

Mitochondrial Disease and Exercise

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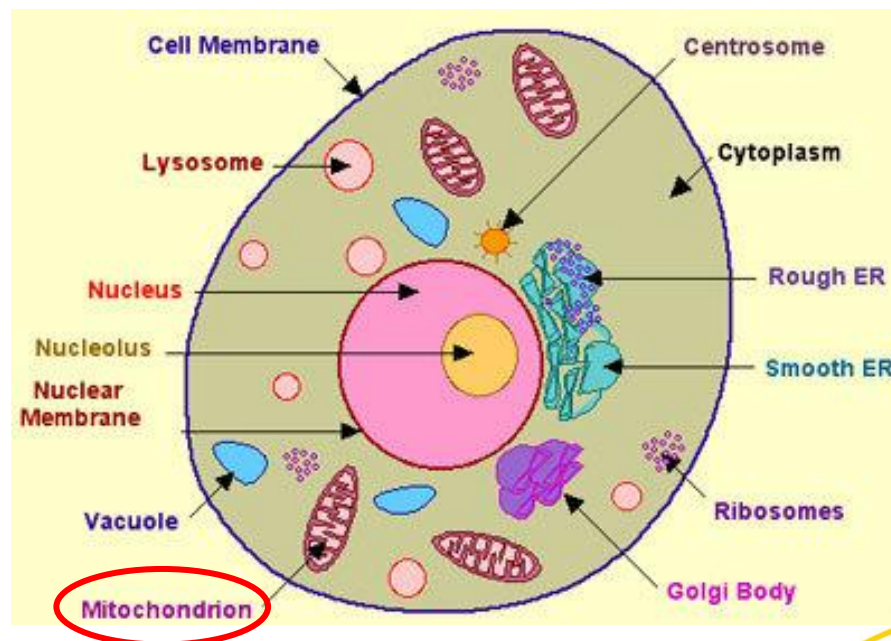


What will be covered

- What is Mitochondrial disease (MD)?
- Why do we exercise?
- Benefits of exercise for people with MD
- Types of exercise that may help
- Monitoring during exercise sessions
- Other considerations
- Questions?

What is Mitochondrial Disease?

- **Mitochondrial disease (MD)** is due to a fault in one or more genes that make up mitochondria causing a hiccup in the production of Mitochondria from the time of conception.



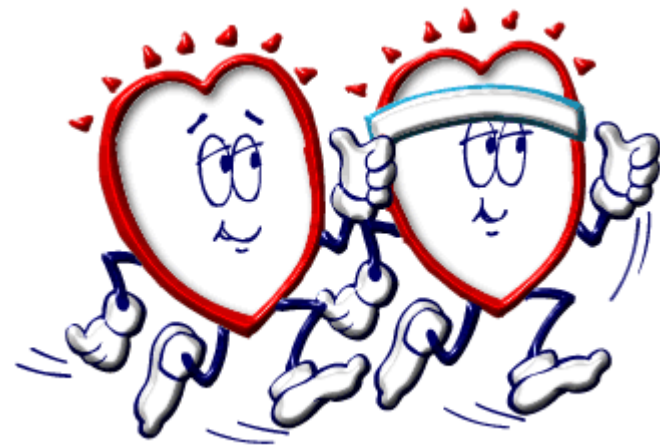
Exercise versus Physical Activity

- **Physical Activity**...is movement that is carried out by muscle movement requiring energy.
- **Exercise** is...planned, structured and intentional physical activity completed to work on cardiovascular fitness and strength.



Why do we exercise?

- Improved cardiovascular fitness
- Maintain healthy weight
- Reduce risk of developing comorbidities
- Maintain physical mobility and independence
- Improve Mental health status



Types of Exercise

- **Resistance versus endurance**

- *Resistance* exercise is any form of exercise that forces your skeletal muscles to contract

- For example: free weights, resistance bands, cycling

- *Endurance* exercise is the act of exercising to increase endurance

- For example: Walking, swimming and body-weight exercises



Benefits of exercise for people with Mitochondrial Disease



If completed in the correct manner, exercise can:

- **Alter the ratio** of mutated to wild-type mitochondria (Taivassalo et al.)
- Improving oxygen use, muscle function and overall metabolism efficiency (Murphy et al. 2008 & Taivassalo et al. 2006a, b)
- Ultimately resulting in improvements in **quality of life**



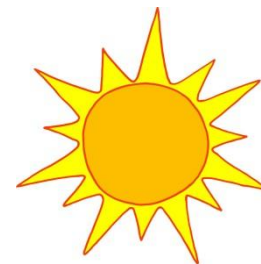
Monitoring during Exercise

- Noting early **signs of fatigue** and time of onset
- Self-monitoring (own awareness of signs)
- Timed play and planned breaks
(e.g. 10 minutes of playing and 10 minutes of quiet game OR on the sideline being score keeper)
- Stopping **BEFORE** exhaustion
- Monitoring response to different types of exercise



Other Considerations

- Weather conditions (e.g. temperature)
- Time of day (e.g. morning or afternoon)
- Current health (e.g. sickness)
- What else is planned for the day?
(e.g. community appointments)
- Assistive technology (e.g. walker)



Client's Story

- Knowing their energetic times and utilising them
- Varying exercise (swimming, walking, body-weight)
- Having rest days
- Noting early signs of fatigue
- Keeping up nutrition
- Use of assistive technology
(e.g. manual wheelchair, modified bike, walker, SPIO suit, Pedro boots, foot orthoses)



Summary:

- Exercise 3x/week (every-other-day)
- Fuel up before, during and after exercise
- Stay hydrated
- Warm up and cool down
- Factor in rest and nutrition
- Goals should be small and achievable
- Stop BEFORE exhaustion

QUESTIONS??



References:

- Taivassalo T, Gardner JL, Taylor RW et al (2006a)
Endurance training and detraining in mitochondrial myopathies due to single largescale mtDNA deletions. Brain 129:3391–3401
- Taivassalo T, Gardner JL, Taylor RW et al (2006b)
Endurance training and detraining in mitochondrial myopathies due to single largescale mtDNA deletions. Brain 129:3391–3401



References continued:

- Taivassalo T, Shoubridge EA, Chen J et al (2001)
Aerobic conditioning in patients with mitochondrial myopathies: physiological, biochemical, and genetic effects. Ann Neurol 50:133–141
- Murphy JL, Blakely EL, Schaefer AM et al (2008)
Resistance training in patients with single, large-scale deletions of mitochondrial DNA. Brain 131:2832–2840