

-

()

... , ... ,

);

(;

1.

()

(, ()) - pH 0) 25 °C 1,0 / (-

(-) - 0. pH 7,0 -

- -0,42 . -

- pH 7,0. -

() - °.

1 -

1.

(- , °).

25 °C 1 (1,0 1 /)

2 ++ 2 ~

1 2*

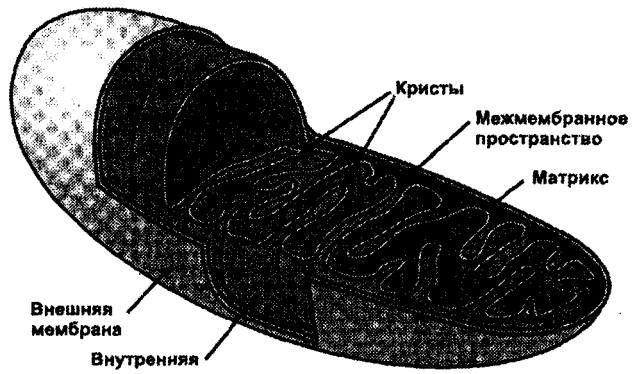
« ? » 2016, 1, .8): (.

$$-E^{\circ} = -\frac{nF\Delta E^{\circ}}{RT} = -\frac{nF\Delta E^{\circ}}{2.303RT} \log K$$

I—

()	()		E°,
2 +2 ~	2	2	-0,42
- + +2 +2 ~		2	-0,38
+ +2 +2 ~		2	-0,33
+ +2 ~		2	-0,32
+ +2 '		2	-0,32
1,3- +2 +2 ~	- - +	2	-0,29
() +2 +2 ~	2 ()	2	-0,23
() +2 +2	2	2	-0,22
+2 +2 ~		2	-0,20
+2 +2 ~		2	-0,19
() +2 +2		2	-0,17
2+	2' ()	1	-0,16
- + NH ₄ ⁺ +2 +4.2 "	+ 2	2	-0,14
() +2 +2	2 ()	2	-0 -0,30
+2 +2 ~		2	0,03
Q + 2H ⁺ + 2e ⁻ ~	QH ₂	2	0,04
+2 +2 *		2	0,06
b (+3) +	b (+2)	1	0,07
Cl (+3) + ~	I (+3)	1	0,23
(+3) + ~	(+2)	1	0,29
2 +2 +2 ~	2 2	2	0,30
+2 ~		2	0,36
NO ₃ () +2 +2 ~	NO ₂ ~ () + 2	2	0,42
(+3) + ~	3 (+2)	1	0,55
2 2 +2 +2 -	2	2	0,82

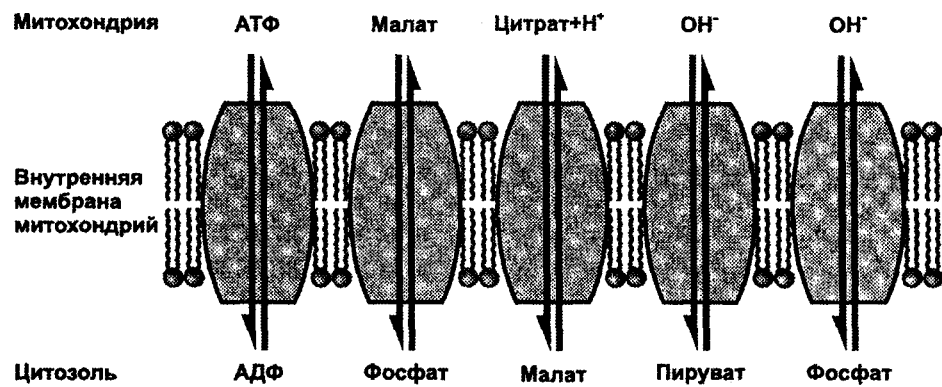
90 %)
 2 2;
 (. 2). 2)
 ()
 : ()
);
 3)
 :
 1)
 2 ()



1 —

(. 2).
 - 22 — 37 — 16 569
 - 12S 16S , 2 — («
 - (. 3).
 3 —

	I	II	III	IV	
-	7 (ND1-ND6)	0	1 (Ctyfe)	3 (COI-)	2 (6- 8)
	-36	4	10	10	-14



---- ^ 4 1 V- ().

te , , Q (I, II, III, IV, V).

: (2,)

> ; MX 2 4. ()

[(+ (2)) -
: . , - , -
) 70 % 30 % -

3.

, - -
, (,
, : 1) 2. + +
2) , Fe³⁺ (+ -); (-
, (: ~), - 3. -

4.

+) (+ -
•). (SH₂+ + S+ + +;
SH₂+ + S+ + +.

5.

[(- + +. - (+ (+), -
(- + +. - (+ (+), -
, ()

6.

() 2 (3.) 1 10 (:
2 (- , “). 6,7-
4.

7.

+ + + +
, - , (»
, -), , (,
+ + + + : 5. -
().

8.

+ + — 10 10^{-5} , -
+ / , - « » (Q, KoQ).
- + : 1. Q — <
Q
+ , - 10
 Q_iQ .
, (-
,)].

9.

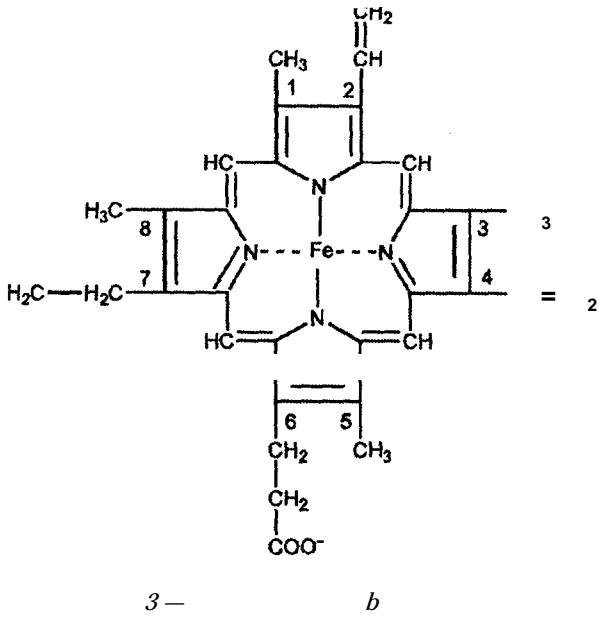
, - 2.
(/ , (QH) (QH₂) coo
) 3.

1.

() — 4. Q
() — ,
6,7- , - 1. 5 : ,

2.

+ . — 3
2 -
2 —



IX,

1

Cj

> . 1) 8-

2) 2-

(15); 3)

4.

4 —

	~ - ()- 2 ⁻
	R ₄ = - = 2
	R ₈ = -
	R ₂ = - = 2
	R ₄ = - = 2
	R _s = - 3
	R ₂ = -CH(CH ₃)-S-R
	R ₄ = -CH(CH ₃)-S-R
	R _s = -CH ₃

6.

7.

Fe (*Fe*³⁺ ; *Fe*²⁺)

(+ +).

(*FeS*)

FeS-

Fe,

).

FeS-

().

FeS-

FeS-

SH-

FeS-

() (. 4).

[2FeS-2S],

2

2

(. 46).

4

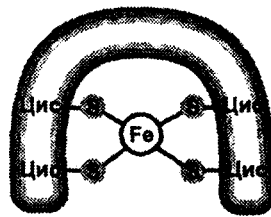
, [4Fe-4S],

4

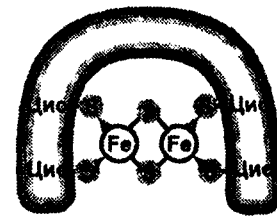
, 4

4

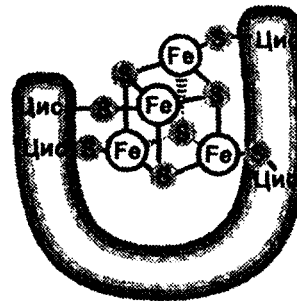
(. 4).



a



б



4 —

[D. L. Nelson, . . .]

Rieske FeS- -0,65 +0,45 :
 FeS- , Fe -
 FeS- Fe²⁺ Fe³⁺]

4.

(, *Electron transport chain*) — I II >
 : I — ,
 KoQ² III , KOMnnef
 ()
 ()
).
 ,
 ,
 (.5).

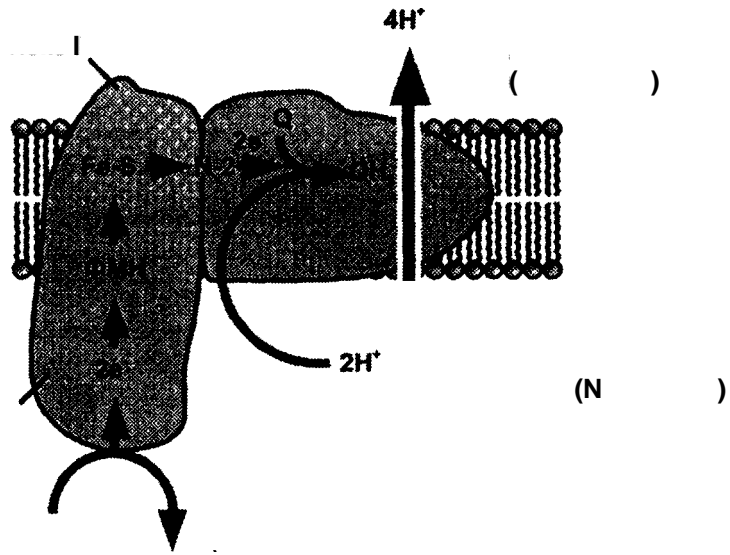
5—

	()		{
I. (- ^_)	850	42 (14)	, FeS
II. (- -)	140	5	, FeS
III. (KoQ- -)	250	11	, FeS
*	13	1	
IV. (-)	160	13 (3-4)	, ,

. * ; »

III IV.

I (-) - ()
 Q (.5)) - , ()
 1. — 45 , (— ;
 14 , -
 . (— ;
 . -
 . 2. .
 , (L- I,
). -
 . 2 ~ >



5- - }- [D. L. Nelson, . . .]

FeS- N-2 FeS- N-2 1. II (II) -

2. : Fe. FeS-

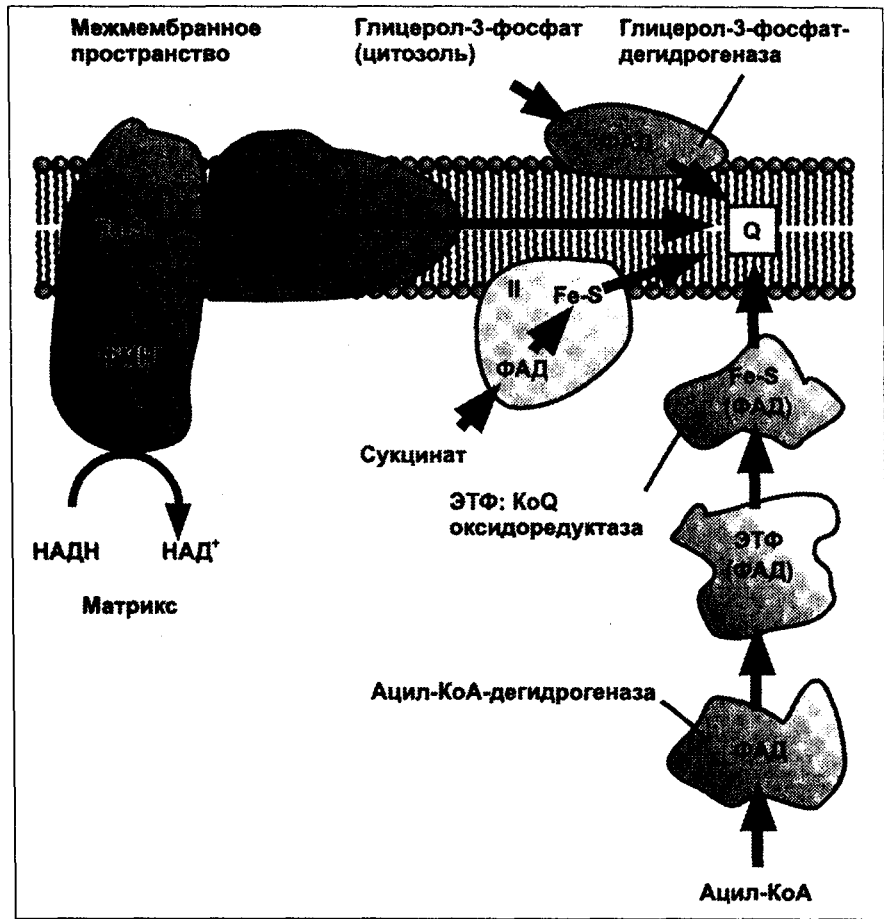


FeS- Q. 3.

4. II (. 6). ()

» (), : Q. 5. - - ,

: + 5H_n⁺ + Q -> + + QH₂ + 4 + , legative) — (), (positive) — Q. 6. Q (QH₂) I III,



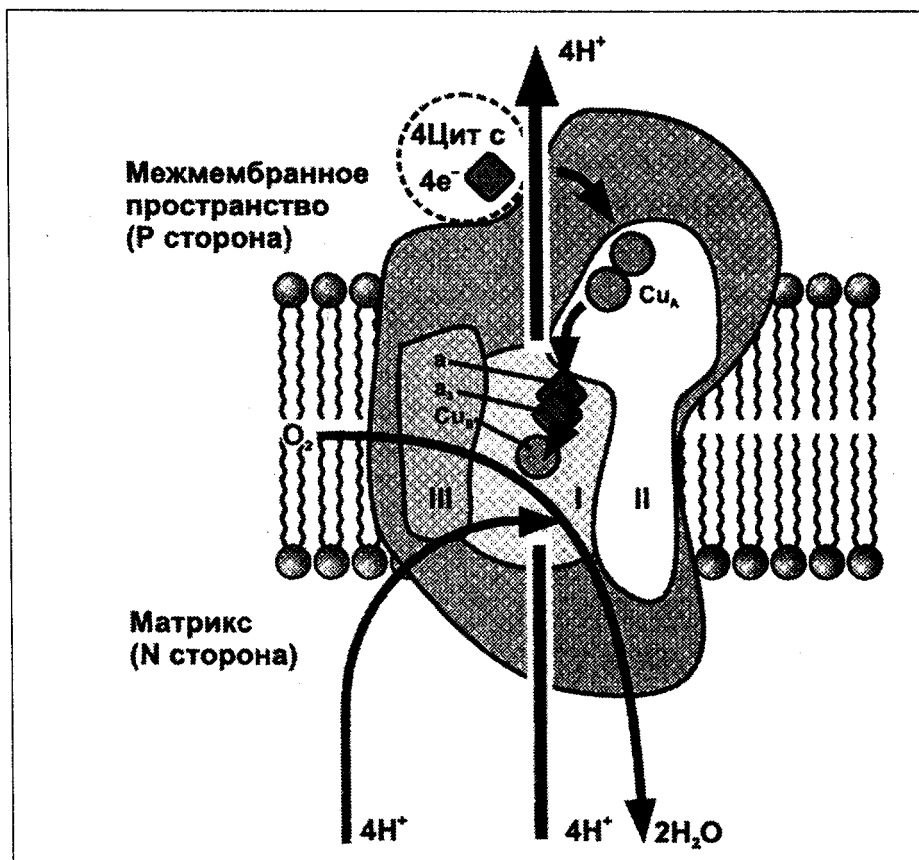
6—

[D. L. Nelson, . . .]

-3-

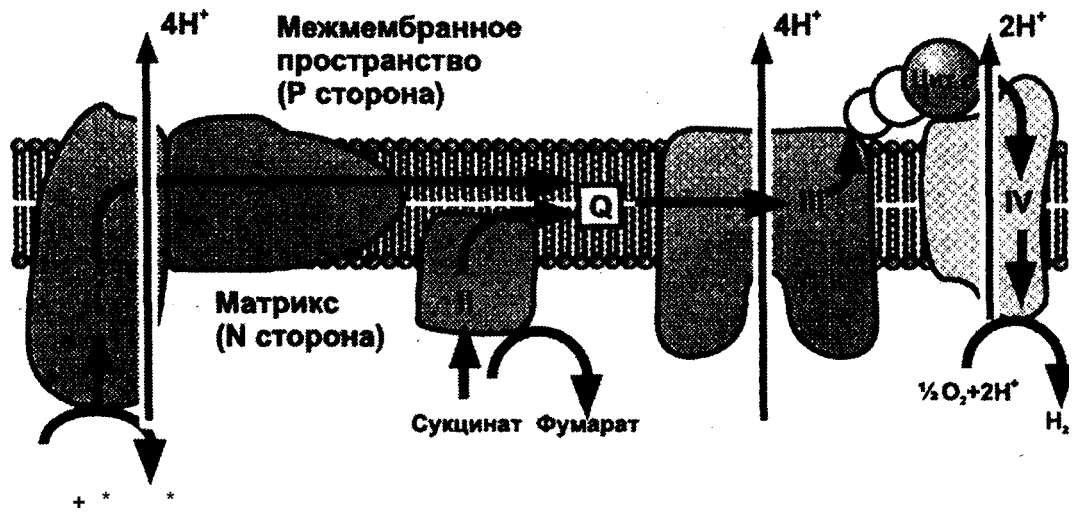
Q. 6 : III
 I, II -
 Q () .
 III (KoQ-)
 Q () , - Q, <
 KoQ- 2 11 !
 & Fe-S- III,
 7. : QH₂
 Q QH b (+2) QH Fe-S (+2) +3 (+2)
 QH b (+3) ** QH₂ Fe-S (+3) ** c_f (+2) (+3)

III
 :
 $-2 () + 2 H^+_N \rightarrow$
 $2 () + 4 ^+$
 Q-),
 : QH_2
 IV
 (13 , . . . 204 000)
 (),
 $(Cu^{2+} \rightarrow Cu^{1+}) (. 8)$
 III
 IV $\rightarrow Cu_A \rightarrow Fe \rightarrow Fe^{3-}$
 «³»
 3



8—

IV [D. L. Nelson, . . .]



9—

[D. L. Nelson, . . .]

! , -

IV, -

(N 4 « » +) ,]

2 .]

- +

() 4

+ (.9).

Q

I II. QH₂

III, QH₂

IV —

4 (.) + 8H_N⁺ + 2⁻ ->

-> 4 (.) + 4⁺ + 2₂ .

IV]

H₂S, HCN, (Fe³⁺)

Q.

(.)