**Table S1.** Annual publication count and annual total citations and annual average citations per document of the effect of skin innervation on wound healing

| Year | Counts | Total cites | Cites per docs |
|------|--------|-------------|----------------|
| 1959 | 1      | 4           | 4.00           |
| 1964 | 1      | 13          | 13.00          |
| 1968 | 1      | 0           | 0.00           |
| 1984 | 1      | 72          | 72.00          |
| 1986 | 1      | 37          | 37.00          |
| 1991 | 2      | 255         | 127.50         |
| 1992 | 2      | 96          | 48.00          |
| 1994 | 2      | 123         | 61.50          |
| 1995 | 4      | 258         | 64.50          |
| 1996 | 5      | 403         | 80.60          |
| 1997 | 5      | 361         | 72.20          |
| 1998 | 10     | 659         | 65.90          |
| 1999 | 9      | 538         | 59.78          |
| 2000 | 6      | 182         | 30.33          |
| 2001 | 12     | 1035        | 86.25          |
| 2002 | 9      | 483         | 53.67          |
| 2003 | 12     | 952         | 79.33          |
| 2004 | 14     | 941         | 67.21          |
| 2005 | 9      | 398         | 44.22          |
| 2006 | 11     | 953         | 86.64          |
| 2007 | 14     | 652         | 46.57          |
| 2008 | 13     | 512         | 39.38          |
| 2009 | 8      | 351         | 43.88          |
| 2010 | 11     | 314         | 28.55          |
| 2011 | 12     | 586         | 48.83          |
| 2012 | 18     | 516         | 28.67          |
| 2013 | 22     | 646         | 29.36          |
| 2014 | 22     | 1437        | 65.32          |
| 2015 | 15     | 1048        | 69.87          |
| 2016 | 14     | 358         | 25.57          |
| 2017 | 17     | 305         | 17.94          |
| 2018 | 18     | 279         | 15.50          |
| 2019 | 9      | 416         | 46.22          |
| 2020 | 18     | 200         | 11.11          |
| 2021 | 25     | 61          | 2.44           |
| 2022 | 15     | 9           | 0.60           |
Table S2. Countries/Regions in each cluster based on co-authorship country network analysis

| Cluster   | Country/Region | Counts | Total link | Cites | Cites per docs | Average publication year |
|-----------|----------------|--------|------------|-------|----------------|--------------------------|
| Cluster 1 | France         | 14     | 5          | 807   | 57.64          | 2011.23 |
|           | Brazil         | 13     | 3          | 258   | 19.85          | 2013.00 |
|           | Canada         | 11     | 3          | 337   | 30.64          | 2013.64 |
|           | India          | 11     | 3          | 231   | 21.00          | 2015.00 |
| Cluster 2 | UK             | 42     | 18         | 2737  | 65.17          | 2007.00 |
|           | Germany        | 35     | 25         | 2409  | 68.83          | 2009.20 |
|           | Australia      | 11     | 2          | 185   | 16.82          | 2006.91 |
| Cluster 3 | USA            | 135    | 44         | 6608  | 48.95          | 2010.18 |
|           | China          | 34     | 6          | 274   | 8.06           | 2017.55 |
|           | South Korea    | 9      | 2          | 261   | 29.00          | 2012.89 |
| Cluster 4 | Italy          | 22     | 13         | 943   | 42.86          | 2010.91 |
|           | Sweden         | 9      | 5          | 556   | 61.78          | 2000.56 |
| Cluster 5 | Japan          | 38     | 13         | 1167  | 30.71          | 2012.00 |

Table S3. Institutions in each cluster based on co-authorship institution network analysis

| Cluster   | Institution            | Counts | Total link | Cites | Cites per docs | Average publication year |
|-----------|------------------------|--------|------------|-------|----------------|--------------------------|
| Cluster 1 | univ washington        | 16     | 11         | 1095  | 68.44          | 2005.13 |
|           | northwestern univ      | 6      | 4          | 251   | 41.83          | 2012.67 |
|           | univ calif san francisco | 6   | 10        | 983   | 163.83         | 2001.00 |
|           | emory univ             | 5      | 7          | 536   | 107.20         | 1999.60 |
| Cluster 2 | harvard univ           | 8      | 2          | 489   | 61.13          | 2011.75 |
|           | univ coimbra           | 8      | 1          | 428   | 53.50          | 2013.63 |
|           | mit                    | 7      | 1          | 353   | 50.43          | 2011.71 |
| Cluster 3 | univ manchester        | 13     | 5          | 286   | 22.00          | 2013.77 |
|           | univ munster           | 8      | 6          | 1131  | 141.38         | 2005.13 |
|           | univ miami             | 7      | 3          | 441   | 63.00          | 2017.86 |
| Cluster 4 | stanford univ          | 7      | 1          | 251   | 35.86          | 2012.71 |
|           | osaka univ             | 5      | 1          | 222   | 44.40          | 2009.80 |
| Cluster 5 | ucl                    | 7      | 1          | 266   | 38.00          | 2002.57 |
|           | univ toronto           | 5      | 1          | 188   | 37.60          | 2012.20 |
| Cluster 6 | ohio state univ        | 5      | 0          | 226   | 45.20          | 2010.20 |
| Cluster 7 | shandong univ          | 7      | 0          | 29    | 4.14           | 2017.14 |
Table S4. Top 5 authors that published documents on the effects of skin innervation on wound healing of 3 stages (1991-2006, 2007-2014, 2015-2022)

| Stage | Author | Counts | Total cites | Countries/Regions |
|-------|--------|--------|-------------|-------------------|
| Stage 1991-2006 | Ansel, John C. | 8 | 969 | USA |
| | Olerud, John E. | 7 | 743 | USA |
| | Bunnett, Nigel W. | 6 | 1009 | USA |
| | Gibran, Nicole S. | 6 | 401 | USA |
| | Khalil, Zeinab G. | 5 | 167 | Australia |
| | Terenghi, Giorgio | 5 | 163 | UK |
| Stage 2007-2014 | Carvalho, Eugenia | 6 | 303 | Portugal |
| | Satoh, Akira | 6 | 336 | Japan |
| | Gardiner, David M. | 5 | 326 | USA |
| | Gibran, Nicole S. | 5 | 123 | USA |
| | Moura, Liane I. F. | 5 | 246 | Portugal |
| Stage 2015-2022 | Desmouliere, Alexis | 5 | 116 | France |
| | Calza, Laura | 4 | 22 | Italy |
| | Giardino, Luciana | 4 | 22 | Italy |
| | Girard, Dorothee | 4 | 113 | France |
| | Laverdet, Betty | 4 | 113 | France |
| | Pannella, Micaela | 4 | 22 | Italy |
| | Wang, Yibing | 4 | 21 | China |

Table S5. Authors in each cluster based on co-authorship author network analysis

| Cluster | Author | Counts | Total strength | link | Cites | Cites per docs | Average publication year |
|---------|--------|--------|----------------|------|-------|----------------|--------------------------|
| Cluster 1 | gibran, nicole s. | 11 | 41 | 524 | 47.64 |
| | ansel, jc | 8 | 27 | 969 | 121.13 |
| | olerud, je | 7 | 31 | 743 | 106.14 |
| Name                  | Cluster | First Year | Last Year | Year of Publication |
|-----------------------|---------|------------|-----------|---------------------|
| Bunnett, Nigel W.     | 6       | 2000       | 2001      | 2001.50             |
| Muangman, Pornprom    | 5       | 2006       | 2007      | 2006.00             |
| Muffley, Lara A.      | 5       | 2007       | 2008      | 2007.20             |
| Isik, F. Frank        | 4       | 2005       | 2006      | 2005.50             |
| Usui, M.L.            | 4       | 2000       | 2001      | 2000.25             |
| Luger, Ta             | 3       | 2004       | 2005      | 2004.33             |
| Scott, Jeffrey R.     | 3       | 2008       | 2009      | 2008.00             |
| Spenny, M.L.          | 3       | 2003       | 2004      | 2002.67             |
| Sullivan, Stephen R.  | 3       | 2004       | 2005      | 2004.33             |
| Tamura, Richard N.    | 3       | 2006       | 2007      | 2006.67             |
| Desmouliere, Alexis  | 6       | 2015       | 2016      | 2015.50             |
| Paus, Ralf            | 6       | 2014       | 2015      | 2014.17             |
| Misery, Laurent       | 5       | 2013       | 2014      | 2013.20             |
| Berthod, Francois     | 4       | 2016       | 2017      | 2016.00             |
| Cheret, Jeremy        | 4       | 2016       | 2017      | 2016.75             |
| Girard, Dorothee      | 4       | 2016       | 2017      | 2016.75             |
| Laverdet, Betty       | 4       | 2016       | 2017      | 2016.75             |
| Lebonvallet, Nicolas  | 3       | 2015       | 2016      | 2015.00             |
| Matsuda, H.           | 3       | 2003       | 2004      | 2003.00             |
| Peters, E. M. J.      | 3       | 2006       | 2007      | 2006.00             |
| Wang, Yibing          | 6       | 2016       | 2017      | 2016.50             |
| Cao, Yongqian         | 4       | 2016       | 2017      | 2016.75             |
| Feng, Yongqiang       | 3       | 2013       | 2014      | 2013.00             |
| Li, Xiaohong          | 3       | 2018       | 2019      | 2018.67             |
| Ma, Jiaxu             | 3       | 2020       | 2021      | 2020.00             |
| Yin, Siyuan           | 3       | 2020       | 2021      | 2020.00             |
| Zhang, Min            | 3       | 2018       | 2019      | 2018.67             |
| Zhang, Rui            | 3       | 2013       | 2014      | 2013.67             |
| Luigi Aloe            | 5       | 2006       | 2007      | 2006.40             |
| Calza, Laura          | 4       | 2020       | 2021      | 2020.75             |
| Giardino, Luciana     | 4       | 2020       | 2021      | 2020.75             |
| Pannella, Micaela     | 4       | 2020       | 2021      | 2020.75             |
| Alastra, Giuseppe     | 3       | 2021       | 2022      | 2021.00             |
| Baldassarro, Vito      | 3       | 2021       | 2022      | 2021.00             |
| Giuliani, Alessandro  | 3       | 2021       | 2022      | 2021.00             |
| Lorenzini, Luca       | 3       | 2021       | 2022      | 2021.00             |
| Carvalho, Eugenia     | 8       | 2013       | 2014      | 2013.63             |
| Moura, Liane I. F.    | 5       | 2013       | 2014      | 2013.20             |
| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Veves, Aristidis  |            | 5    | 9    | 621    | 2012.40  |
| Cruz, Maria Teresa|            | 4    | 8    | 129    | 2012.00  |
| Leal, Ermelindo C.|            | 4    | 10   | 302    | 2014.00  |
| Logerfo, Frank W. |            | 4    | 9    | 377    | 2012.00  |
| Andersen, Nicholas D. |       | 3    | 6    | 266    | 2011.00  |
| Cruz, Maria Teresa|            | 4    | 8    | 129    | 2012.00  |
| Leal, Ermelindo C.|            | 4    | 10   | 302    | 2014.00  |
| Logerfo, Frank W. |            | 4    | 9    | 377    | 2012.00  |
| Andersen, Nicholas D. |       | 3    | 6    | 266    | 2011.00  |

**Cluster 6**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Akamatsu, Hirohiko |            | 3    | 12   | 45     | 2015.33  |
| Hasegawa, Seiji    |            | 3    | 12   | 45     | 2015.33  |
| Matsunaga, Kayoko  |            | 3    | 12   | 45     | 2015.33  |
| Nakata, Satoru     |            | 3    | 12   | 45     | 2015.33  |
| Yagami, Akiko      |            | 3    | 12   | 45     | 2015.33  |

**Cluster 7**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Hasan, Wohaib      |            | 3    | 6    | 142    | 2005.67  |
| Liu, MX            |            | 3    | 4    | 162    | 2000.33  |
| Mccarson, Kenneth E.|          | 3    | 5    | 124    | 2008.00  |
| Rook, Jerri M.     |            | 3    | 5    | 124    | 2008.00  |
| Smith, PG          |            | 3    | 4    | 162    | 2000.33  |

**Cluster 8**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Terenghi, Giorgio  |            | 8    | 13   | 198    | 2004.38  |
| Ferguson, Mark William James | | 5    | 9    | 105    | 2010.40  |
| Henderson, James   |            | 4    | 9    | 75     | 2010.00  |
| Mcgrourther, D. A. |            | 3    | 5    | 113    | 2002.67  |
| Polak, JM          |            | 3    | 2    | 104    | 1996.33  |

**Cluster 9**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Satoh, Akira       |            | 7    | 10   | 346    | 2011.57  |
| Gardiner, David M. |            | 6    | 9    | 554    | 2007.83  |
| Bryant, Susan V.   |            | 5    | 8    | 520    | 2007.40  |
| Makanae, Aki       |            | 3    | 3    | 115    | 2015.33  |

**Cluster 10**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Ferreira, Lydia Masako |       | 4    | 9    | 56     | 2013.25  |
| Hochman, Bernardo  |            | 4    | 9    | 56     | 2013.25  |
| Furtado, Fabianne  |            | 3    | 8    | 51     | 2013.00  |
| Liebano, Richard Eloi |      | 3    | 6    | 48     | 2014.00  |

**Cluster 11**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Gopal, Anu         |            | 4    | 11   | 123    | 2015.00  |
| Kant, Vinay        |            | 4    | 11   | 123    | 2015.00  |
| Kumar, Dinesh      |            | 4    | 11   | 123    | 2015.00  |
| Kumar, Dhirendra   |            | 3    | 9    | 94     | 2014.00  |

**Cluster 12**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Bigliardi, PL      |            | 3    | 6    | 142    | 2003.67  |
| Bigliardi-Qi, M    |            | 3    | 6    | 142    | 2003.67  |
| Rufli, T           |            | 3    | 6    | 142    | 2003.67  |

**Cluster 13**

| Last Name          | First Name | Rank | ID   | Score  | Date     |
|-------------------|------------|------|------|--------|----------|
| Yannas, Ioannis V. |            | 4    | 6    | 198    | 2013.00  |
| So, Peter T. C.   |            | 3    | 6    | 140    | 2015.67  |
| Tzeranis, Dimitrios S. |      | 3    | 6    | 140    | 2015.67  |
| Cluster | Author keywords                        |Occurrences| Total link strength | Average publication year |
|--------|---------------------------------------|-----------|--------------------|-------------------------|
| Cluster 1 | wound healing                        | 107       | 221                | 2012.21                 |
|         | diabetic foot ulcer                   | 8         | 13                 | 2016.38                 |
|         | collagen                              | 6         | 21                 | 2012.33                 |
|         | myofibroblast                         | 6         | 15                 | 2010.20                 |
|         | pressure ulcer                        | 6         | 12                 | 2012.50                 |
|         | nerve regeneration                     | 5         | 20                 | 2010.40                 |
| Cluster 1 | sensory nerve                        | 5         | 12                 | 2001.80                 |
|         | vascular endothelial growth factor    | 5         | 9                  | 2015.60                 |
|         | electrical stimulation                 | 4         | 5                  | 2010.50                 |
|         | neurotensin                           | 4         | 10                 | 2013.25                 |
|         | wound contraction                      | 4         | 4                  | 2011.00                 |
|         | cutaneous innervation                 | 3         | 8                  | 1994.50                 |
|         | mesenchymal stem cells                | 3         | 5                  | 2016.33                 |
|         | skin                                  | 31        | 89                 | 2010.19                 |
|         | inflammation                          | 16        | 46                 | 2009.00                 |
|         | wound                                 | 11        | 34                 | 2004.73                 |
| Cluster 2 | pain                                 | 9         | 26                 | 2012.11                 |
|         | sensory neuron                        | 9         | 32                 | 2009.89                 |
|         | cytokine                              | 7         | 18                 | 2013.57                 |
|         | atopic dermatitis                     | 3         | 12                 | 2020.33                 |
| Cluster 3                  |        |   |            |    |            |
|---------------------------|--------|---|------------|----|------------|
| fibroblast                | 18     | 61| 2009.53    |    |            |
| regeneration              | 14     | 43| 2010.21    |    |            |
| nerve                     | 9      | 34| 2009.33    |    |            |
| axolotl                   | 6      | 20| 2009.67    |    |            |
| dedifferentiation         | 6      | 27| 2010.17    |    |            |
| blastema                  | 5      | 11| 2012.20    |    |            |
| epidermis                 | 5      | 12| 2007.80    |    |            |
| tgf beta                  | 5      | 9 | 2009.20    |    |            |
| activin                   | 4      | 13| 2008.00    |    |            |
| bone morphogenetic protein| 4      | 11| 2011.75    |    |            |
| limb regeneration         | 4      | 8 | 2012.25    |    |            |
| limb                      | 3      | 14| 2008.33    |    |            |
| Cluster 4                 |        |   |            |    |            |
| cd271 (p75ntr)            | 11     | 30| 2013.00    |    |            |
| epidermal stem cell       | 5      | 18| 2017.60    |    |            |
| stem cell                 | 5      | 6 | 2016.00    |    |            |
| burn                      | 4      | 11| 2017.00    |    |            |
| migration                 | 4      | 9 | 2001.25    |    |            |
| proliferation             | 4      | 8 | 2007.75    |    |            |
| skin wound healing        | 4      | 10| 2018.75    |    |            |
| tyrosine kinase a         | 4      | 14| 2008.00    |    |            |
| cell proliferation        | 3      | 13| 2010.33    |    |            |
| hair follicle             | 3      | 12| 2006.67    |    |            |
| peripheral nerve          | 3      | 3 | 2014.00    |    |            |
| Cluster 5                 |        |   |            |    |            |
| diabetes mellitus         | 21     | 51| 2012.67    |    |            |
| macrophage                | 10     | 26| 2012.70    |    |            |
| denervation               | 9      | 25| 2011.22    |    |            |
| transcutaneous electric nerve stimulation | 7 | 11 | 2009.83 |    |            |
| rat                       | 6      | 14| 2006.17    |    |            |
| chronic wound             | 5      | 10| 2017.67    |    |            |
| microcirculation          | 4      | 9 | 1999.75    |    |            |
| neuropathy                | 4      | 8 | 2005.00    |    |            |
| beta-adrenoceptor         | 3      | 8 | 2013.33    |    |            |
| nitric oxide              | 3      | 4 | 2008.33    |    |            |
| Cluster 6                                                                 | Count | Value | Year   |
|-------------------------------------------------------------------------|-------|-------|--------|
| substance p                                                             | 25    | 66    | 2008.75|
| calcitonin gene related peptide                                         | 12    | 33    | 2006.08|
| capsaicin                                                               | 7     | 12    | 2002.14|
| innervation                                                             | 7     | 14    | 2013.00|
| Cluster 6                                                               |       |       |        |
| scar                                                                    | 5     | 18    | 2013.80|
| reinnervation                                                           | 4     | 12    | 2008.25|
| cutaneous                                                               | 3     | 8     | 2005.67|
| injury                                                                  | 3     | 6     | 2004.00|
| pgp 9.5                                                                 | 3     | 7     | 2002.00|
| Cluster 7                                                               |       |       |        |
| neuropeptide                                                            | 34    | 90    | 2009.23|
| nerve growth factor                                                     | 26    | 62    | 2006.81|
| angiogenesis                                                            | 14    | 29    | 2013.79|
| neurotrophin                                                            | 5     | 18    | 2006.20|
| endothelial cell                                                        | 4     | 14    | 2005.50|
| wound repair                                                            | 4     | 12    | 2009.75|
| neurite outgrowth                                                       | 3     | 3     | 2008.33|
| neuroinflammation                                                       | 3     | 11    | 2004.33|
| Cluster 8                                                               |       |       |        |
| neurogenic inflammation                                                 | 7     | 22    | 2005.71|
| mast cell                                                               | 4     | 10    | 2014.00|
| mouse                                                                   | 3     | 13    | 2011.00|
| nerve fiber                                                             | 3     | 10    | 2012.00|
| neuromediators                                                          | 3     | 5     | 2017.33|
| stress                                                                  | 3     | 6     | 2009.67|
| sympathetic nervous system                                              | 3     | 6     | 2004.00|
| Cluster 9                                                               |       |       |        |
| keratinocyte                                                            | 19    | 52    | 2007.33|
| keloid                                                                  | 3     | 15    | 2012.67|
| tissue engineering                                                      | 3     | 7     | 2010.33|
| trigeminal trophic syndrome                                             | 3     | 3     | 2008.67|
| Cluster 10                                                              |       |       |        |
| cutaneous wound healing                                                 | 3     | 4     | 2015.00|
| knockout mice                                                           | 3     | 9     | 2009.33|