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- : (Jonathan Latham)
 - : “Genetics Is Giving Way to a New Science of Life“(2017.2.6) / Creative Commons Attribution 3.0 License
 - :
 - :
-

DNA() .
 DNA
 (master molecule) .
 DNA 가
 . DNA (主) (master controller)가
 .
 .

1. DNA

DNA
 (Kary Mullis) DNA “ ” “

”(the big one) . DNA
(James Watson) □DNA: □(DNA: The Secret of Life) “
” DNA .

MIT < >(Broad
Institute) (Eric Lander) □DNA: □
“ ” - (Mary-
Claire King) “ DNA • • •
• ” .

DNA 가
□(Life) DNA DNA DNA

,
□ (Francis Collins)가
□(The Language of Life), □ □(Language of God)
DNA 가 DNA가

DNA
DNA ,
가 DNA •RNA()
, DNA ‘
DNA가 ,

가? □ DNA가 □ DNA가 가
가? 가?
.
DNA가 , 가
.
가 , 가
DNA
DNA , .

2. (systems) .

DNA 가 . 가 (complex systems)
. 가
가 . 가
가 . 가

— , , — .

가 (器官)

, . 가 , .

RNA

DNA가

(Crick, 1970) ,
DNA

가

가

가

DNA

'

'

가

DNA가

가

. DNA

가

DNA

•RNA•DNA가
가

DNA

, RNA

가,

가

가

가

가

DNA

DNA

DNA

DNA

' , ' , ' , ' . ' '(expression)

DNA

DNA

DNA가

가

DNA가

(transcriptional variation)

” (Chick et al., 2016)

24

(the circadian rhythm)

DNA가

가

(Nakajima et al., 2005).

DNA

가

가

DNA

(Nobel, 2003)

DNA

, DNA

DNA

DNA

DNA

”

가

가

(emergent properties)

‘DNA

’(a relational model)

RNA

(input)

DNA

RNA

(Carl Woese)가

가

(Denis Noble)

가 가 DNA

3. DNA가 ' ' 가 ' ' ?

DNA가

RNA

(viroid)

DNA

DNA

RNA

RNA가

RNA가

DNA

DNA RNA

RNA DNA

RNA DNA

□ RNA

() DNA

□ RNA

DNA

(modification)

가

. (A, C, G, T 가) DNA

가 가 DNA

가 (epigenetics)

. RNA 가 (A, C, G, U) 가

RNA가

□ RNA DNA

1%

가

99%

RNA

DNA

□ RNA가 DNA

. RNA

가

가 RNA

RNA가

DNA

RNA가

DNA

RNA

가 DNA

. DNA

(司書)

가

DNA

가

RNA

가

DNA

가

RNA

4. DNA

DNA

『 』

DNA가

가

가

1.

2.

DNA

가

(, ,) DNA가 가
(Carter, 2016).

()
『 』

가 가 (e.g.
Kauffman, 1993; Carter, 2016). DNA가
가

DNA가 가 가
가 (Batten)

“ (“Self-organization proposes what natural selection disposes”
(Batten et al., 2008)

. DNA

3

(Munson et al., 1996). (+

charge) . DNA가

DNA

(PH), □

3 (APT) , (chaperones)

(molecular channels) 가 가

DNA

DNA ()

(ultra-determinist)

가

DNA

DNA

가

가

(Patrick Bateson)—

— “
(genotypes)

”

가

DNA가

DNA가

DNA가

가

가

5.

가

RNA

DNA

가

. DNA

DNA

DNA

(種)

DNA

DNA

가

가

가

DNA가

(落果)

6. DNA

(Robert Rosen) “

8

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가

DNA
RNA

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DNA

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‘DNA

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DNA

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DNA

가

가

(e.g. Kaufman, 1993; [Strohman, 1997](#); Rose, 1999;

Woese 2004; Annala and Baverstock 2014; Friston et al., 2015).

가

DNA

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가

(Ioannidis, 2007; [Dermitzakis and Clark, 2009](#); [Manolio et al., 2009](#)).

가

(Pasteur)

가

(Carl Woese)

“

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([Badylak, 2016](#)).

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.([Strohman, 1997](#))

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7.

(Helmholtz machine)

. , ()

(reviewed in Clark, 2013).

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가 가 (가) 가

가 , 가 가

가 “ ” () “ ” ()

가 . 가

(Friston, 2010).

, .

(the vascular system).

2
2008).

(Wheeler and Stroock,

(掌心).

가

(metabolon) .

(metabolon)

3
(metabolic pathway)

30%
(Laursen et al., 2017).

(homeostasis)

가 . 24 .

가

가 . 1972

(Nicolas Rashevsky)

(Robert Rosen) AH (AH Louie)가 .

가? (What is life?)

(Erwin Schrödinger), (Stuart Kauffman), :

1933)

(Stuart Kauffman), :

(Lifelines: Biology beyond determinism, 1997)

(Steven Rose), (The Art of Genes, 1999)

(Enrico Coen), (The Music of Life, 2003)

: (Dance to the Tune of Life: Biological Relativity,

2017) (Denis Noble), 2

(Annala) (Baverstock) .(Annala

and Baverstock, 2014; see also Friston et al., 2015).

가

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—

가 'RNA

'RNA

DNA

가 'RNA

'-RNA' 가

-RNA (Carter, 2016) RNA

가 () 가

(1 2) 가

. 1 2 (가

) 가

RNA

가 (Carter 2016). RNA

RNA 가 가 가

가

. RNA

-RNA

가

, RNA가

(a replication-first theory)

(a metabolism-first theory)

RNA

8. DNA ()

“ 가

(life)

가

가

가

,

가

.” [Anand et al., 2008](#))

(Craig Venter)

가

가

DNA

DNA

가?

가?

가?

Meaning of Life")



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