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Supporting Online Material for

Rules for Biologically Inspired Adaptive Network Design

Atsushi Tero, Seiji Takagi, Tetsu Saigusa, Kentaro Ito, Dan P. Bebber, Mark D. Fricker, Kenji Yumiki, Ryo Kobayashi, Toshiyuki Nakagaki*

*To whom correspondence should be addressed. E-mail: nakagaki@es.hokudai.ac.jp

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Figs. S1 and S2

Fig. S1: The effect of varying I_0 on network architecture

Simulation results are shown for increasing values of I_0 at a fixed value of γ (1.80). The networks increase the number of cross connections from close to a minimum spanning tree at the lowest values of I_0 (A), to give a better connectivity at higher values (I). Numbers in parenthesis are (γ, I_0, TL_{MST}, FT_{MST} and MD_{MST}).

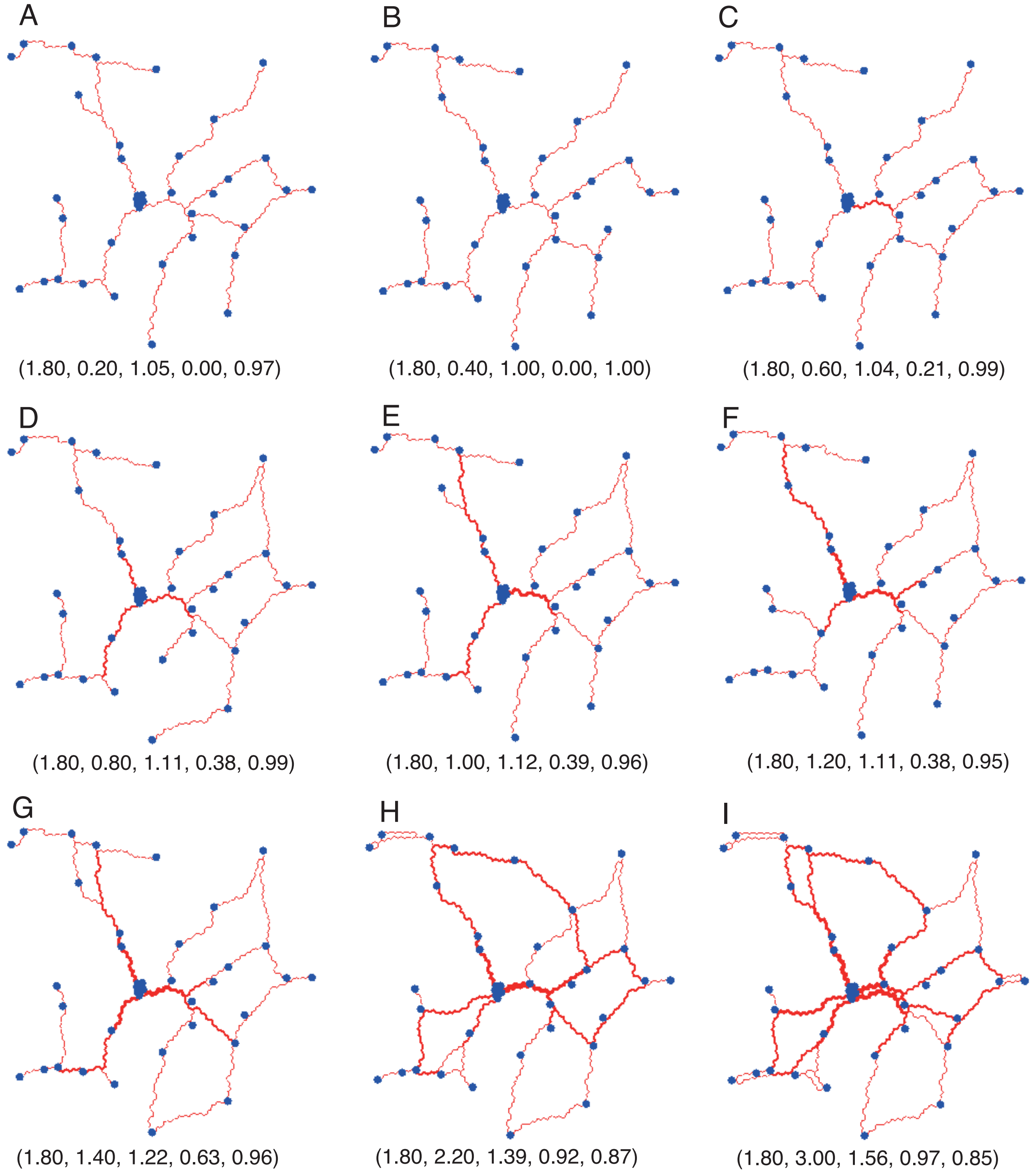
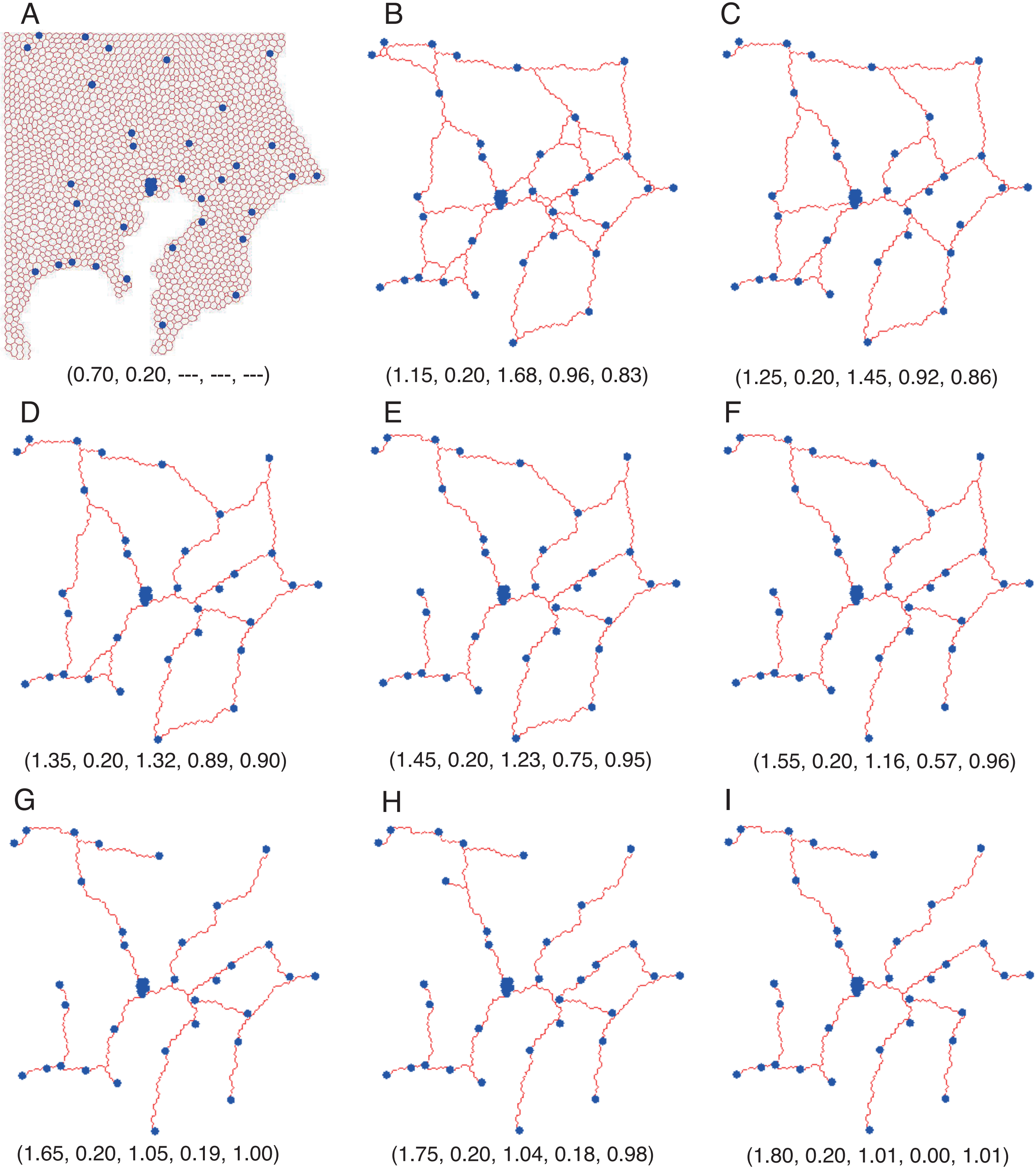

A
(1.80, 0.20, 1.05, 0.00, 0.97)
B
(1.80, 0.40, 1.00, 0.00, 1.00)
C
(1.80, 0.60, 1.04, 0.21, 0.99)
D
(1.80, 0.80, 1.11, 0.38, 0.99)
E
(1.80, 1.00, 1.12, 0.39, 0.96)
F
(1.80, 1.20, 1.11, 0.38, 0.95)
G
(1.80, 1.40, 1.22, 0.63, 0.96)
H
(1.80, 2.20, 1.39, 0.92, 0.87)
I
(1.80, 3.00, 1.56, 0.97, 0.85)

Fig. S2: The effect of varying γ on network architecture

Simulation results are shown for increasing values of γ at a fixed value of I_0 (0.2). At the lowest value of γ, much of the original mesh remains, with little development of a preferential distribution network (A). As γ is increased, the network progressively resolves towards the minimum spanning tree (I). The parameter combinations shown in B, give a network that closely matches the Tokyo rail network and the illuminated *Physarum* networks. Numbers in parenthesis are (γ, I_0, TL_{MST}, FT_{MST} and MD_{MST}).



A
(0.70, 0.20, ---, ---, ---)
B
(1.15, 0.20, 1.68, 0.96, 0.83)
C
(1.25, 0.20, 1.45, 0.92, 0.86)
D
(1.35, 0.20, 1.32, 0.89, 0.90)
E
(1.45, 0.20, 1.23, 0.75, 0.95)
F
(1.55, 0.20, 1.16, 0.57, 0.96)
G
(1.65, 0.20, 1.05, 0.19, 1.00)
H
(1.75, 0.20, 1.04, 0.18, 0.98)
I
(1.80, 0.20, 1.01, 0.00, 1.01)