Supporting Information

Fang-Yen et al. 10.1073/pnas.0904036106

Fig. S1. Pump-phase durations vs. pump period for adult animals. (a) CC: Duration of corpus contraction. (b) CR: Duration of corpus relaxation. (c) IC: Duration of isthmus contraction. (d) IR: Duration of isthmus relaxation.
<table>
<thead>
<tr>
<th>Worms</th>
<th>n</th>
<th>T</th>
<th>CC</th>
<th>CR</th>
<th>IC</th>
<th>IR</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>L1</td>
<td>9</td>
<td>252.1</td>
<td>22.4</td>
<td>85.6</td>
<td>14.8</td>
<td>32.6</td>
<td>7.7</td>
</tr>
<tr>
<td>L2</td>
<td>8</td>
<td>260.3</td>
<td>32.2</td>
<td>90.5</td>
<td>26.0</td>
<td>31.9</td>
<td>7.5</td>
</tr>
<tr>
<td>L3</td>
<td>10</td>
<td>240.8</td>
<td>44.5</td>
<td>111.7</td>
<td>11.6</td>
<td>36.1</td>
<td>7.8</td>
</tr>
<tr>
<td>L4</td>
<td>8</td>
<td>246.3</td>
<td>44.5</td>
<td>122.4</td>
<td>27.4</td>
<td>39.7</td>
<td>9.5</td>
</tr>
<tr>
<td>Adult</td>
<td>23</td>
<td>305.1</td>
<td>109.0</td>
<td>145.0</td>
<td>32.3</td>
<td>35.4</td>
<td>7.1</td>
</tr>
</tbody>
</table>

All times are in milliseconds. T indicates pumping period; CC, duration of corpus contraction; CR, duration of corpus relaxation; IC, duration of isthmus contraction; IR, duration of isthmus relaxation; D, delay between onset of corpus contraction and onset of isthmus contraction; n, number of worms assayed.
## Table S2. Bead size distribution and feeding accumulation data

<table>
<thead>
<tr>
<th>Nominal diameter, μm</th>
<th>Diameter, μm</th>
<th>Mean</th>
<th>SD</th>
<th>Procorpus lumen</th>
<th>Procorpus channels</th>
<th>Isthmus lumen</th>
<th>Isthmus channels</th>
<th>Gut</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.03</td>
<td>0.03</td>
<td>0.026</td>
<td>0.0044</td>
<td>33</td>
<td>19</td>
<td>36</td>
<td>32</td>
<td>39</td>
<td>43</td>
</tr>
<tr>
<td>0.1</td>
<td>0.1</td>
<td>0.115</td>
<td>0.0054</td>
<td>33</td>
<td>6</td>
<td>38</td>
<td>36</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>0.5</td>
<td>0.5</td>
<td>0.526</td>
<td>0.0237</td>
<td>33</td>
<td>4</td>
<td>36</td>
<td>13</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1.06</td>
<td>0.0233</td>
<td>19</td>
<td>0</td>
<td>24</td>
<td>0</td>
<td>28</td>
<td>33</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2.0</td>
<td>0.10</td>
<td>5</td>
<td>0</td>
<td>18</td>
<td>0</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>3.0</td>
<td>0.15</td>
<td>11</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>0.32</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Size distributions of red fluorescent polystyrene microspheres (0.03–1.0 μm in diameter; Sigma) and nonfluorescent polystyrene microspheres (2.0–4.5 μm in diameter; Polysciences) used in filtering experiments, according to the manufacturer's specifications. Number of worms positive for beads in procorpus lumen, procorpus channels, isthmus lumen, isthmus channels, and intestinal lumen (gut) are shown. n indicates number of worms assayed.
Table S3. Approximate size distributions of the OP50 strain used in our experiments and 17 other types of bacteria capable of supporting *C. elegans* growth

<table>
<thead>
<tr>
<th>Strain</th>
<th>Identity</th>
<th>n</th>
<th>Long axis, μm</th>
<th>Short axis, μm</th>
<th>Growth rate, day⁻¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>OP50</td>
<td><em>Escherichia coli</em></td>
<td>19</td>
<td>0.99</td>
<td>0.34</td>
<td>0.52</td>
</tr>
<tr>
<td>B7</td>
<td><em>Pseudomonas sp.</em></td>
<td>17</td>
<td>1.76</td>
<td>0.44</td>
<td>0.63</td>
</tr>
<tr>
<td>H39</td>
<td><em>Comamonas sp.</em></td>
<td>17</td>
<td>1.65</td>
<td>0.42</td>
<td>0.68</td>
</tr>
<tr>
<td>W11</td>
<td><em>Pseudomonas sp.</em></td>
<td>12</td>
<td>1.67</td>
<td>0.73</td>
<td>0.65</td>
</tr>
<tr>
<td>H10</td>
<td>Unidentified</td>
<td>10</td>
<td>1.63</td>
<td>0.51</td>
<td>0.82</td>
</tr>
<tr>
<td>H12</td>
<td><em>Acinetobacter junii</em></td>
<td>12</td>
<td>1.71</td>
<td>0.41</td>
<td>0.92</td>
</tr>
<tr>
<td>H26</td>
<td><em>Pantoea sp.</em></td>
<td>8</td>
<td>2.62</td>
<td>0.26</td>
<td>1.37</td>
</tr>
<tr>
<td>H8101</td>
<td><em>Escherichia coli</em></td>
<td>9</td>
<td>3.47</td>
<td>0.58</td>
<td>0.85</td>
</tr>
<tr>
<td>H25</td>
<td><em>Acinetobacter sp.</em></td>
<td>11</td>
<td>3.21</td>
<td>0.80</td>
<td>1.45</td>
</tr>
<tr>
<td>H28</td>
<td><em>Bacillus simplex</em></td>
<td>4</td>
<td>5.87</td>
<td>2.61</td>
<td>1.47</td>
</tr>
<tr>
<td>W8</td>
<td>Unidentified</td>
<td>4</td>
<td>3.95</td>
<td>0.66</td>
<td>1.48</td>
</tr>
<tr>
<td>S4</td>
<td><em>Panteoa dispersa</em></td>
<td>5</td>
<td>3.27</td>
<td>0.35</td>
<td>1.51</td>
</tr>
<tr>
<td>S3</td>
<td><em>Bacillus licheniformis</em></td>
<td>5</td>
<td>3.91</td>
<td>0.24</td>
<td>1.61</td>
</tr>
<tr>
<td>DA837</td>
<td><em>Escherichia coli</em></td>
<td>9</td>
<td>2.14</td>
<td>0.59</td>
<td>0.92</td>
</tr>
<tr>
<td>S9</td>
<td><em>Bacillus sp.</em></td>
<td>6</td>
<td>4.52</td>
<td>1.59</td>
<td>2.11</td>
</tr>
<tr>
<td>S13</td>
<td><em>Bacillus cereus</em></td>
<td>4</td>
<td>6.55</td>
<td>2.04</td>
<td>3.39</td>
</tr>
<tr>
<td>L10</td>
<td><em>Bacillus megaterium</em></td>
<td>7</td>
<td>4.40</td>
<td>0.68</td>
<td>2.39</td>
</tr>
</tbody>
</table>

**Movie S1.** Video sequence summarized in Fig. 2. Adult worm feeding on 0.75-μm-diameter polystyrene beads.
Movie S2. Video sequence from an L2 animal feeding on OP50 bacteria. Note movement of bacteria, isthmus peristalsis, and action of grinder on bacteria.

Movie S2 (MOV)
Movie S3. Adult worm ingesting a single 2-μm-diameter bead. During the first pump cycle shown, bead enters pharynx and is trapped in the anterior procorpus. During the second pump cycle, bead is transferred to the anterior isthmus.

Movie S3 (MOV)
**Movie S4.** Adult worm feeding on OP50 bacteria. Fig. 3 shows bacteria tracking data for this image sequence.
Movie S5. L1 worm feeding on OP50 bacteria.

Movie S5 (MOV)
**Movie 56.** Adult worm feeding in dense suspension of bacteria. Note metastomal flaps at base of stoma.
Movie S7. Adult worm feeding on 2-μm-diameter beads and bacteria. During this pump, beads are blocked by stoma while bacteria enter pharynx and are trapped normally.