

Lithium chloride prevents glucocorticoid-induced growth failure in cultured fetal rat metatarsal bones

Soucek Ondrej, Zaman Farasat, Sävendahl Lars



Fetal rat metatarsal bone (FRMB) at experiment end (i.e. day 14).

Conclusions

- Lithium chloride has the capacity to prevent GC-induced growth failure in cultured fetal rat metatarsal bones.
- The effect is likely to be mediated through Wnt/ β -catenin signalling.
- As lithium chloride is already available for clinical use, our data could potentially open up for a new approach to prevent GC-induced growth failure in children.

DISCLOSURE

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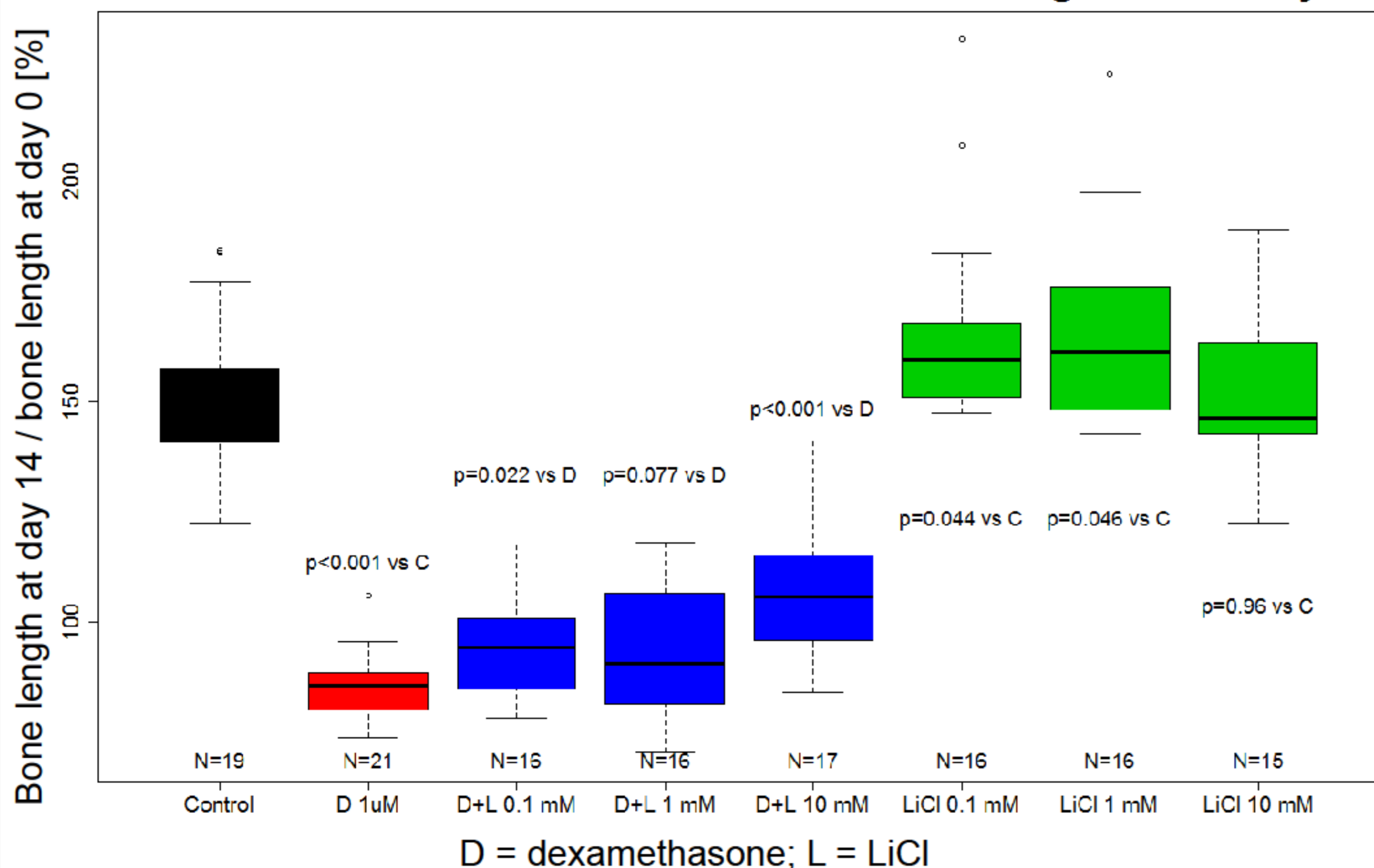
Introduction

Glucocorticoids (GCs) are used to treat numerous chronic diseases in children due to their anti-inflammatory and immunosuppressive effects. However, GCs also cause osteoporosis and impaired linear bone growth, serious side effects partially linked to impairment of Wnt/ β -catenin signalling. There is no therapy available to rescue from the undesired skeletal effects of GCs.

Aim

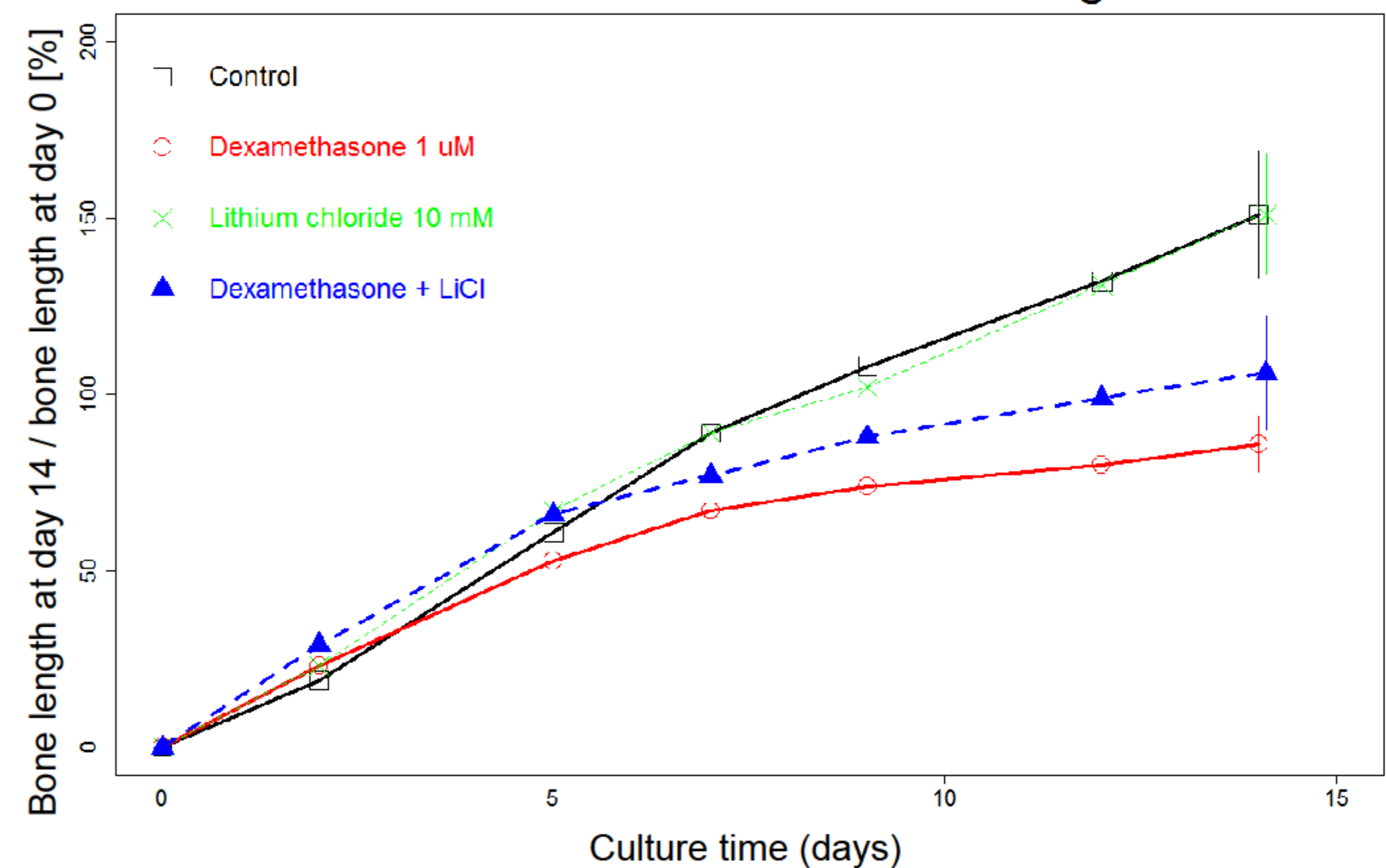
To test whether lithium chloride (LiCl), an activator of non-canonical Wnt/ β -catenin signalling, can rescue from GC-induced bone growth impairment.

The effect of dexamethasone and LiCl on FRMB growth at day 14



The maximum growth rescuing effect was seen by LiCl 10 mM concentration.

The effect of dexamethasone and LiCl on FRMB growth in vitro



While dexamethasone impairs the growth by 43%, LiCl can rescue 31% of the dexamethasone induced growth retardation.

Methods

Fetal (day E20) rat metatarsal bones were dissected out and cultured with control medium (C), 1 μ M dexamethasone (D), 0.1, 1 and 10 mM LiCl (L) or combination of dexamethasone and LiCl for 14 days. Digital pictures were taken at days 0, 2, 5, 7, 9, 12 and 14 and bone length was assessed using Image J software. The percent increase in bone length was calculated for each time point (bone length at day X / bone length at day 0 * 100). Statistics was computed and figures were created in R.

Karolinska Institutet

Ondrej Soucek MD, PhD

Department of Children's and Women's health

Astrid Lindgren's Children Hospital

171 76 Stockholm, Sweden

E-mail: ondrej.soucek@ki.se

Telephone: +46 8 5177 2488

Website: <http://ki.se/en/people/larsav>



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