**SUPPLEMENTARY TABLES**

Supplementary Table 1. Quantification of Ca\(^{2+}\) signal parameters (ratio 340/380 ± SEM) for combined Ca\(^{2+}\) measurements with 0.5 mM Ca\(^{2+}\) in the external solution as shown in Figures 1A, 3A and Supplementary Figure 5A, 5G.

<table>
<thead>
<tr>
<th></th>
<th>Basal Ca(^{2+})</th>
<th>Influx Peak</th>
<th>Ca(^{2+}) Plateau</th>
<th>Influx Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>adult</td>
<td>0.41572</td>
<td>3.35034</td>
<td>2.86868</td>
<td>0.01493</td>
</tr>
<tr>
<td>untouched</td>
<td>(+0.00724)</td>
<td>(+0.06840)</td>
<td>(+0.11545)</td>
<td>(+0.00325)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.43849</td>
<td>2.74772</td>
<td>2.29437</td>
<td>0.00943</td>
</tr>
<tr>
<td>untouched</td>
<td>(+0.00963)</td>
<td>(+0.16623)</td>
<td>(+0.17377)</td>
<td>(+0.00138)</td>
</tr>
<tr>
<td>adult</td>
<td>0.44257</td>
<td>1.58579</td>
<td>1.32114</td>
<td>0.00618</td>
</tr>
<tr>
<td>stimulated</td>
<td>(+0.00828)</td>
<td>(+0.08134)</td>
<td>(+0.06486)</td>
<td>(+0.00135)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.45081</td>
<td>1.22973</td>
<td>0.99628</td>
<td>0.00411</td>
</tr>
<tr>
<td>stimulated</td>
<td>(+0.00674)</td>
<td>(+0.11855)</td>
<td>(+0.10602)</td>
<td>(+0.00030)</td>
</tr>
<tr>
<td>norm. adult sorted CM/EM</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>norm. elderly sorted CM</td>
<td>1.00521</td>
<td>0.76461</td>
<td>0.76402</td>
<td>0.66231</td>
</tr>
<tr>
<td></td>
<td>(+0.01682)</td>
<td>(+0.04269)</td>
<td>(+0.03756)</td>
<td>(+0.06913)</td>
</tr>
<tr>
<td>norm. elderly sorted CM</td>
<td>0.97606</td>
<td>0.89495</td>
<td>0.90768</td>
<td>0.77298</td>
</tr>
<tr>
<td></td>
<td>(+0.00743)</td>
<td>(+0.04126)</td>
<td>(+0.03429)</td>
<td>(+0.09990)</td>
</tr>
</tbody>
</table>

Supplementary Table 2. Quantification of Ca\(^{2+}\) signal parameters (ratio 340/380 ± SEM) for re-addition measurements with 0.5 mM Ca\(^{2+}\) in the external solution as shown in Figures 1B, 3B and Supplementary Figure 5B, 5H.

<table>
<thead>
<tr>
<th></th>
<th>Basal Ca(^{2+})</th>
<th>TG Peak</th>
<th>Influx Peak</th>
<th>Ca(^{2+}) Plateau</th>
<th>Influx Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>adult</td>
<td>0.40805</td>
<td>0.54841</td>
<td>3.44848</td>
<td>2.71912</td>
<td>0.04126</td>
</tr>
<tr>
<td>untouched</td>
<td>(+0.00360)</td>
<td>(+0.01312)</td>
<td>(+0.12020)</td>
<td>(+0.09117)</td>
<td>(+0.00299)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.43947</td>
<td>0.69555</td>
<td>2.6784</td>
<td>2.08323</td>
<td>0.02871</td>
</tr>
<tr>
<td>untouched</td>
<td>(+0.01381)</td>
<td>(+0.08362)</td>
<td>(+0.08594)</td>
<td>(+0.06764)</td>
<td>(+0.00205)</td>
</tr>
<tr>
<td>adult</td>
<td>0.49956</td>
<td>0.55749</td>
<td>1.73206</td>
<td>1.26592</td>
<td>0.01808</td>
</tr>
<tr>
<td>stimulated</td>
<td>(+0.02458)</td>
<td>(+0.01406)</td>
<td>(+0.08618)</td>
<td>(+0.08696)</td>
<td>(+0.00189)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.46913</td>
<td>0.62148</td>
<td>1.34722</td>
<td>0.92057</td>
<td>0.01210</td>
</tr>
<tr>
<td>stimulated</td>
<td>(+0.01081)</td>
<td>(+0.03382)</td>
<td>(+0.06802)</td>
<td>(+0.05860)</td>
<td>(+0.00064)</td>
</tr>
<tr>
<td>norm. adult sorted CM/EM</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>norm. elderly sorted CM</td>
<td>0.99123</td>
<td>1.03256</td>
<td>0.80305</td>
<td>0.77923</td>
<td>0.81061</td>
</tr>
<tr>
<td></td>
<td>(+0.01456)</td>
<td>(+0.01979)</td>
<td>(+0.03007)</td>
<td>(+0.03169)</td>
<td>(+0.09589)</td>
</tr>
<tr>
<td>norm. elderly sorted EM</td>
<td>0.99405</td>
<td>1.02691</td>
<td>0.91613</td>
<td>0.91261</td>
<td>0.95864</td>
</tr>
<tr>
<td></td>
<td>(+0.01283)</td>
<td>(+0.04218)</td>
<td>(+0.02254)</td>
<td>(+0.01533)</td>
<td>(+0.04460)</td>
</tr>
</tbody>
</table>
Supplementary Table 3. Quantification of Ca²⁺ signal parameters (ratio 340/380 ± SEM) of combined Ca²⁺ measurements with 2 mM Ca²⁺ in the external solution as shown in Supplementary Figures 2A, 3A.

<table>
<thead>
<tr>
<th></th>
<th>Basal Ca²⁺</th>
<th>Influx Peak</th>
<th>Ca²⁺ Plateau</th>
<th>Influx Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>adult</td>
<td>0.44246</td>
<td>3.67726</td>
<td>3.37786</td>
<td>0.01558</td>
</tr>
<tr>
<td>untouched</td>
<td>(± 0.01405)</td>
<td>(± 0.07794)</td>
<td>(± 0.07495)</td>
<td>(± 0.00312)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.45475</td>
<td>3.18998</td>
<td>2.77220</td>
<td>0.01403</td>
</tr>
<tr>
<td>untouched</td>
<td>(± 0.01841)</td>
<td>(± 0.08738)</td>
<td>(± 0.07289)</td>
<td>(± 0.00602)</td>
</tr>
<tr>
<td>adult</td>
<td>0.48054</td>
<td>2.32779</td>
<td>2.09853</td>
<td>0.01558</td>
</tr>
<tr>
<td>stimulated</td>
<td>(± 0.00932)</td>
<td>(± 0.20696)</td>
<td>(± 0.18375)</td>
<td>(± 0.00757)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.49030</td>
<td>2.09466</td>
<td>1.80740</td>
<td>0.01403</td>
</tr>
<tr>
<td>stimulated</td>
<td>(± 0.01157)</td>
<td>(± 0.15442)</td>
<td>(± 0.14058)</td>
<td>(± 0.00109)</td>
</tr>
</tbody>
</table>

Supplementary Table 4. Quantification of Ca²⁺ signal parameters (ratio 340/380 ± SEM) for re-addition measurements with 2 mM Ca²⁺ in the external solution as shown in Supplementary Figures 2D, 3D.

<table>
<thead>
<tr>
<th></th>
<th>Basal Ca²⁺</th>
<th>TG Peak</th>
<th>Influx Peak</th>
<th>Ca²⁺ Plateau</th>
<th>Influx Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>adult</td>
<td>0.44743</td>
<td>0.52506</td>
<td>3.87886</td>
<td>3.12665</td>
<td>0.03775</td>
</tr>
<tr>
<td>untouched</td>
<td>(± 0.01368)</td>
<td>(± 0.01526)</td>
<td>(± 0.10149)</td>
<td>(± 0.11758)</td>
<td>(± 0.00362)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.44508</td>
<td>0.62696</td>
<td>3.40563</td>
<td>2.68961</td>
<td>0.02863</td>
</tr>
<tr>
<td>untouched</td>
<td>(± 0.00836)</td>
<td>(± 0.07810)</td>
<td>(± 0.14274)</td>
<td>(± 0.08306)</td>
<td>(± 0.00161)</td>
</tr>
<tr>
<td>adult</td>
<td>0.49982</td>
<td>0.55386</td>
<td>2.53691</td>
<td>2.06464</td>
<td>0.01970</td>
</tr>
<tr>
<td>stimulated</td>
<td>(± 0.01600)</td>
<td>(± 0.00431)</td>
<td>(± 0.17716)</td>
<td>(± 0.15648)</td>
<td>(± 0.00080)</td>
</tr>
<tr>
<td>elderly</td>
<td>0.51258</td>
<td>0.64717</td>
<td>2.22903</td>
<td>1.70259</td>
<td>0.01882</td>
</tr>
<tr>
<td>stimulated</td>
<td>(± 0.01150)</td>
<td>(± 0.03941)</td>
<td>(± 0.09299)</td>
<td>(± 0.07201)</td>
<td>(± 0.00072)</td>
</tr>
</tbody>
</table>

Supplementary Table 5. Quantification of rate constant (k), calculated as 1/tau (sec⁻¹ ± SEM), extract from global Ca²⁺ measurements with 0.5 mM [Ca²⁺]_int for untouched and stimulated CD8⁺ T cells isolated from adult and elderly mice as shown in Figure 6B, 6E.

<table>
<thead>
<tr>
<th>[Ca²⁺]_int</th>
<th>untouched</th>
<th>elderly</th>
<th>adult</th>
<th>stimulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>mean</td>
<td>cells</td>
<td>mean</td>
<td>cells</td>
<td>mean</td>
</tr>
<tr>
<td>0-0.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.02306</td>
</tr>
<tr>
<td>0.5-1</td>
<td>0.04083</td>
<td>(± 0.00551)</td>
<td>40</td>
<td>0.053413</td>
</tr>
<tr>
<td>1-1.5</td>
<td>0.048453</td>
<td>(± 0.00552)</td>
<td>35</td>
<td>0.060124</td>
</tr>
<tr>
<td>1.5-2</td>
<td>0.05410</td>
<td>(± 0.00505)</td>
<td>60</td>
<td>0.05795</td>
</tr>
<tr>
<td>2-2.5</td>
<td>0.05111</td>
<td>(± 0.00324)</td>
<td>383</td>
<td>0.06567</td>
</tr>
<tr>
<td>2.5-3</td>
<td>0.05461</td>
<td>(± 0.00094)</td>
<td>627</td>
<td>0.07003</td>
</tr>
<tr>
<td>3-3.5</td>
<td>0.05139</td>
<td>(± 0.00054)</td>
<td>145</td>
<td>0.05901</td>
</tr>
</tbody>
</table>