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Spatiotemporal patterning in reptile tooth replacement

For over a century, the development and replacement of reptile teeth has been of interest in comparative anatomy and evolutionary biology due to the prevalence of teeth in the fossil record and, more recently, for understanding spatiotemporal patterning in developmental biology as well as the fundamentals of tooth replacement for a clinical context. In collaboration with the Richman Lab (UBC Dentistry), we are using the Leopard Gecko as a model organism to understand the mechanisms underlying the regular and long-lasting spatiotemporal patterns of tooth replacement seen in many polyphyodonts. I will describe the data and our implementation and analysis of several mechanisms that have been proposed in the past to explain the observations. Finding shortcomings in these models, I will describe a new model consisting of phase oscillators coupled by a diffusing inhibitor which does better at explaining the data.