

Energy From Fatty Acids

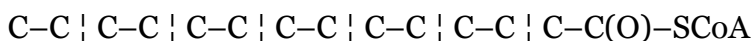
- Activation of the fatty acid costs 2 ATP. (It happens just once in the 1st step.)
- Each cycle of β -oxidation produces 1 NADH and 1 FADH₂.
- Each acetyl CoA produces 3 NADH, 1 FADH₂ and 1 ATP.

In the electron transport chain:

Each NADH \rightarrow 3 ATP.

Each FADH₂ \rightarrow 2 ATP.

For a 14-C fatty acid:



6 “breaks” in the chain must be made and this means 6 cycles of the β -oxidation.

From the fatty acid we produce 7 molecules of acetyl CoA.

Net Energy:

| Step | ATP |
|----------------------|-----------|
| Activation | -2 |
| 6 β -oxidation | |
| 6 NADH | (x 3 ATP) |
| 6 FADH ₂ | (x 2 ATP) |
| | +18 |
| | +12 |
| 7 acetyl Co A | |

From Citric Acid Cycle we get:

| | | | |
|--|-------------|-----------|----------------|
| 3 NADH | (x 7 times) | (x 3 ATP) | +63 |
| 1 FADH ₂ | (x 7 times) | (2 ATP) | +14 |
| 1 ATP | (x7 times) | | +7 |
| <hr style="border: none; border-top: 1px solid black; margin-bottom: 5px;"/> | | | |
| TOTAL | | | 112 ATP |