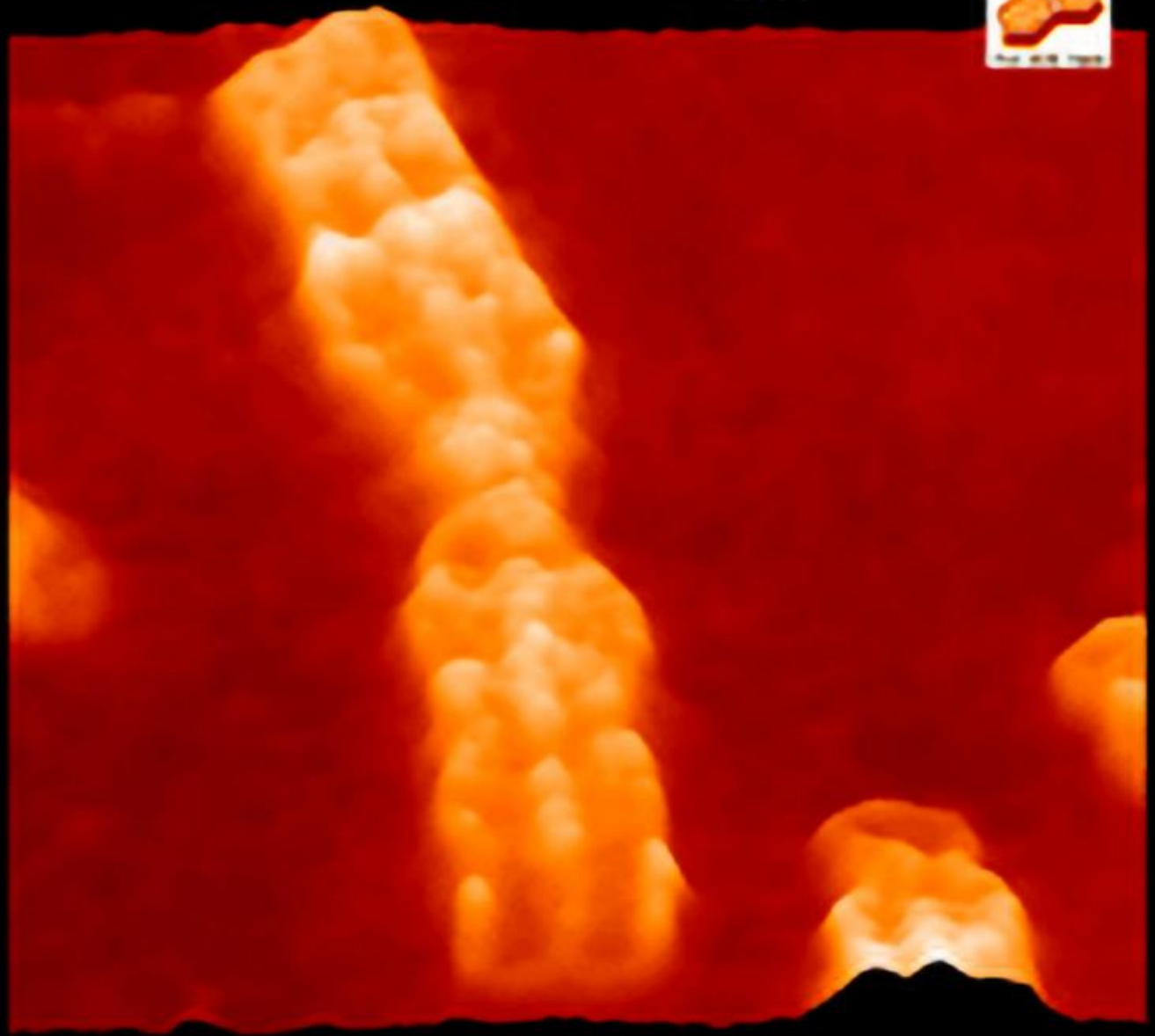


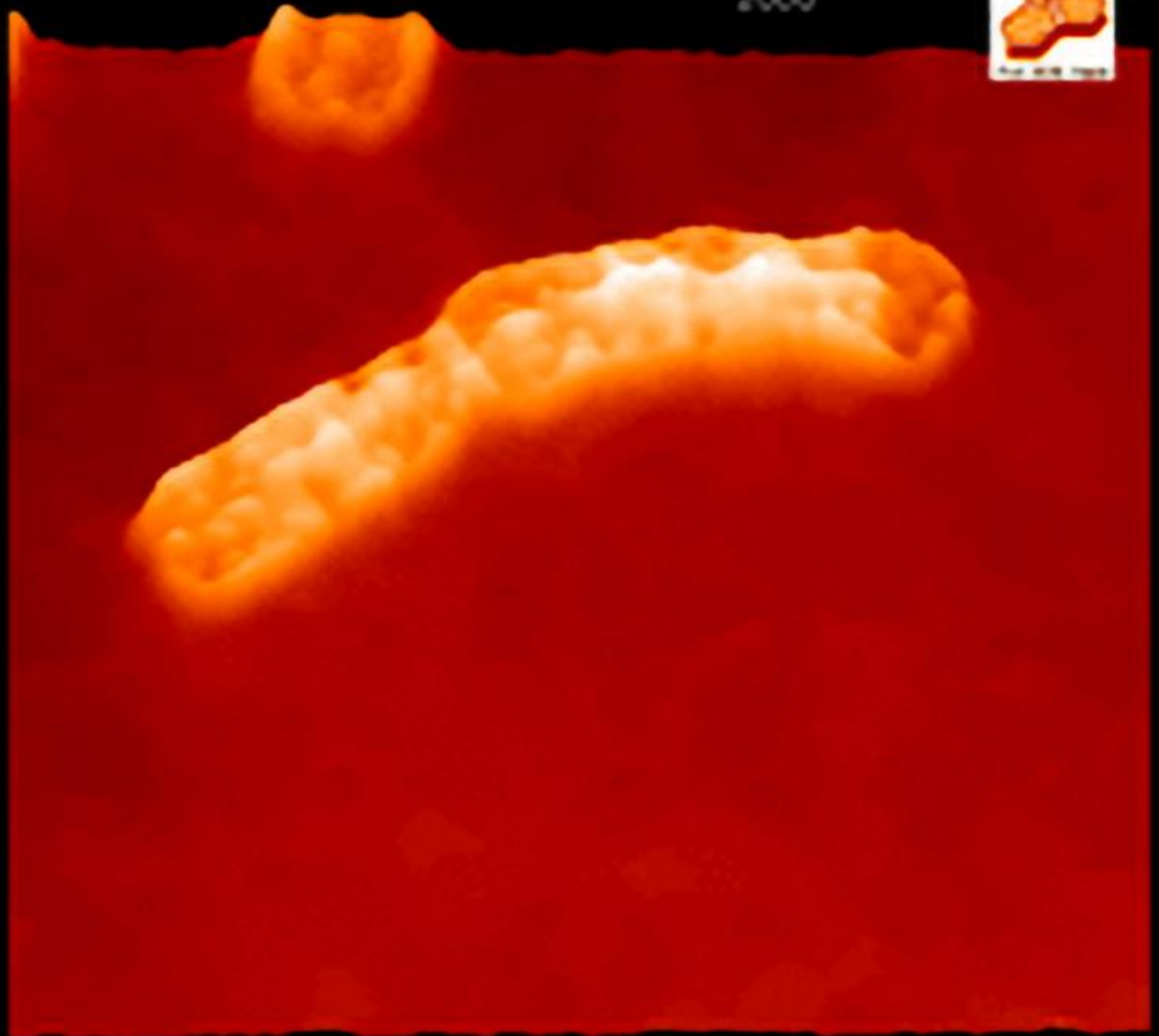
chromosome 1

© Tholhammer
Jamitzky
2000



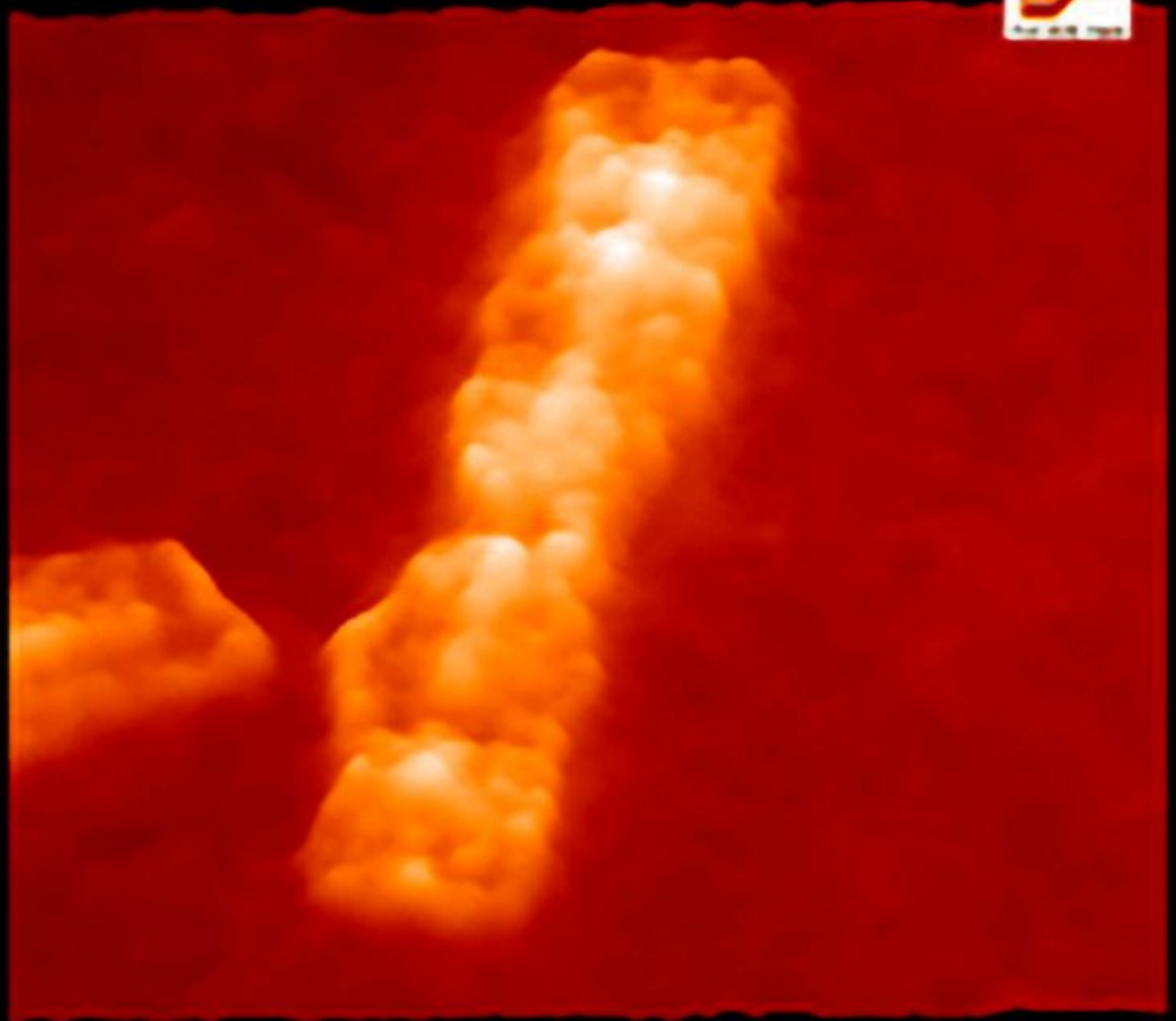
chromosome 2

(c) Tholhammer
Jamitzky
2000



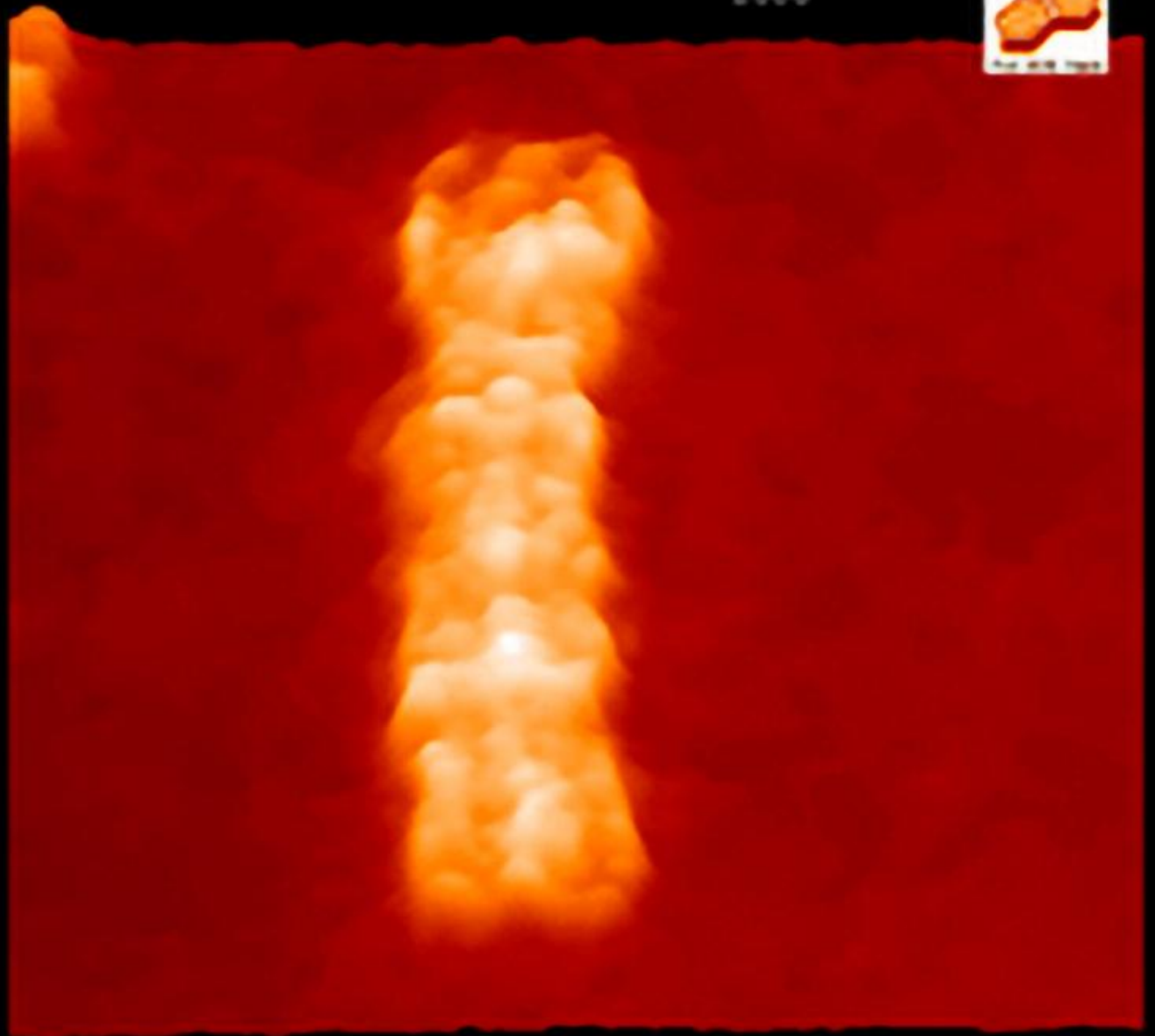
chromosome 3

(c) Thalhammer
Jamitzky
2000



chromosome 4

(c) Tholhammer
Jamitzky
2000



chromosome 5

(c) Thalhammer
Jamitzky
2000



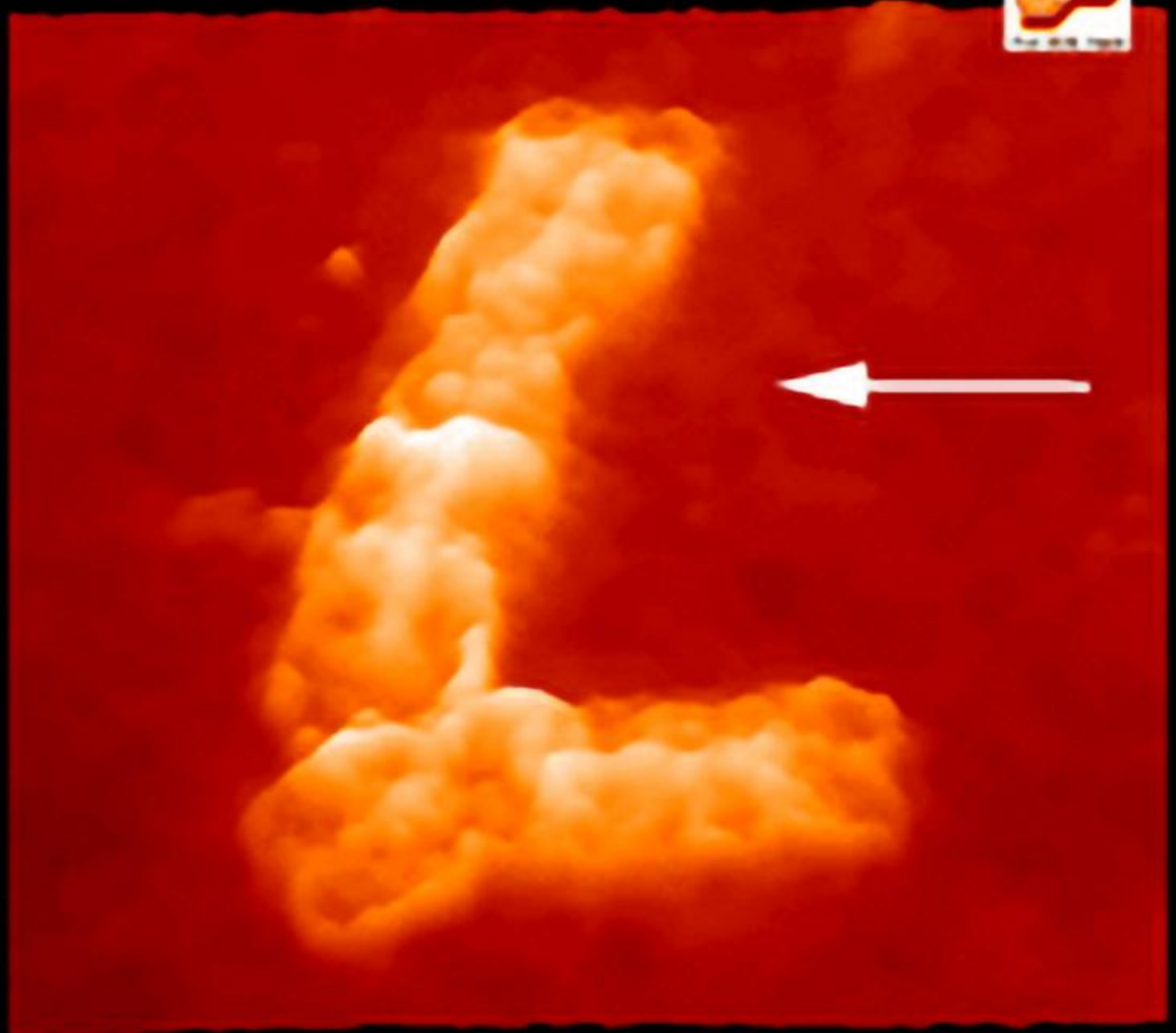
chromosome 6

(c) Thorhammer
Jamitzky
2000



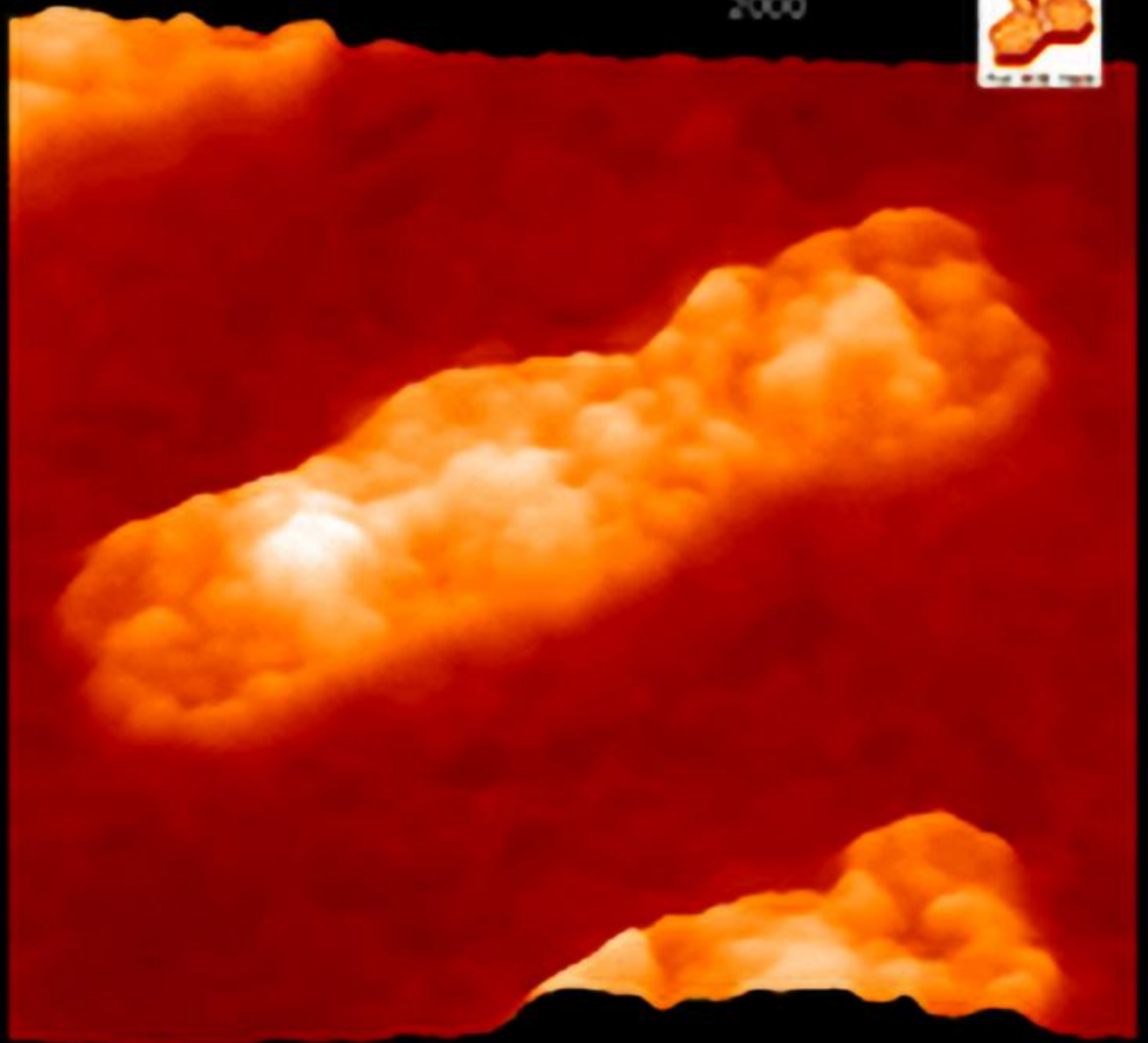
chromosome 7

(c) Tholhammer
Jamitzky
2000



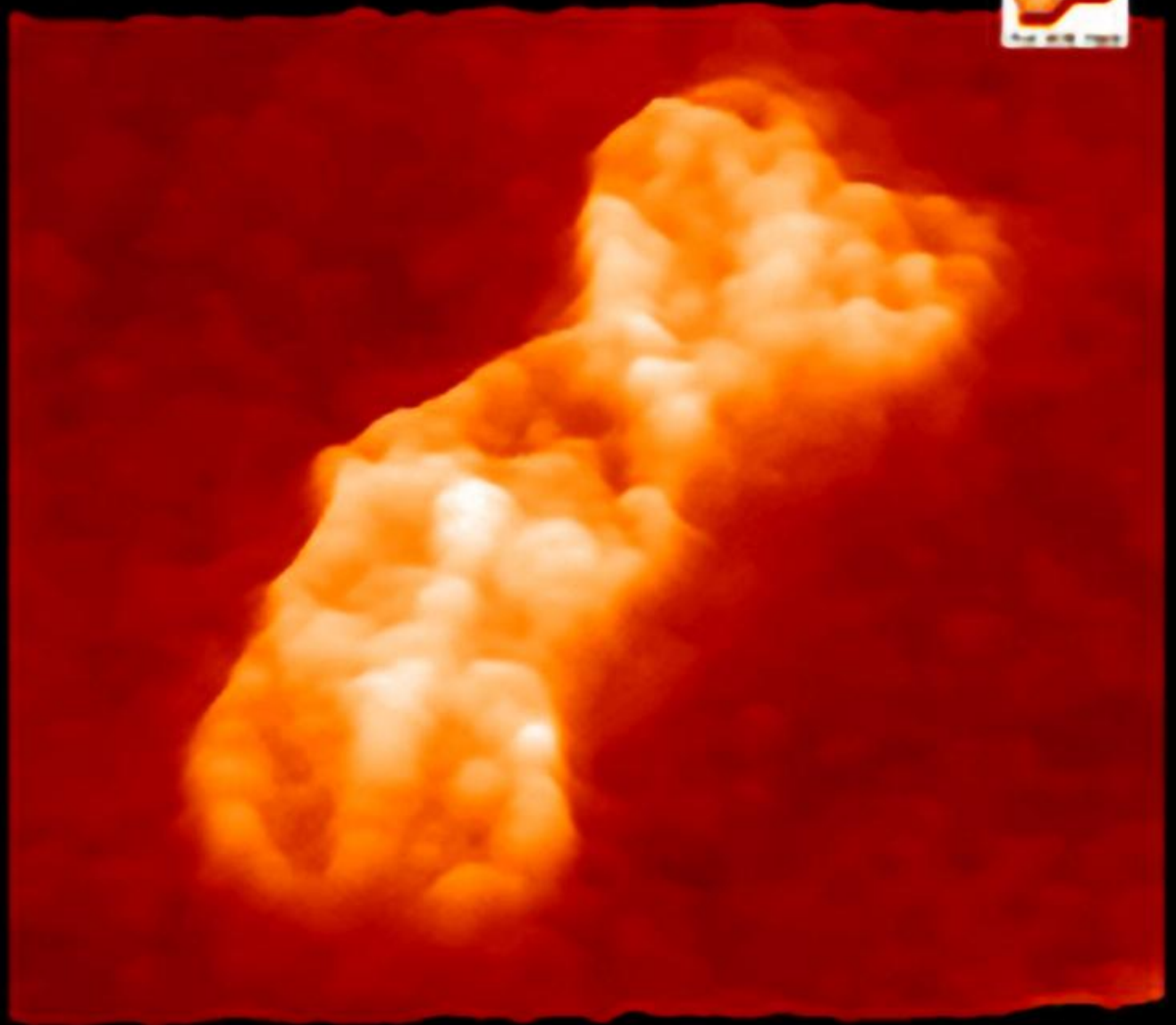
chromosome 8

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Jamitzky
2000



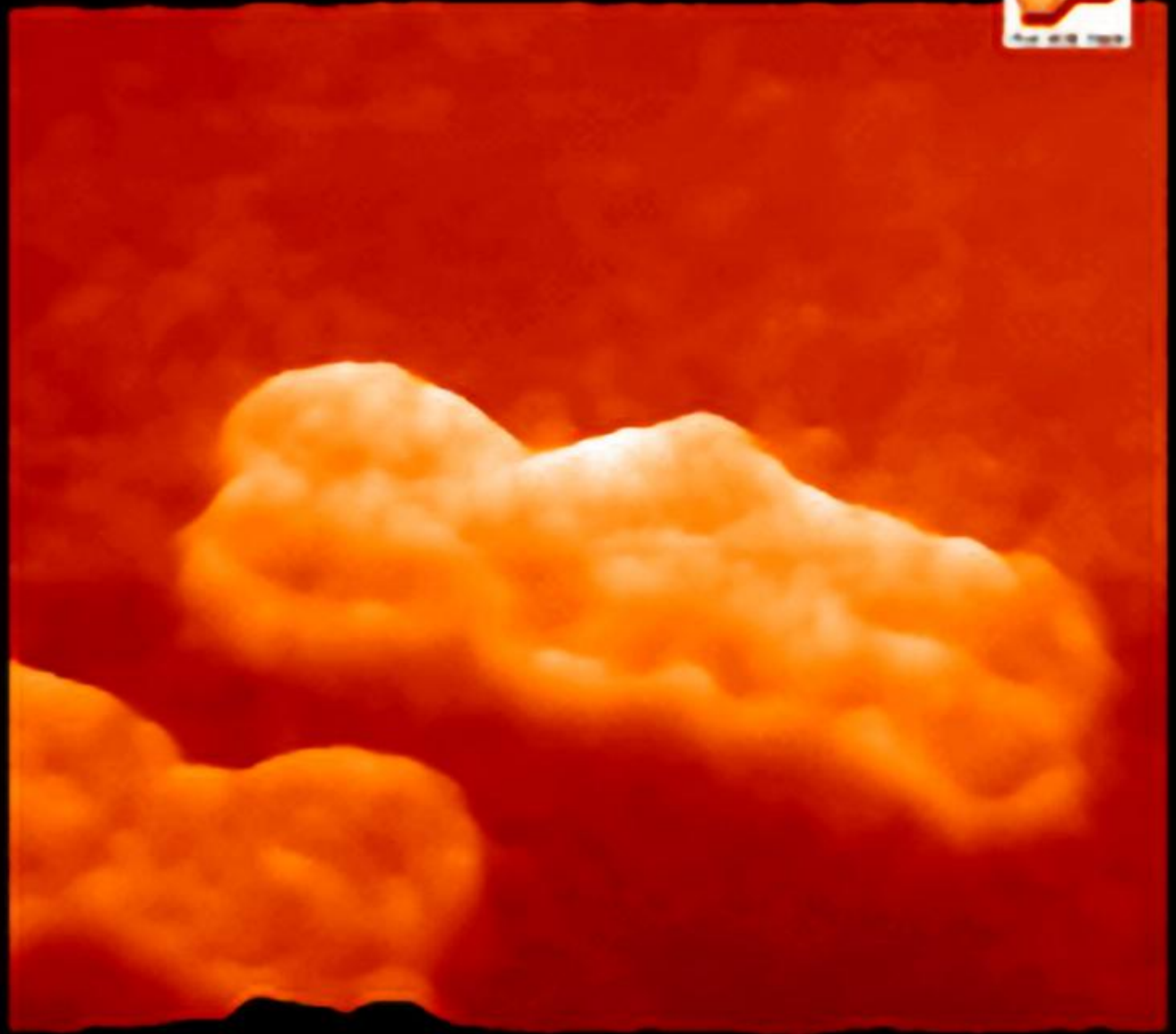
chromosome 9

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Jamitzky
2000



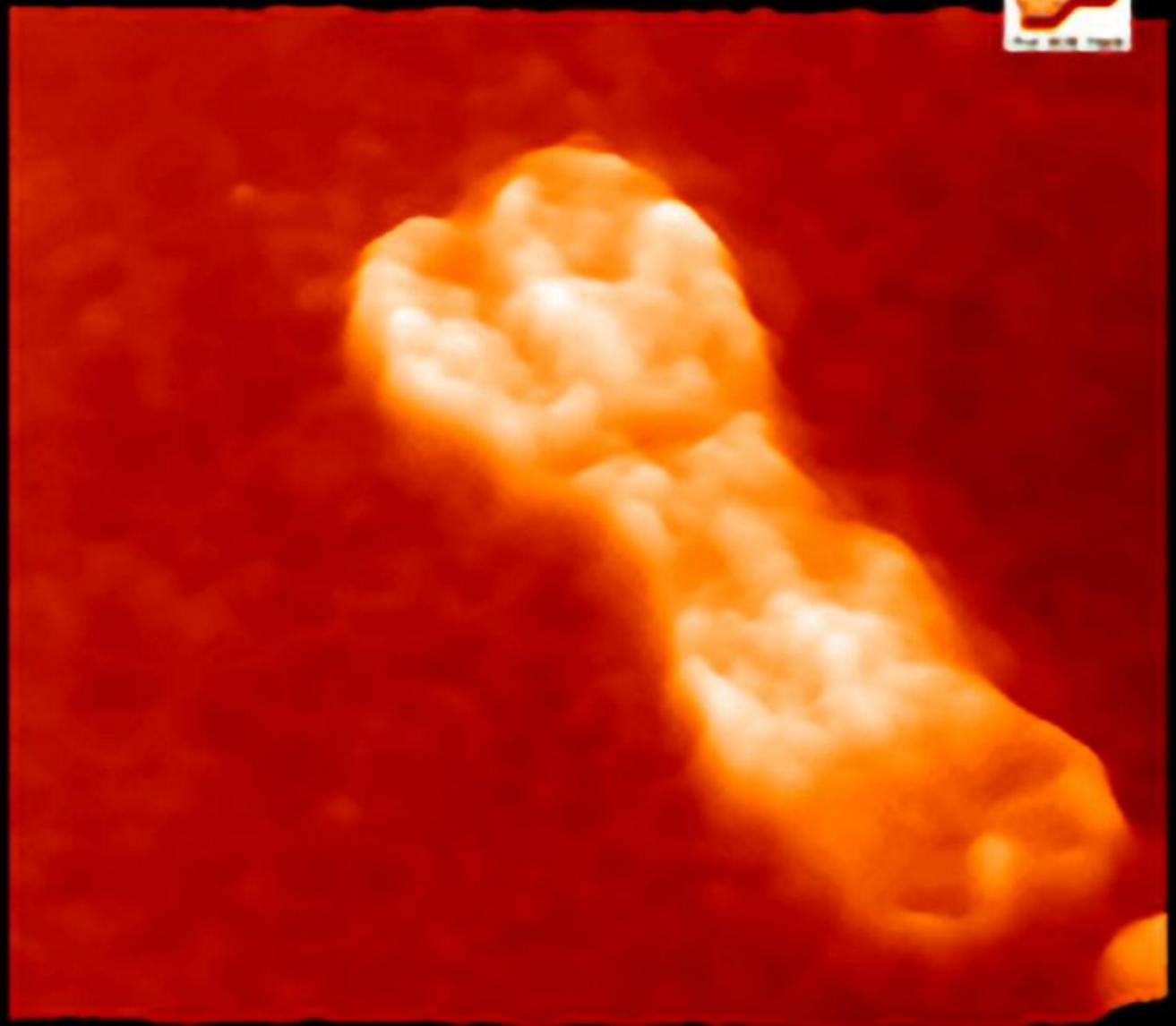
chromosome 10

(c) Thorhammer
Jamitzky
2000



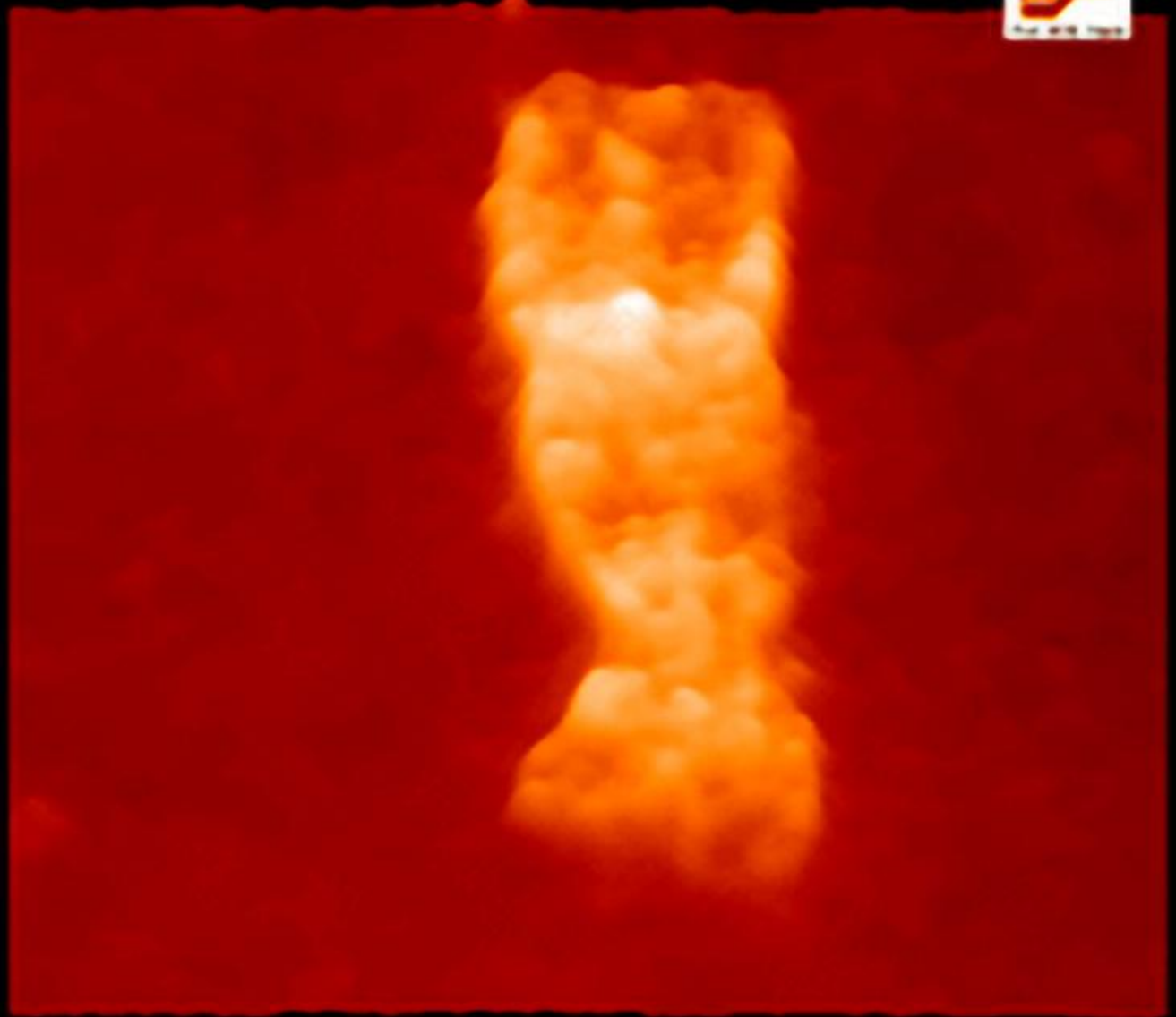
chromosome 11

(c) Thorhammer
Jamitzky
2000



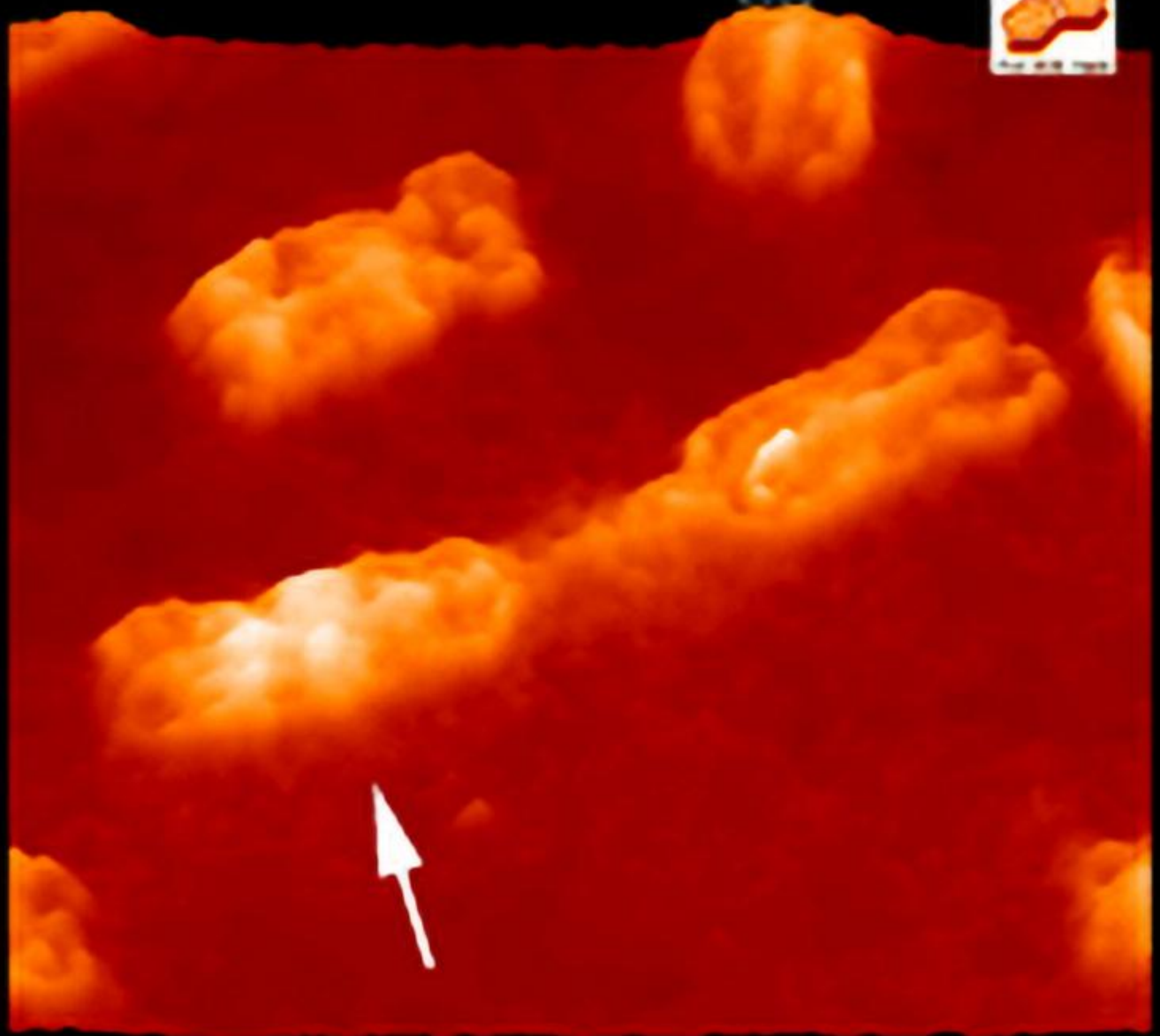
chromosome 12

(c) Tholhammer
Jamitzky
2000



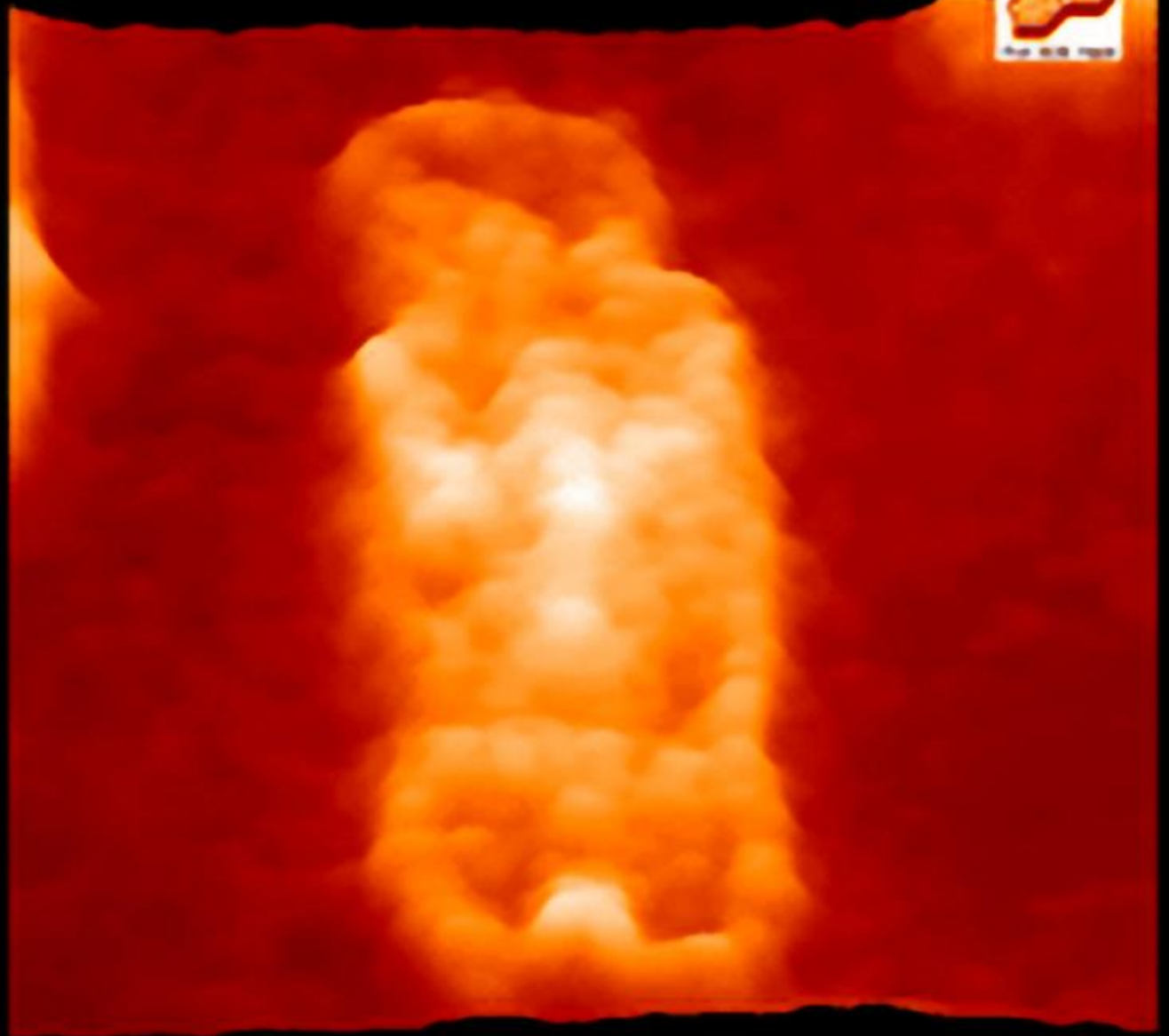
chromosome 13

(c) Thorhammer
Jamitzky
2000



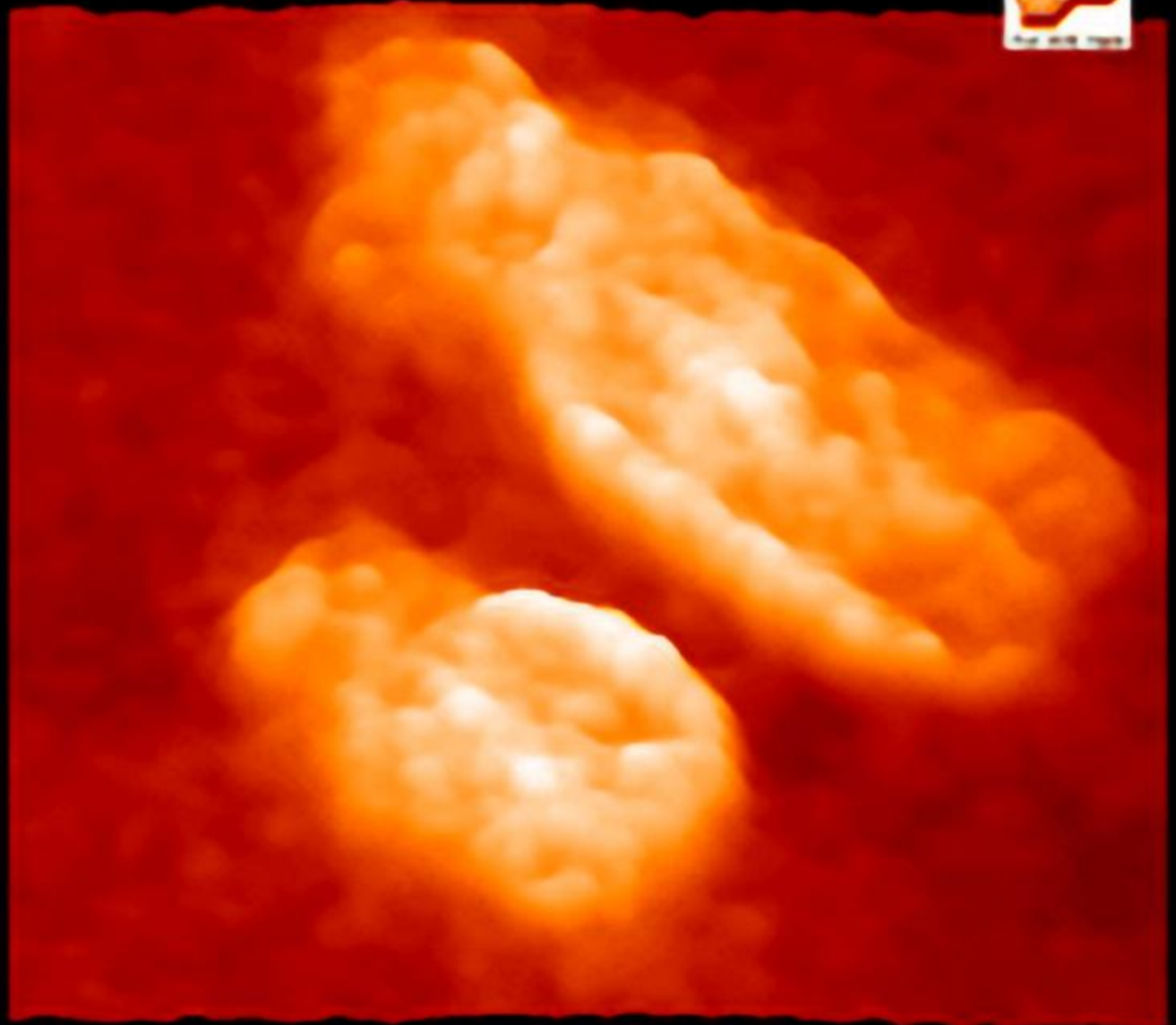
chromosome 14a

(c) Tholhammer
Jamitzky
2000



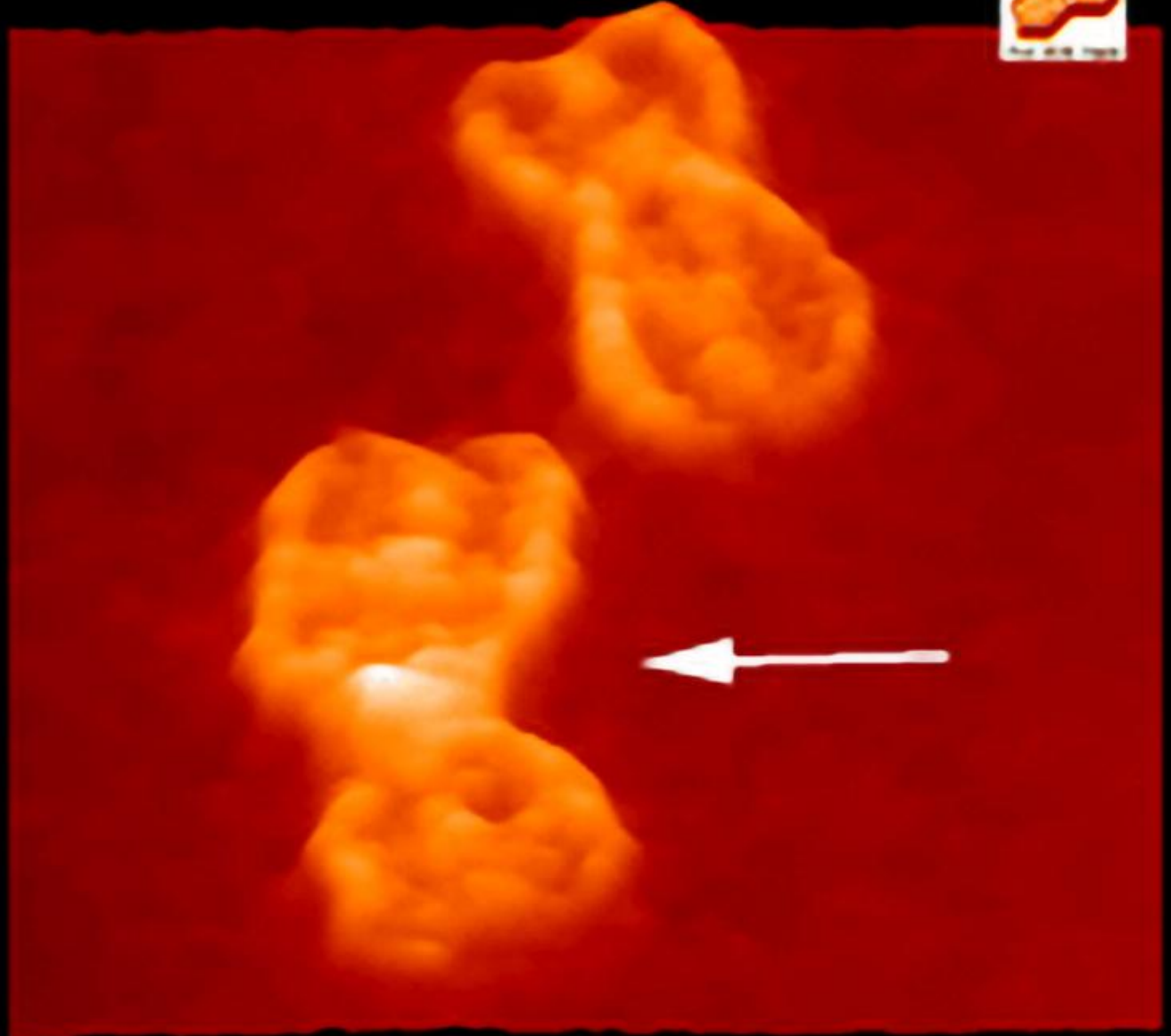
chromosome 15a

(c) Thorhammer
Jamitzky
2000



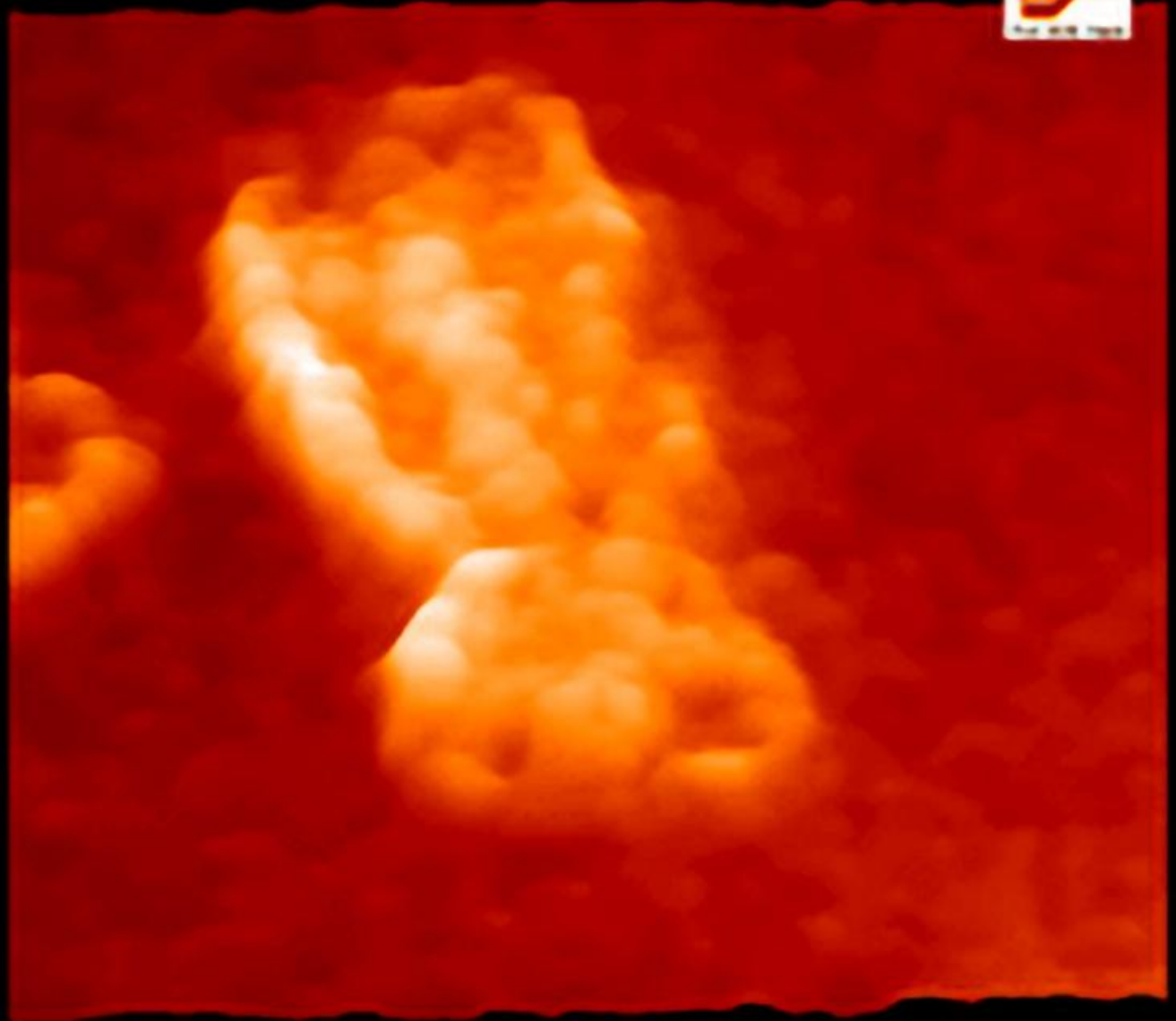
chromosome 16

(c) Tholhammer
Jamitzky
2000



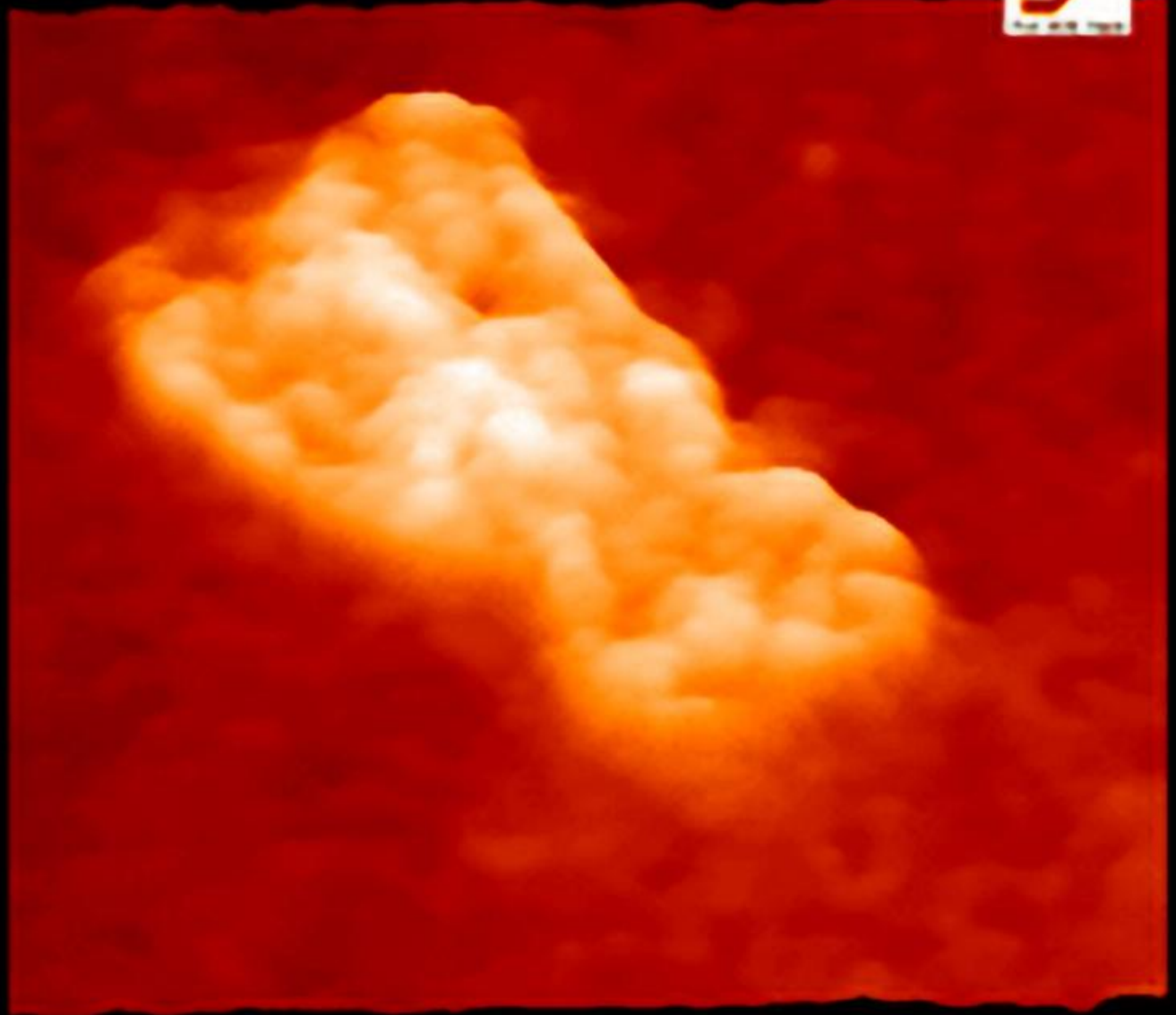
chromosome 17

(c) Tholhammer
Jamitzky
2000



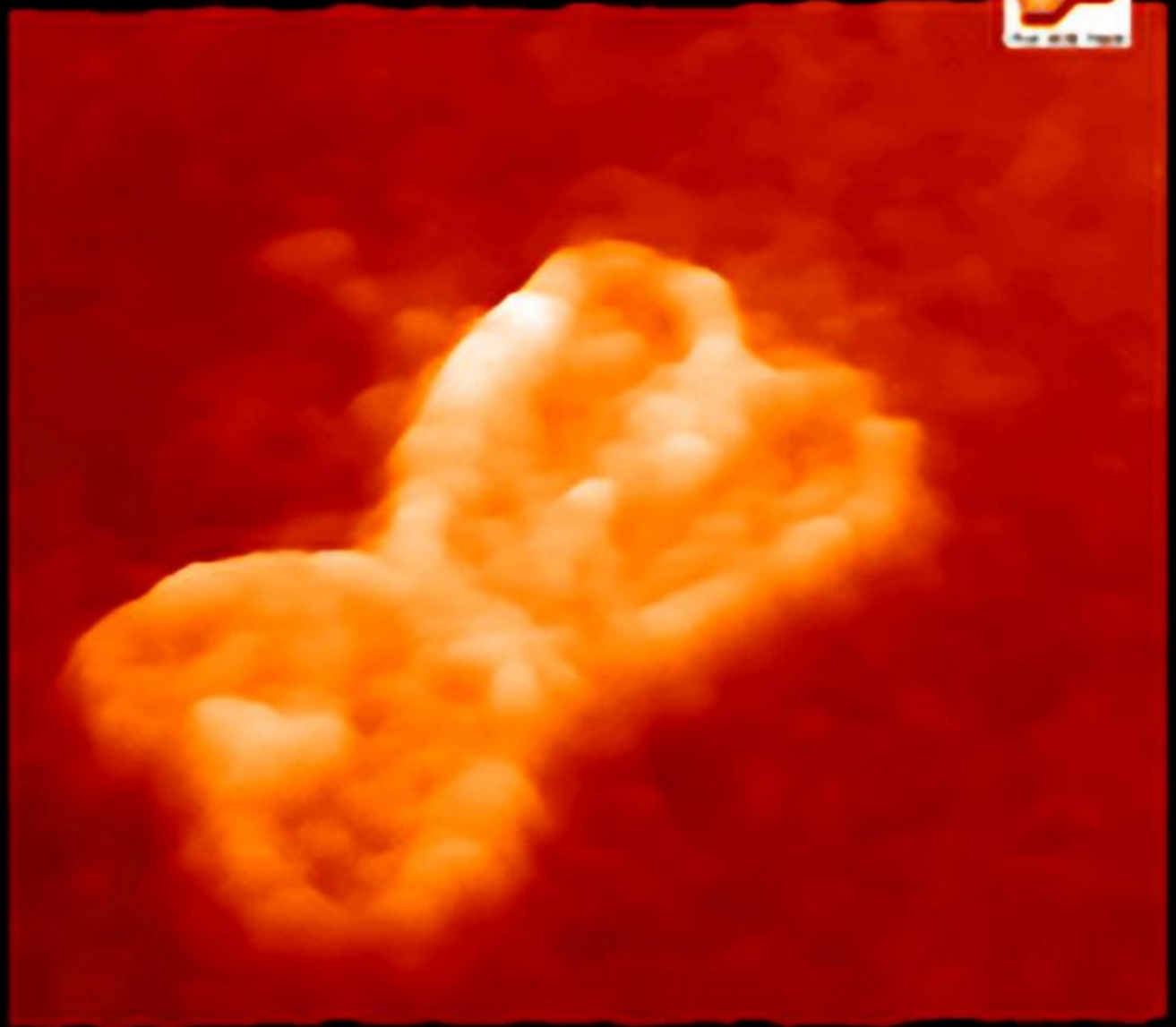
chromosome 18

(c) Thorhammer
Jamitzky
2000



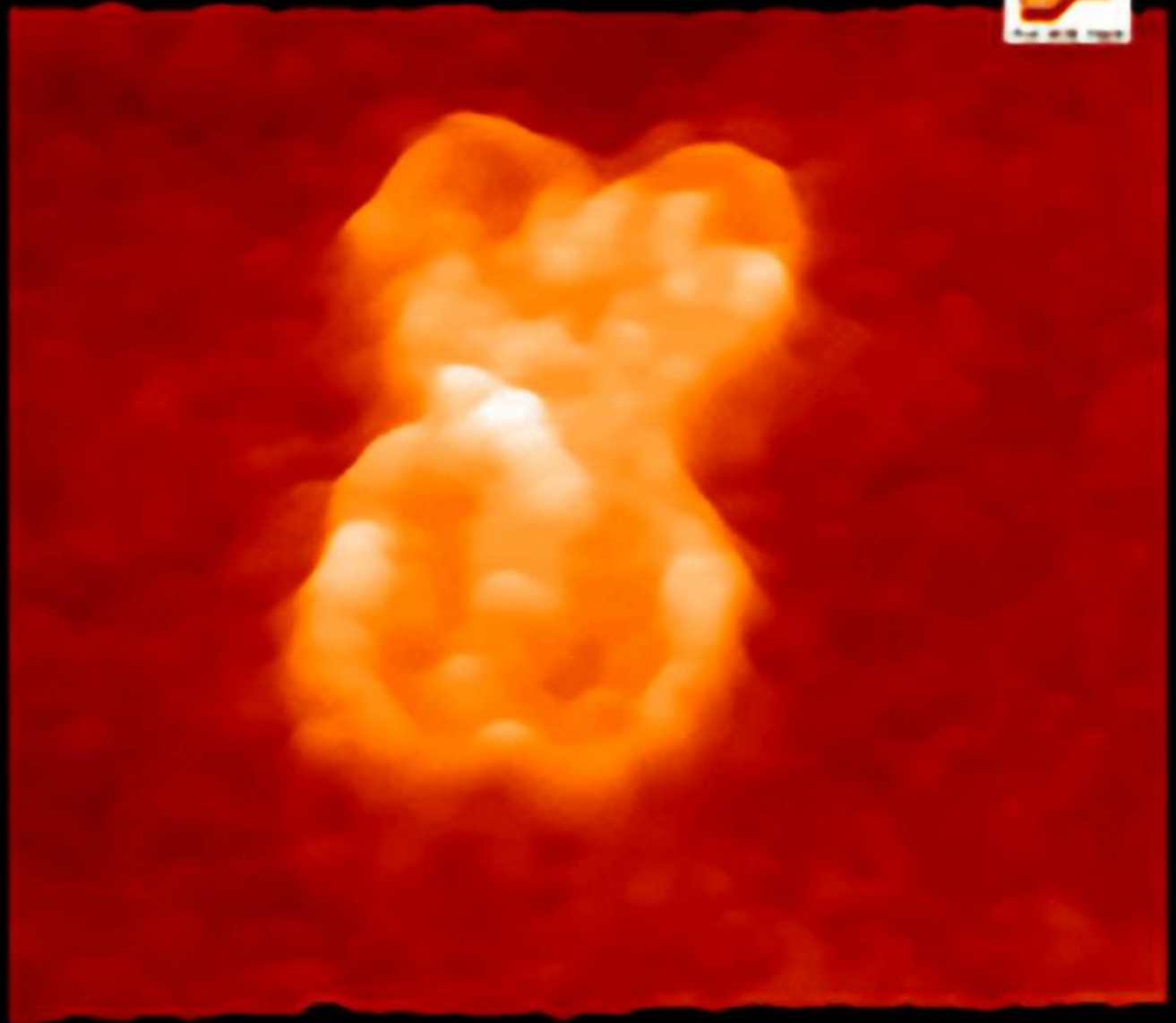
chromosome 19a

(c) Tholhammer
Jamitzky
2000



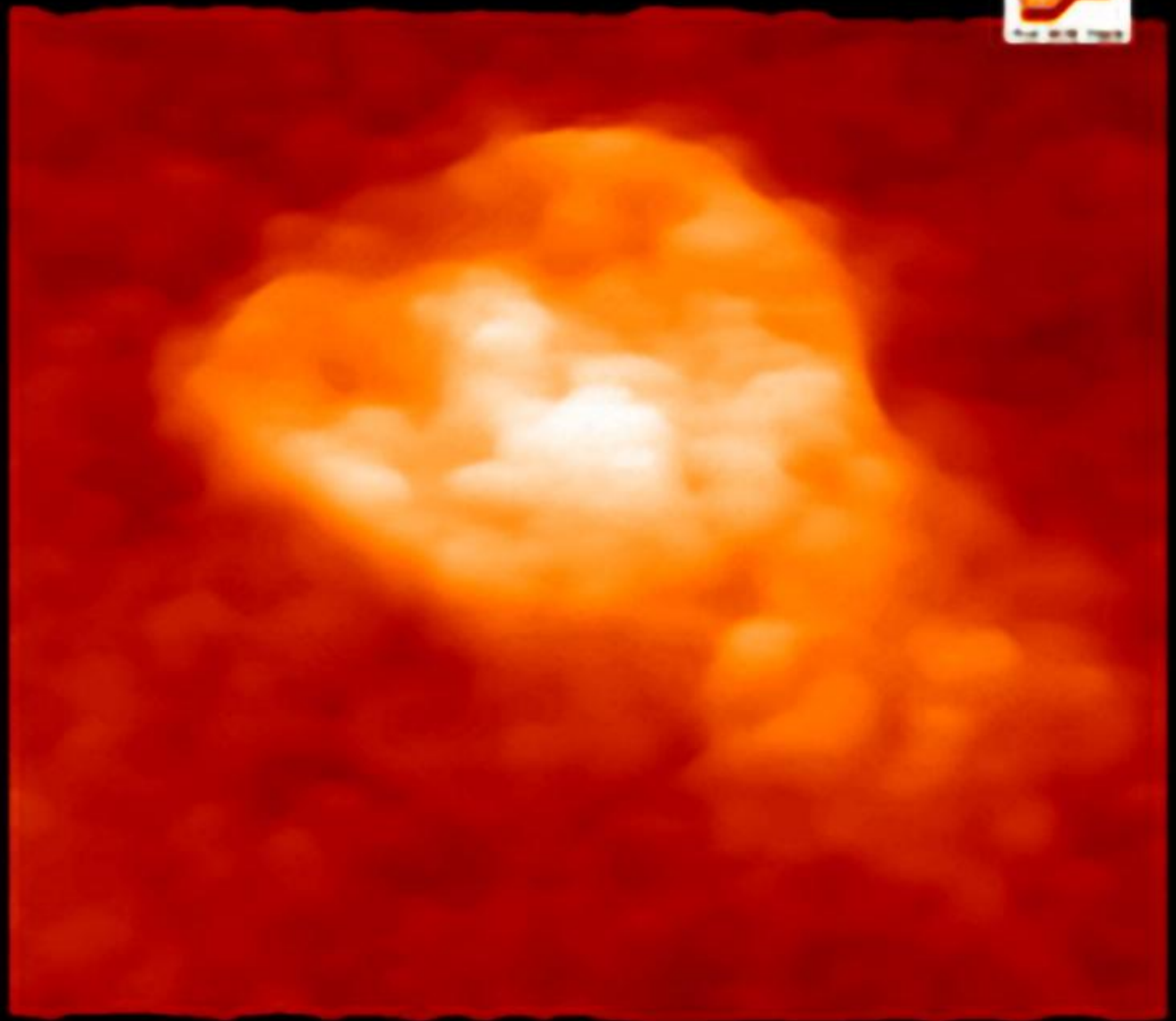
chromosome 20

(c) Tholhammer
Jamitzky
2000



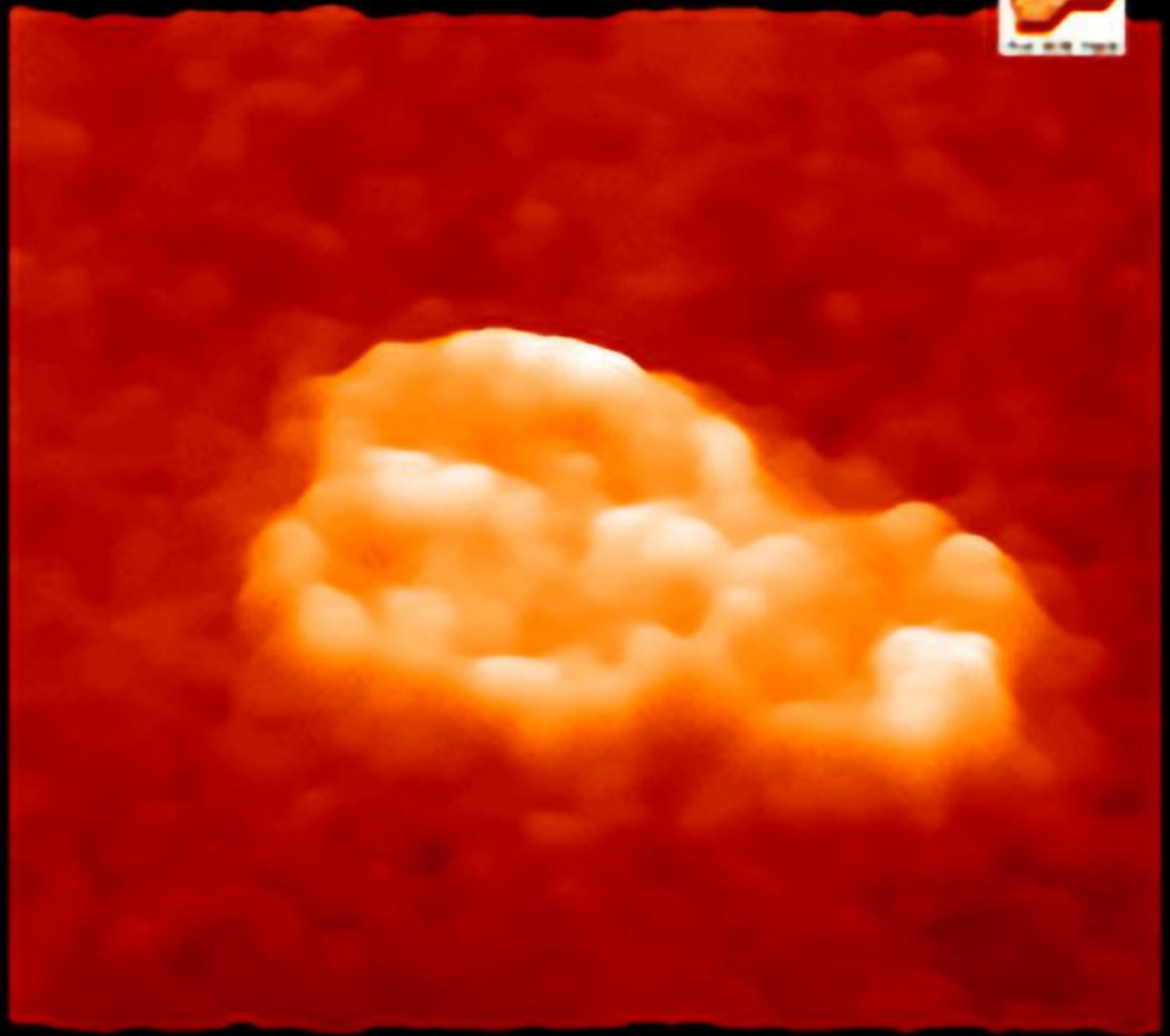
chromosome 21

(c) Tholhammer
Jamitzky
2000



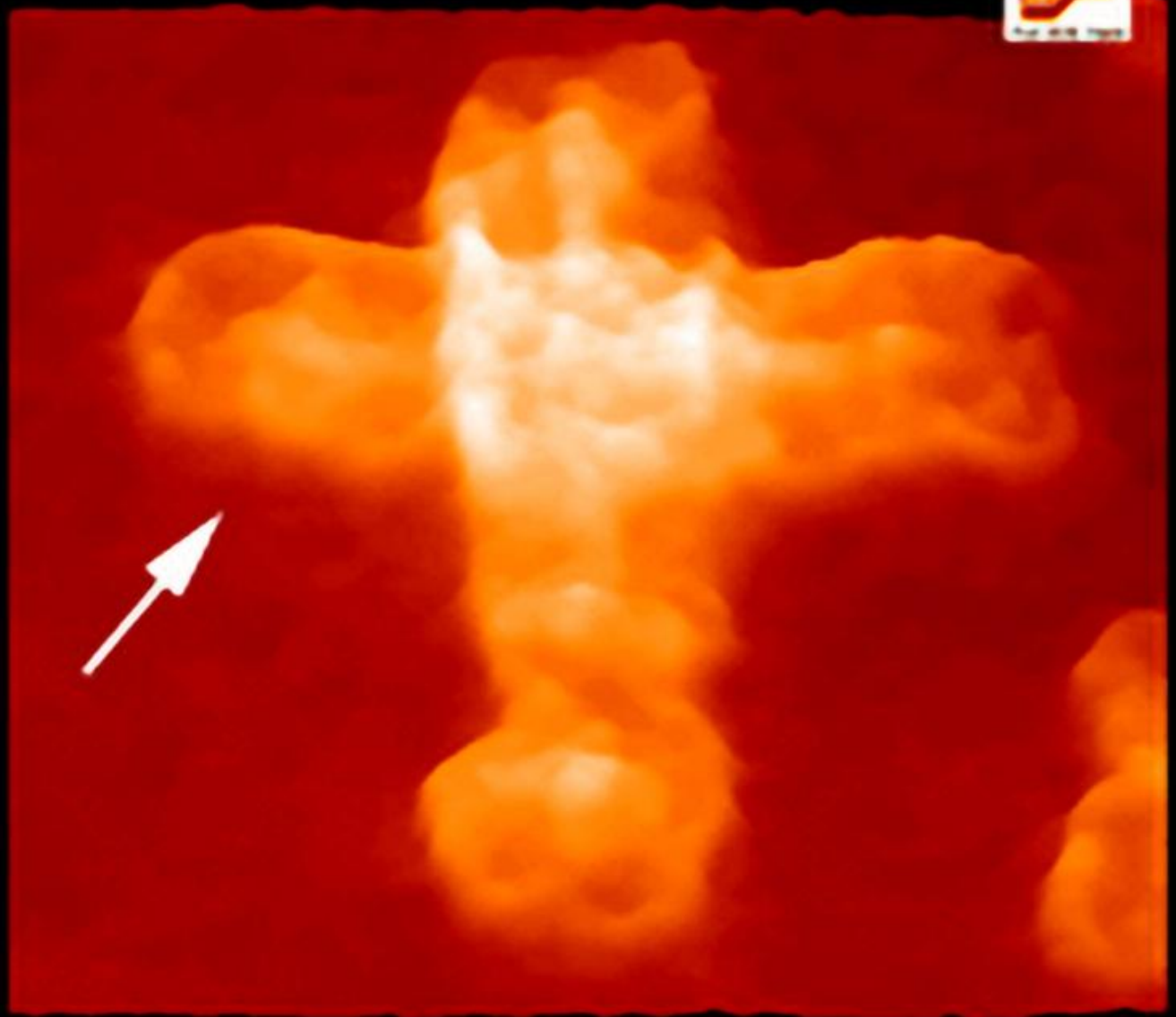
chromosome 22

(c) Tholhammer
Jamitzky
2000



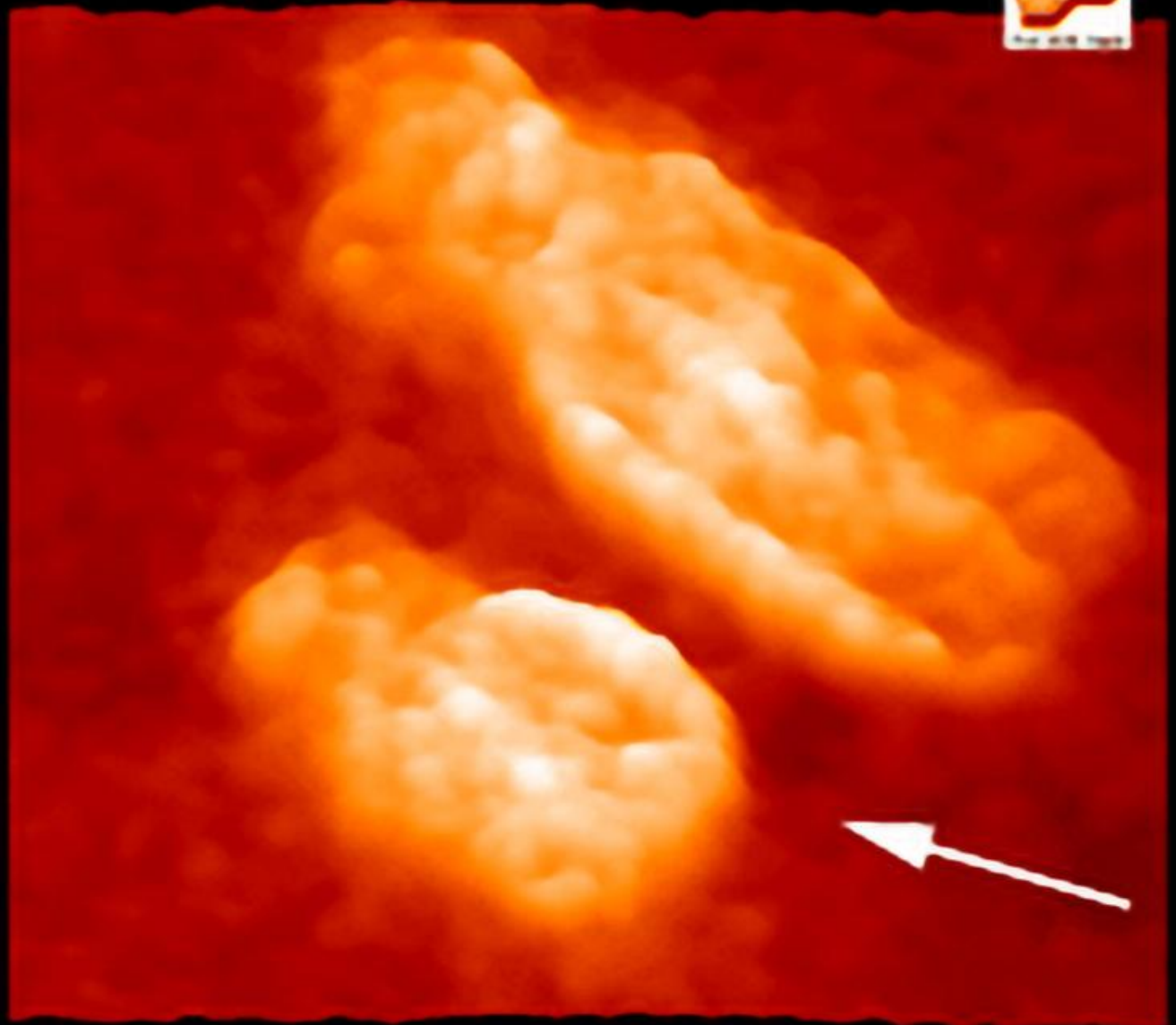
chromosome X

(c) Thorhammer
Jamitzky
2000



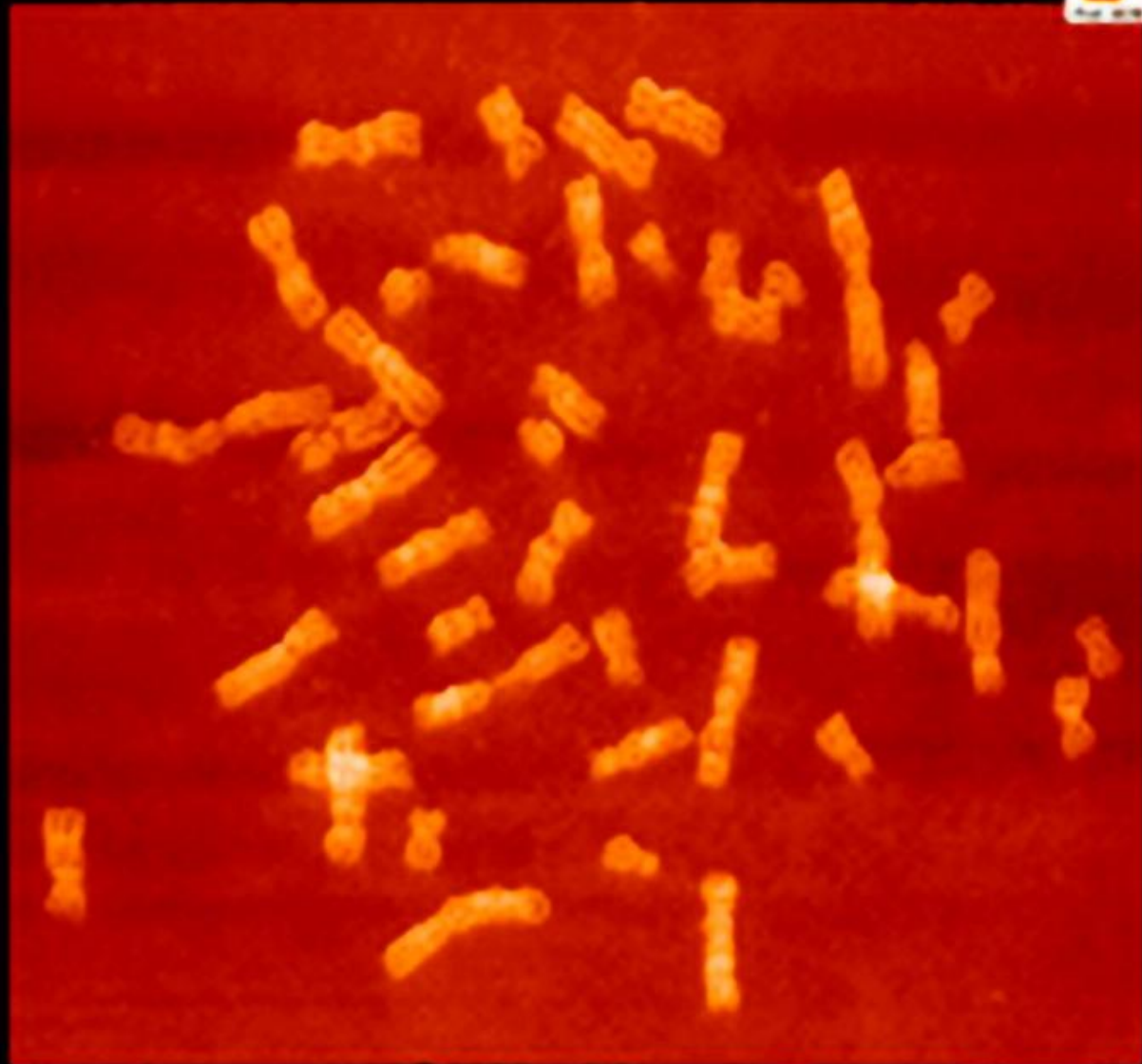
chromosome Y

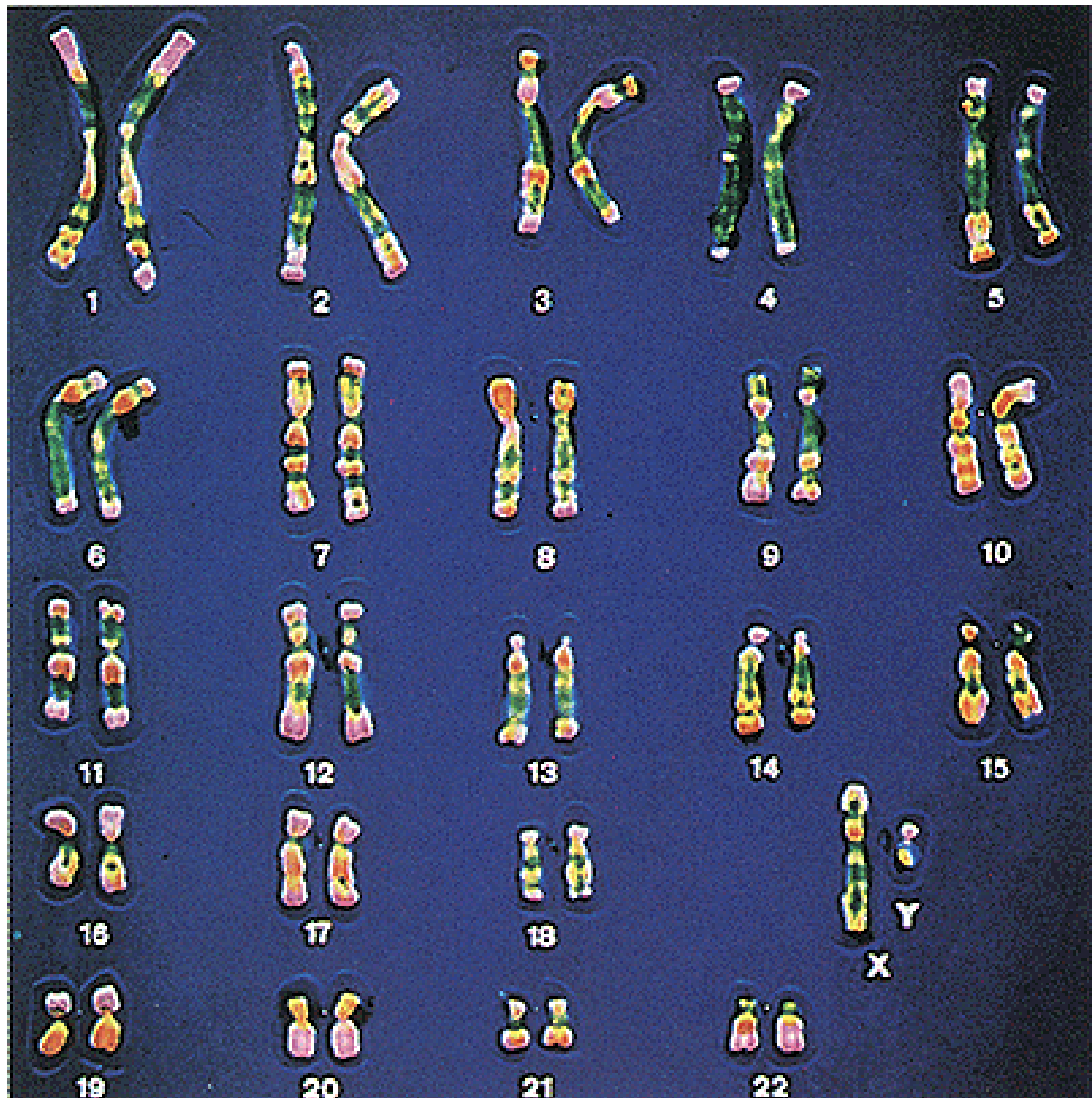
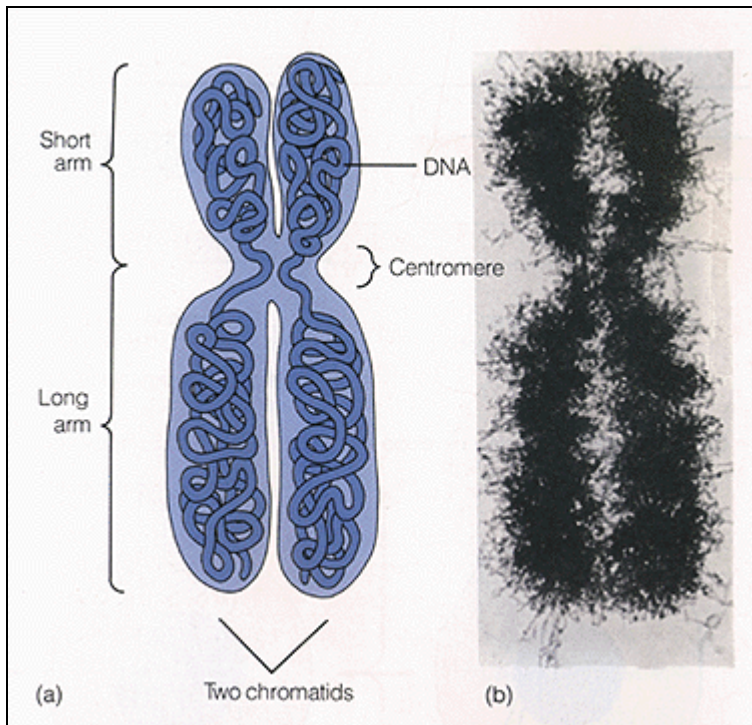
(c) Thorhammer
Jamitzky
2000



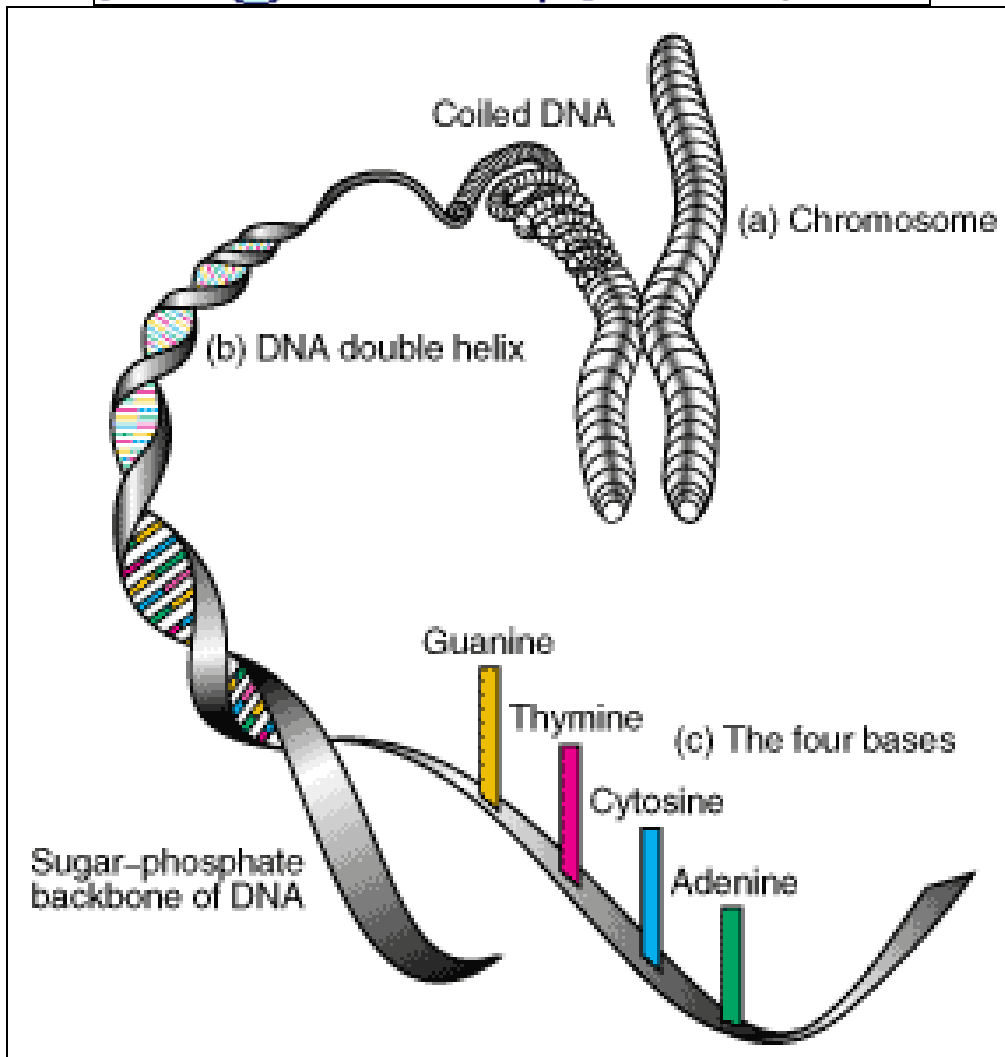
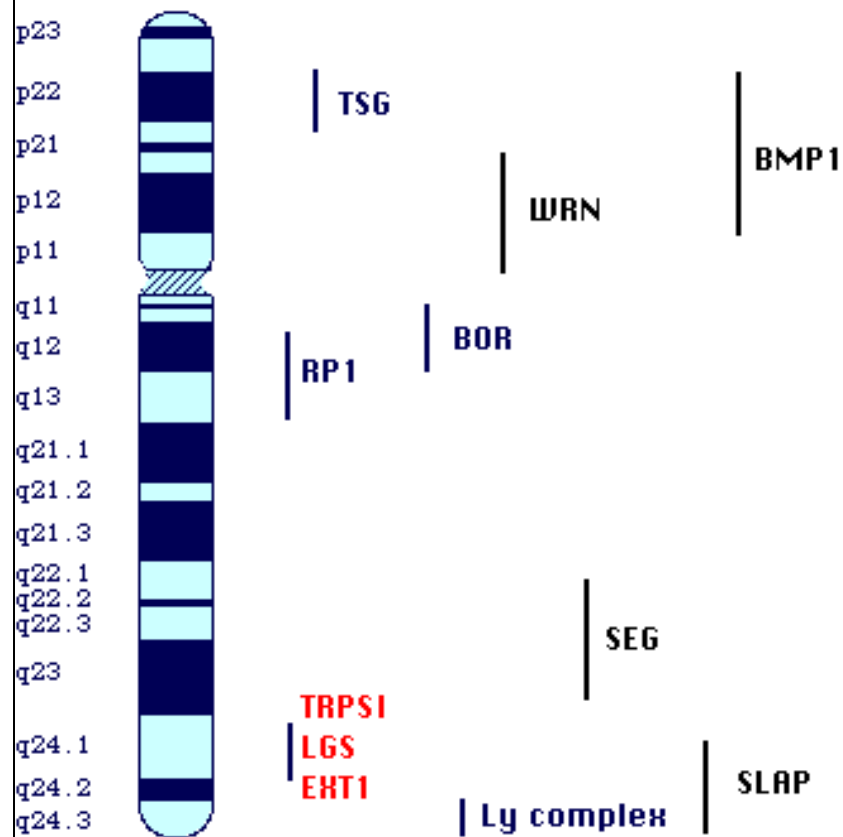
Human Metaphase Spread
46 XY

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Jamitzky
2000





Chromosome 8



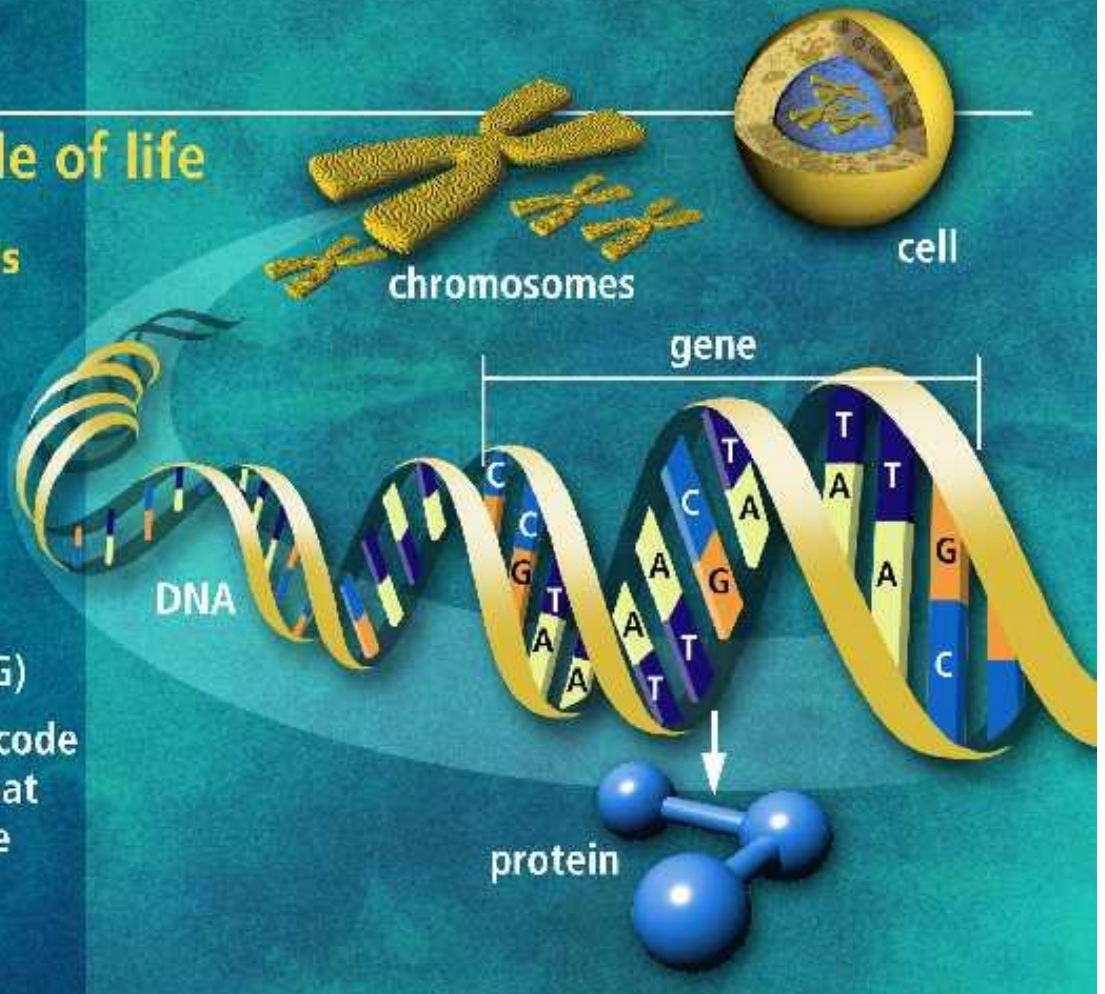
DNA

the molecule of life

Trillions of cells

Each cell:

- 46 human chromosomes
- 2 m of DNA
- 3 billion DNA subunits (the bases: A, T, C, G)
- 80,000 genes code for proteins that perform all life functions



Y:GA 98-090R

Cell → **Nucleus** → **Chromosome** → **Strand of DNA** → **Gene** → **Bases (letters) of the genetic code**

X chromosome

MUTATION IN SPECIFIED AREA CAUSES:

- Duchenne muscular dystrophy
- Retinitis pigmentosa
- Anemia
- Cleft palate
- Hemophilia B
- Colorblindness

Comparing the X and Y

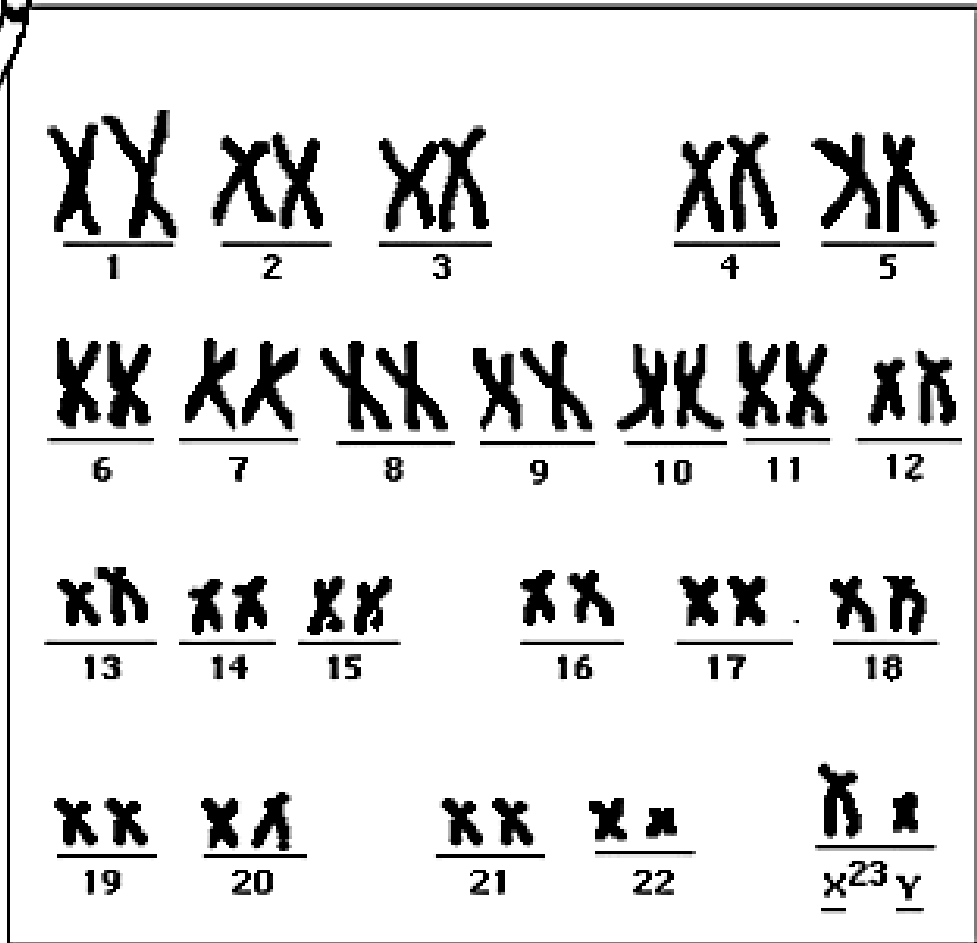
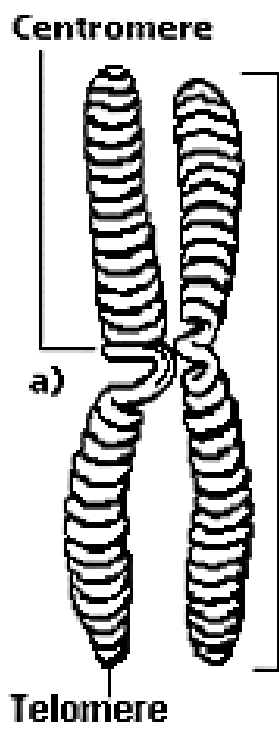
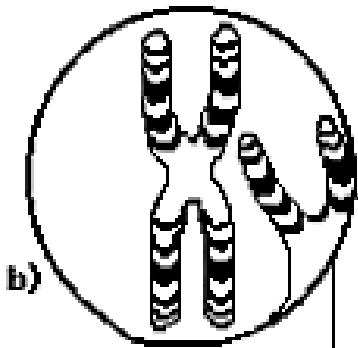
X CHROMOSOME	SOURCE	Mother or father
	BASES	155 million
	GENES	More than 1,000
DISEASES		More than 307
Y CHROMOSOME	SOURCE	Father
	BASES	24 million
	GENES	About 100
DISEASES		3*

Diseases

The X chromosome carries many genes whose mutated forms cause familiar inherited diseases. Defective genes on the X easily lead to disease in males because males don't have a second X chromosome to compensate.

*One of these, male infertility has many variations.

HUMAN CHROMOSOMES



<http://www.accessexcellence.org/AB/GG/human.html>