

M	T	W	T	F	S	S	A U G 18
		1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	
27	28	29	30	31			

Week 29

Day 203 • 162

Date 22 • 07 • 2018

July 2018

22

Sunday

Key Point:- Oxidn of 1 molecule of pyruvate through the citric acid cycle produces:-

- (i) 3 molecule of CO_2
- (ii) 4 NADH and 1 $FADH_2$
- (iii) 1 molecule of ATP

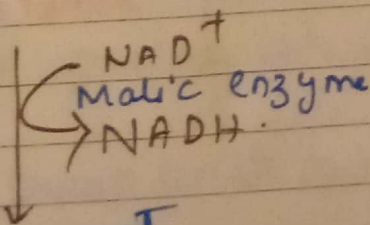
Diff betⁿ CA cycle of plants and animals

(i) The step catalyzed by Succinyl-CoA Synthetase produces ATP in plants and GTP in animals.

(ii) A feature of the plant citric acid cycle that is absent in many other organisms is the significant activity of NAD^+ malic enzyme, which has been found in the matrix of all plant mitochondria analyzed to date.

If there is an inhibitor in glycolysis pathway i.e. no pyruvate is not produced in optimum amt, then NAD^+ malic enzyme can convert malate directly to pyruvate. This is possible only in case of plants.

Malate



23

Monday

Week 30

Day 204 • 161

Date 23 • 07 • 2018

July 2018

	M	T	W	T	F	S	S
J	30	31					
U	2	3	4	5	6	7	8
L	9	10	11	12	13	14	15
18	16	17	18	19	20	21	22
	23	24	25	26	27	28	29

8.00 All the hydrogen atoms from the original glucose are now on hydrogen carriers, NAD and FAD.



10.00 These hydrogen carriers enter the next phase known as respiratory chain or Electron Transport Chain (E.T.C) for further release of energy.

12.00 Complexes involved in ETS:

1.00 The e^- transport chain catalyzes an e^- flow from NADH (and $FADH_2$) to oxygen, the final e^- acceptor of the respiratory process.



2.00 ETS in plants contain multiple NADH dehydrogenases and an alternate oxidase.



E.T.S catalyses an e^- flow from NADH to O_2 (final e^- acceptor).



Process carried out by 4 integral membrane bound enzyme complexes in inner mitochondrial membrane.

Doubt: Are these

M	T	W	T	F	S	S	
6	7	8	9	10	11	12	A
13	14	15	16	17	18	19	U
20	21	22	23	24	25	26	G
27	28	29	30	31			18

Complex I (NADH dehydrogenase).

Electrons from NADH are oxidized by Complex I.

↓
 The e^- carriers in Complex I include a tightly bound cofactor FMN and several Fe-S centers.

↓
 Complex I transfers these e^- to ubiquinone (a small lipid soluble e^- and proton carrier, located within the inner membrane).

↓
 $4H^+$ are pumped from the matrix to the intermembrane space for every e^- pair passing through the complex.

↓
 Complex I is inhibited by Rotenone (inhibitor).

Complex II. (Succinate dehydrogenase).

Oxidn of succinate in the citric acid cycle is catalyzed by this complex II.

↓
 The resulting e^- are transferred via the $FADH_2$ and a group of Fe-S protns into the ubiquinone pool.

↓
 This complex does not pump protons.

Complex III (cytochrome bc₁ complex).

This complex oxidizes reduced ubiquinone and further transfers the e^- to cytochrome c.



$4H^+$ are pumped per e^- pair by complex III.



Cytochrome c is a small protein loosely attached to the outer surface of the inner membrane and serves as a mobile carrier to transfer e^- betⁿ complexes III and IV.



Complex III is inhibited by **Antimycin** (inhibitor).

Complex IV (cytochrome c oxidase).

Complex IV is terminal oxidase.



Complex IV contains 2 copper centers and cytochrome a and a₃.



$2H^+$ are pumped per e^- pair.



Complex IV is inhibited by CO, cyanide and azide.