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Establishing the Turing mechanism using synthetic cells CAMILLE GIRABAWE, NATHAN TOMPKINS, NING LI, Brandeis University, G. BARD ERMENTROUT, University of Pittsburgh, IRVING R. EPSTEIN, SETH FRADEN, Brandeis University — In 1952 Alan Turing published his seminal pape *The Chemical Basis of Morphogenesi* in which he described a basis for physical morphogenesis due solely to a reaction-diffusion system. His mechanism has been tested extensively but remains controversial and not fully demonstrated for cellular systems. Now 60 years after its debu, we describe an experimental system that demonstrates all six of his phenomenological predictions with additional support that these observations are due specifically to the Turing mechanism itsel. Further we demonstrate a nonlinear phenomena in the same system that was not predicted by Turing and which is not explained by a linear solution analysis of the governing system equations. Finally we also demonstrate that this system undergoes chemical and physical morphogenesis as Turing suggeste.

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