# Minimally invasive, injectable treatment for craniosynostosis and other bone formation disorders

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## Technology description

### Summary

Craniosynostosis is a birth defect that causes a child's skull to fuse before the brain has developed to its full size. To date the only treatment available is an expensive and invasive open-skull surgery (craniotomy) to break and reshape the incorrectly fused sections of the skull. This traumatic and complex surgery requires blood transfusions, a long recovery time, and oftentimes multiple surgeries. This technology is a method for treating craniosynostosis and other bone formation disorders through the localized delivery of growth factors that slow the rate of skull fusion and bone ossification.

## Injection of growth factors as an alternative to craniotomy

Craniosynostosis affects 1 in 2500 infants per year in the United States so an improvement or alternative to craniotomy has large implications for the clinical setting. This technology takes advantage of the natural reproduction cycle for fibroblasts and osteoblasts by using their own growth factors to promote cell proliferation and differentiation. Polymeric microspheres and other delivery agents can be used to control the rate of growth factor release. The technology has demonstrated in vivo skull tissue and bone regeneration in a rat model for craniosynostosis. The method may also be developed into a tool for testing drug delivery to the brain.

### Application area

Treatment for craniosynostosis

Treatment for bone formation disorders (e.g. scoliosis)

Treatment for tissue formation disorders (e.g. cleft lip)

Tool for testing drug delivery to the brain

## Advantages

Minimally invasive alternative to craniotomy

Targeted delivery of growth factors

Time-controlled release of growth factors

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