Supplementary Information

Supplementary Table I: Summary of primers used for quantitative real-time PCR

| Gene  | Forward primer (5’-3’) | Reverse Primer (5’-3’) |
|-------|------------------------|------------------------|
| **Mouse** | | |
| IL-1β | TGTAATGAAAGACGGGCACACC | TCTTCTTTGGGTATTGCTTGG |
| IL-6 | GCTACCAAAACTGGATATAATCAGA | CCAGGTAGCTATGGTACTCCAGAA |
| COX-2 | CCAGTCAATCCCTGTGTCTTACT | GATCTCAGGGATGGTACATTG |
| MMP-3 | CCAAGTCTAATCTCTGGAACCTG | AGAGATTTTCGGCCAAAAGTG |
| MMP-13 | TGGACCTTCTGGTCTTTCTGG | GCATCCCCACCATAAGTTT |
| iNOS | GGAGCTTTTAGACCTCAACAGA | AAGGTGAGCTGAACGAGGAG |
| SOD1 | CAGGACCTCATTTTAATCCTCAC | TGCCCAGGTCTCCAACAT |
| CAT | CCTTCAAGTTGGTTAATGCAGA | CAAGTTTTTGATGCCCTTGGT |
| GPx | CAAGTTTTTGTATGGCCTTGGT | TCGGACGTACTTGAGGGAAT |
| GSR | CTATGACAACATGCCCTCTGTTGT | CCCATACTTATGAACAGCTTGGT |
| 18s rRNA | GCAATTATTCCCATGAACG | GGGACTTAATCAACGCAAGC |
| **Human** | | |
| SOD1 | TCATCAATTTTGAGCGAGAAGG | GCAGGCCTTCAGTCAGTCC |
| CAT | TCATCAGGGATGCCTATTTGTT | CTTTCAGATGTGTCTGAGGATT |
| GPx | GGGGACAAGAGAGATCAAGAAGG | GCCAGCATATCTGCTTGAAGG |
| GSR       | ATGATCAGCACCAACTGCAC | CCCTTGTCACTCGGTTTGAAT |
|-----------|----------------------|------------------------|
| iNOS      | CTTACGAGGCGAAGAAAGGAC | TCAGAGCGCTGACATCTCC |
| 18s rRNA  | GTAACCCGTGAAACCCCATC | CCATCCAATCGGTAGTAGCG |

**Supplemental Table II: Linear regression models predicting pain VAS**

| Variable          | Beta   | CI B          | P value |
|-------------------|--------|---------------|---------|
| **Model 1**       |        |               |         |
| SOD1              | -20.3  | -5.8 - -4.7   | 0.02    |
| DAS28CRP3var      | 7.1    | -5.5 – 19.8   | NS      |
| **Model 2**       |        |               |         |
| SOD1              | -11.2  | -20.2 - -2.2  | 0.02    |
| Patient global    | 0.7    | 0.4 - 0.9     | ≤0.001  |
| **Model3**        |        |               |         |
| CAT               | -19.7  | -42.2 - 2.9   | 0.08    |
| DAS28CRP3var      | 7.4    | -7.1 – 21.9   | NS      |
| **Model 4**       |        |               |         |
| CAT               | -11    | -27.1 – 0.003 | 0.05    |
| Patient global    | 0.72   | 0.5 - 0.9     | ≤0.001  |
Supplementary Figure 1: Anti-collagen type II (CII) antibodies in the CIA and CIA+BUP mice indicate collagen driven disease development. DBA/1 mice were challenged with bovine CII i.d, and buprenorphine was administered by s.c. injections immediately after CII immunizations in the thigh, followed by two more buprenorphine injections every 6 h. Mice were sacrificed on day 29 after the first collagen challenge, and blood was collected to isolate serum. The concentrations of (A) anti-mouse collagen type II antibodies and (B) anti-bovine collagen type II antibodies were monitored in the serum by ELISA. Kruskal-Wallis one way analysis of variance (ANOVA) followed by Dunn’s posthoc test was used to determine the significance, and Mann-Whitney U test was used to determine the p-values between the groups. A p-value of <0.05 was considered to be statistically significant.