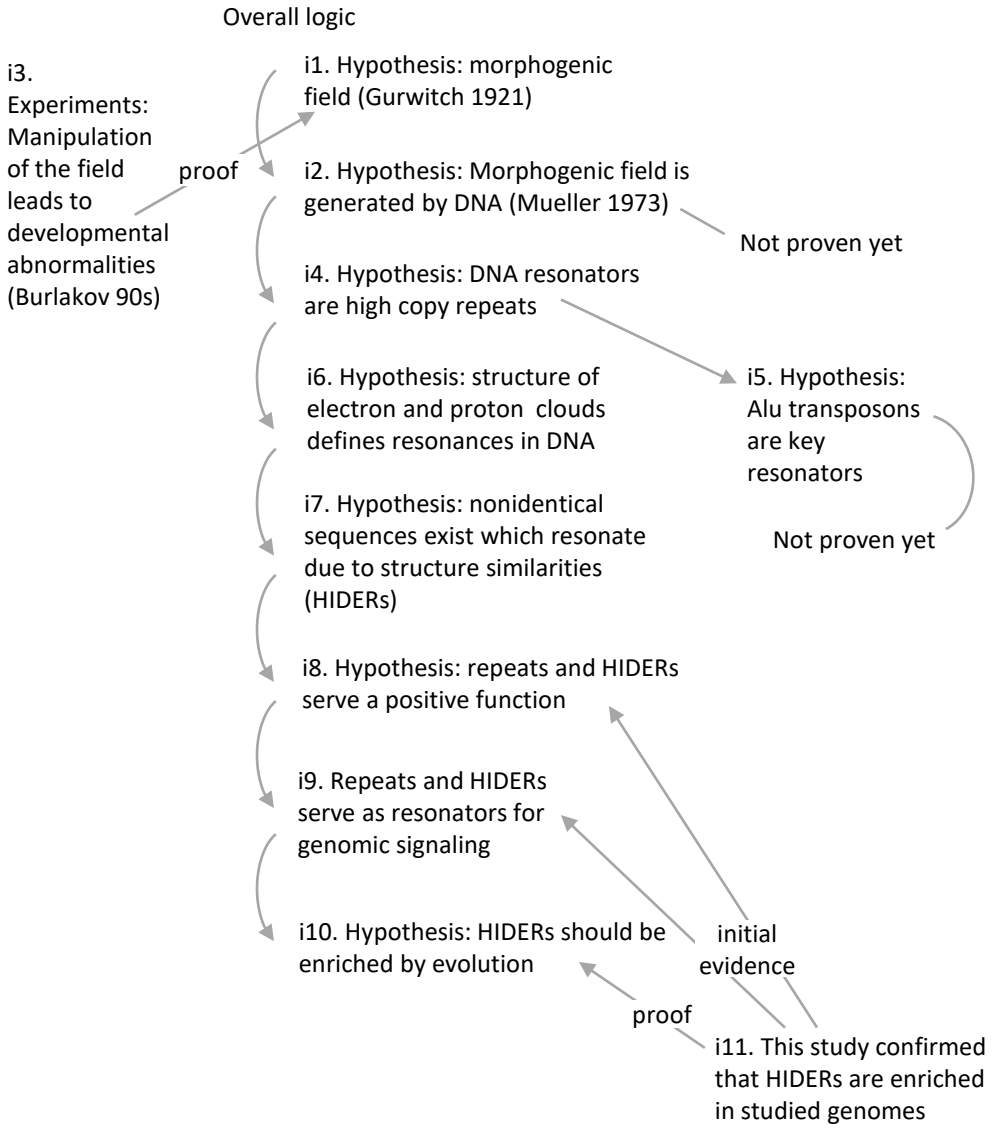
1. Spectroscopy
2. Electrodynamic modeling of oscillations
3. Quantum chemical modeling of oscillations

dnaresonance.org



Contact:

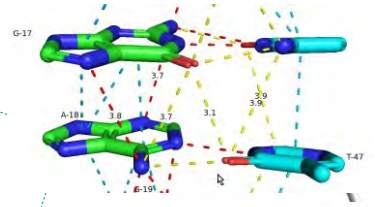
Max Myakishev-Rempel, San Diego, CA, USA max@dnaresonance.org


Overall logic
i1. Hypothesis: morphogenic field (Gurwitch 1921)
i3. Experiments: Manipulation of the field leads to developmental abnormalities (Burlakov 90s)
proof
i2. Hypothesis: Morphogenic field is generated by DNA (Mueller 1973)
Not proven yet
i4. Hypothesis: DNA resonators are high copy repeats
i5. Hypothesis: Alu transposons are key resonators
Not proven yet
i6. Hypothesis: structure of electron and proton clouds defines resonances in DNA
i7. Hypothesis: nonidentical sequences exist which resonate due to structure similarities (HIDERs)
i8. Hypothesis: repeats and HIDERs serve a positive function
i9. Repeats and HIDERs serve as resonators for genomic signaling
i10. Hypothesis: HIDERs should be enriched by evolution
initial evidence
proof
i11. This study confirmed that HIDERs are enriched in studied genomes

AA

how come good single RR to good single RR gives a 12% fall?
Just because of A to G?
maybe a result of PolyAdenilase? Maybe not

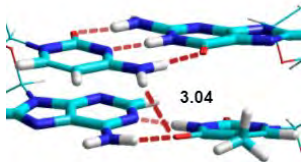
Alle	Alle	bor	AlFrDif	tangent	ShoL	whi
AA	GA	**AA**	-12%	-0.30%	39.70	1
AA	AC	**AA**	-9%	-0.24%	38.61	2
AA	AG	AA	-6%	-0.15%	40.93	2
AA	CA	**AA**	-6%	-0.16%	36.15	1
AA	TA	**AA**	-5%	-0.15%	31.36	1
AA	AT	AA	-4%	-0.12%	37.05	2



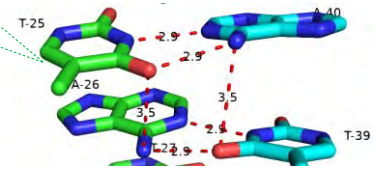
-12% fall
GA likely a stop
RR

F - Maybe not a good single OO 3.1A maj
weak NNOON W maj

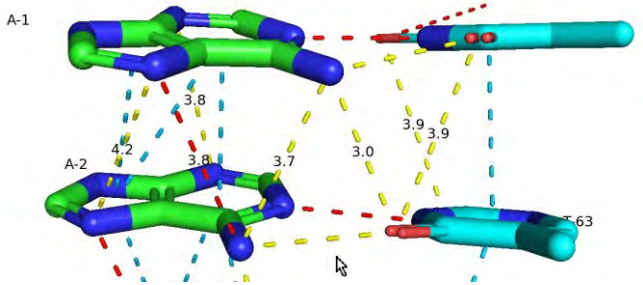
NN 3.7A min
OO 3.9A min



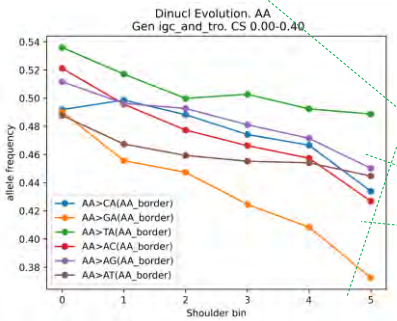
-6% fall
CA good Single

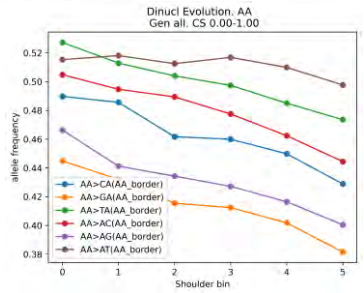


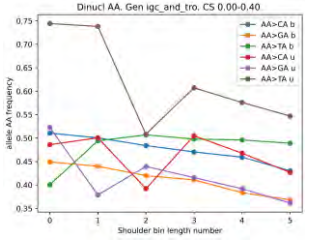
-4% fall
TA medium diamond

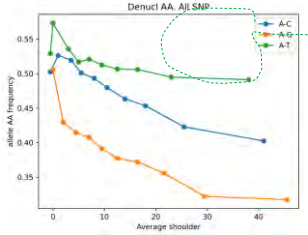


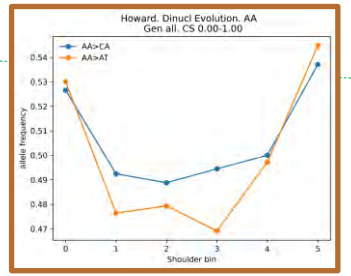
RR
K good single
NN – maj
NO 3.0A – maj
Nothing in min

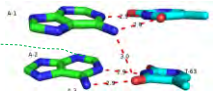


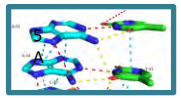












AA Good single