

***Effects of physical activity on Brain-derived  
neurotrophic factor in children: recent findings  
and methodological concerns***

# Physical activity and Brain-derived neurotrophic factor (BDNF)

- Animal studies have identified BDNF as a crucial mediator of the benefits of exercise for brain health. Voluntary exercise increases levels of BDNF mRNA and protein in the hippocampus and other brain regions.
- When it comes to BDNF in humans, the picture is more complex.
- Effects of acute exercise on BDNF  
Research consistently shows that BDNF concentrations are elevated significantly in response to acute aerobic exercise, and the increases return during the recovery period.

Neeper SA, et al. *Nature*, 1995.  
Cotman CW & Berchtold NC. *Trends Neurosci*, 2002.  
Vaynman S, et al. *Eur J Neurosci*, 2004  
Knaepen K, et al. *Sports Med*, 2010

## Cont.

### □ Effects of chronic aerobic exercise on BDNF

Most of published studies reported that resting BDNF levels were increased to some extent after a period of endurance training. Some others did not find the effects.

### □ Effects of strength training on BDNF

The majority of the studies suggest that strength training have no influence on peripheral BDNF.

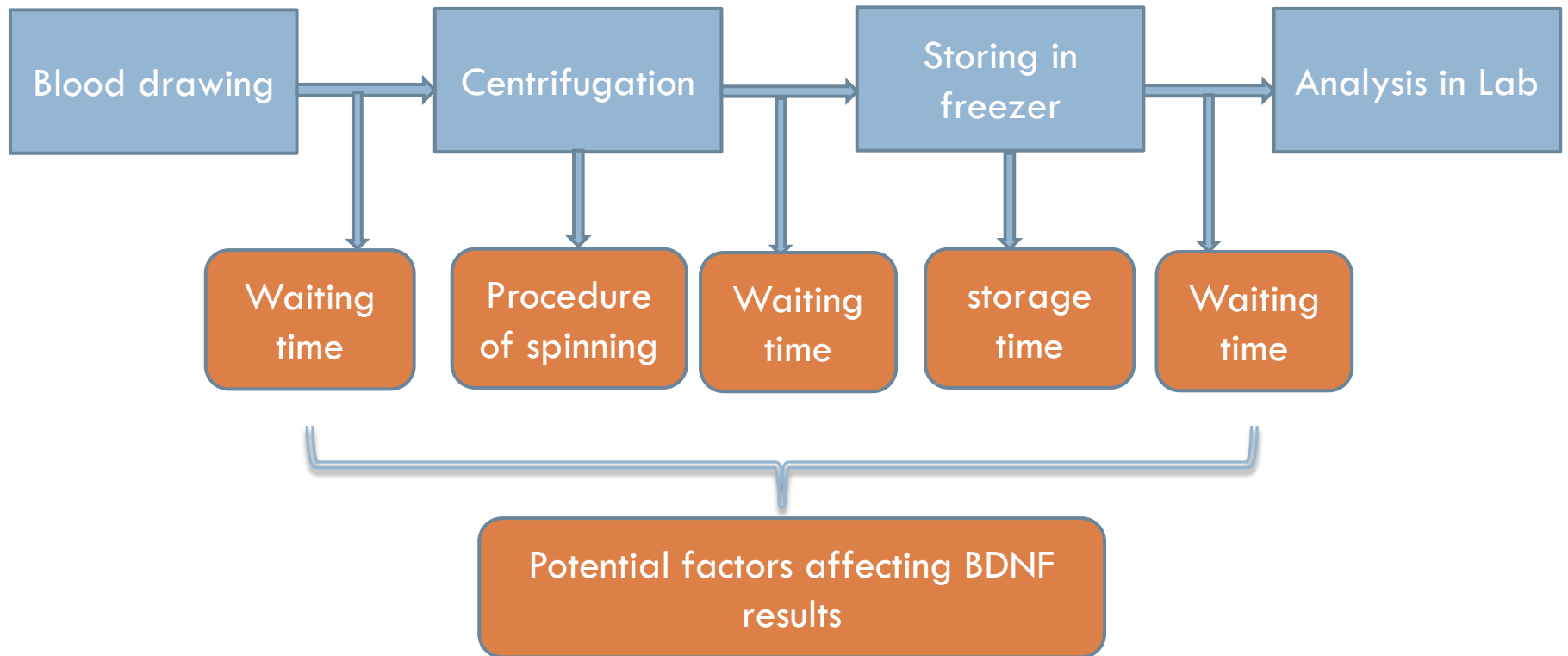
### □ Habitual physical activity, CRF , and BDNF

Some observational studies examined the association between habitual PA or CRF and BDNF, and the results are not consistent.

### □ Besides, recent evidence showed that BDNF is associated with some metabolic risk factors in adults.

# Potential methodological concerns of measuring BDNF

- BDNF is stored in platelets and is released upon platelets activation. Therefore, serum BDNF are usually 100+ times higher than BDNF in plasma.
- Incomplete removal of platelets in plasma
- Different clotting time of serum before centrifugation
- Storage time in freezer
- Pre-analysis storage time after taking out from freezer





Thank you!