Efficacy and safety of low-dose IL-2 in the treatment of systemic lupus erythematosus: a randomised, double-blind, placebo-controlled trial

Jing He,1,2 Ruijun Zhang,1 Miao Shao,1,2 Xiaozhen Zhao,1 Miao Miao,1 Jiali Chen,1 Jiajia Liu,1 Xiaoying Zhang,1 Xia Zhang,1 Yuebo Jin,1 Yu Wang,3 Shilei Zhang,4 Lei Zhu,4 Alexander Jacob,2 Rulin Jia,1 Xujie You,1 Xue Li,1 Chun Li,1 Yunshan Zhou,1 Yue Yang,1 Hua Ye,1 Yanying Liu,1 Yin Su,1 Nan Shen,6 Jessy Alexander,5 Jianping Guo,1,2 Julian Ambrus,5 Xin Lin,4 Di Yu,6,7 Xiaolin Sun,1,2 Zhanguo Li1,2,8

ABSTRACT

Objectives Open-labelled clinical trials suggested that low-dose IL-2 might be effective in treatment of systemic lupus erythematosus (SLE). A double-blind and placebo-controlled trial is required to formally evaluate the efficacy and safety of low-dose IL-2 therapy.

Methods A randomised, double-blind and placebo-controlled clinical trial was designed to treat 60 patients with active SLE. These patients received either IL-2 (n=30) or placebo (n=30) with standard treatment for 12 weeks, and were followed up for additional 12 weeks. IL-2 at a dose of 1 million IU or placebo was administered subcutaneously every other day for 2 weeks and followed by a 2-week break as one treatment cycle. The primary endpoint was the SLE Responder Index-4 (SRI-4) at week 12. The secondary endpoints were other clinical responses, safety and dynamics of immune cell subsets.

Results At week 12, the SRI-4 response rates were 55.17% and 30.00% for IL-2 and placebo, respectively (p=0.052). At week 24, the SRI-4 response rate of IL-2 group was 65.52%, compared with 36.67% of the placebo group (p=0.027). The primary endpoint was not met at week 12. Low-dose IL-2 treatment resulted in 53.85% (7/13) complete remission in patients with lupus nephritis, compared with 16.67% (2/12) in the placebo group (p=0.036). No serious infection was observed in the IL-2 group, but two in placebo group. Besides expansion of regulatory T cells, low-dose IL-2 may also sustain cellular immunity with enhanced natural killer cells.

Conclusions Low-dose IL-2 might be effective and tolerated in treatment of SLE.

Trial registration number ClinicalTrials.gov Registries (NCT02465580 and NCT02932137).

INTRODUCTION

Systemic lupus erythematosus (SLE) is a systemic autoimmune disease with a wide range of clinical manifestations. Sustained remission is achieved in only a small fraction of patients.1-3 Current treatment regimens mainly rely on corticosteroids and immunosuppressive agents which are associated with substantial adverse effects including various infections.4-6 Defective IL-2 production contributes to the unbalanced immune system in SLE.7-10

Previous short term open-labelled trials showed that low-dose IL-2 treatment promoted regulatory T (Treg) cells and inhibited T helper 17 (Th17) cells and follicular helper T (Tfh) cells. The immunological rebalancing was associated with the induction of remission in SLE patients.11-12 The benefits of low-dose IL-2 therapy were reported in case study and open-labelled trials for hepatitis C-associated vasculitis,13 graft-versus-host disease,14-15 type 1 diabetes,16 alopecia areata17 and SLE.11,12

In contrast to increased infection risk associated with standard therapies in SLE, we observed no serious infection in previous study,12 which was in line with the report showing that low-dose IL-2 ameliorated hepatitis C virus-induced vasculitis without increasing viral load.15 From an immunological perspective, IL-2 treatment may enhance virus-specific CD8+ T cell responses18 and promote the activity of NK cells against infections.19-20

Key messages

What is already known about this subject?

- Proof-of-concept studies and case reports suggested that low-dose IL-2 might be therapeutic in systemic lupus erythematosus (SLE).

What does this study add?

- This is the first randomised, double-blind, placebo-controlled study of low-dose IL-2 in the treatment of SLE. The results suggest that low-dose IL-2 therapy may be effective and safe in SLE.
- Immunological analysis revealed that low-dose IL-2 induced expansion of regulatory T cells and NK cells, which may contribute to the restoration of immune homeostasis in SLE patients.

How might this impact on clinical practice or future developments?

- This study provides supportive data to confirm the therapeutic effects of low-dose IL-2 in SLE treatment.

To formally evaluate the safety and efficacy of low-dose IL-2 therapy in SLE, we carried out a randomised, double-blind, placebo-controlled trial in patients with active SLE, with response rate as the primary endpoint. Given that infection is a major cause of relapse, hospitalisation and death in patients with SLE, and that low-dose IL-2 might increase anti-infectious immune response, we determine whether low-dose IL-2 treatment benefits SLE patients by inducing clinical improvement without increasing the incidence of infection.

**METHODS**

**Patients**

All SLE patients were diagnosed according to the 1997 revised classification criteria of the American College of Rheumatology, and had an inadequate response to standard treatment with corticosteroids, antimalarials and immunosuppressants was shown in online supplementary appendix table S1 and S2. Exclusion criteria included: active severe neuropsychiatric manifestations of SLE; history of treatment with rituximab or other biologics; use of high-dose corticosteroids (>1.0 mg/kg) in the preceding month; severe comorbidities including heart failure (≥grade III New York Heart Association), renal insufficiency (creatinine clearance ≤30 mL/min) or hepatic insufficiency (alanine aminotransferase or aspartate aminotransferase ≥2 times of the upper limit of the normal range); active infection (hepatitis B or C virus, Epstein-Barr virus, HIV or Mycobacterium tuberculosis); history of chronic infection; malignancy; pregnancy or lactation in females.

**Study design and blinding**

We conducted a randomised, double-blind, placebo-controlled study to verify the clinical response and safety of low-dose IL-2 (recombinant human IL-2 from Escherichia coli, Beijing SL PHARM) for the treatment of active SLE (ClinicalTrials.gov number NCT02465580). Sixty patients with active SLE at 18–65 years of age were included. Patients were randomly assigned (in a 1:1 ratio) to one of the two arms (low-dose IL-2 or placebo) in the study.

All patients, investigators, sponsor and study staff were blinded to treatment. All clinical and laboratory assessments were performed by qualified, trained investigators who were blinded to the patient’s safety data, previous efficacy data and treatment randomisation. Placebo was provided as sterile and labelled trial medicine. Patients were evaluated at screening, every 2 weeks, every 4 weeks thereafter to week 24. After fixation and permeabilisation, these cells were stained with fluorochrome-conjugated antibodies against CD3, CD56 and other cell surface markers. These cells were stained with anti-CD28 and CD49d monoclonal antibodies (BD Pharmingen, San Diego, California, USA) and 5 μg of CEV viral peptide pool 1 mL of 1640 media containing 10% human AB serum. The cultures were incubated at 37°C in a 5% CO₂ incubator for 1 hour, followed by an additional 5-hour incubation with 10 μg/mL of Brefeldin-A20. The cells were stained with antibodies staining CD3, CD8 and other cell surface markers, then fixed, permeabilised with BD FACs fixation and permeabilisation buffer set. Permeabilised cells were stained with fluorochrome-conjugated antibodies against cytotoxic cytokines for 30 min at 4°C.

For NK cell response evaluation, one million PBMCs were incubated with 1 μg each of the co-stimulatory CD28 and CD49d monoclonal antibodies (BD Pharmingen, San Diego, California, USA) and 5 μg of CEV viral peptide pool 1 mL of 1640 media containing 10% human AB serum. The cultures were incubated at 37°C in a 5% CO₂ incubator for 1 hour, followed by an additional 5-hour incubation with 10 μg/mL of Brefeldin-A20. The cells were stained with antibodies staining CD3, CD8 and other cell surface markers, then fixed, permeabilised with BD FACs fixation and permeabilisation buffer set. Permeabilised cells were stained with fluorochrome-conjugated antibodies against cytotoxic cytokines for 30 min at 4°C.

**Statistics**

The protocol was designed as a superiority trial to demonstrate whether low-dose IL-2 was more efficacious than placebo at

---

**Outcomes**

The primary endpoint was the response measured by the SLE Responder Index-4 (SRI-4) at week 12. SRI response was defined as (1) a ≥4-point reduction in Safety of Estrogens in Lupus Erythematosus National Assessment (SELENA)-SLEDAI score, (2) no new British Isles Lupus Assessment Group (BILAG) A score or ≤1 new BILAG B score and (3) no deterioration from baseline in the physician’s global assessment (PGA) by ≥0.3 points. The secondary endpoints were other clinical responses, safety and dynamics of immune cell subsets including T cell and NK cell subsets.

Complete renal remission (CR) in this study was defined as (1) serum creatinine within the normal range with stable or improved values as compared with baseline (no ≥15% above baseline), (2) inactive urinary sediment and (3) normal range proteinuria <0.3 g/24 hours.

**Flow cytometry and intracellular cytokine assays**

Relative proportions of CD4+ T cell, CD8+ T cell, Treg and NK cell subsets were analysed by flow cytometry using a FACSAria II (BD) instrument and FlowJo software (Tree Star). The detailed gating strategy for these subsets was outlined in online supplementary figure S1. The clone and catalogue numbers for all of the antibodies used in this study were provided in online supplementary table S6.

CD8+ T cell response to CMV-EBV-Flu (CEF) viral peptide pool stimulation was evaluated as described in previous studies. Briefly, one million PBMCs were incubated with 1 μg each of the co-stimulatory CD28 and CD49d monoclonal antibodies (BD Pharmingen, San Diego, California, USA) and 5 μg of CEV viral peptide pool 1 mL of 1640 media containing 10% human AB serum. The cultures were incubated at 37°C in a 5% CO₂ incubator for 1 hour, followed by an additional 5-hour incubation with 10 μg/mL of Brefeldin-A20. The cells were stained with antibodies staining CD3, CD8 and other cell surface markers, then fixed, permeabilised with BD FACs fixation and permeabilisation buffer set. Permeabilised cells were stained with fluorochrome-conjugated antibodies against cytotoxic cytokines for 30 min at 4°C.

For NK cell response evaluation, one million PBMCs were incubated with 1 μg each of the co-stimulatory CD28 and CD49d monoclonal antibodies (BD Pharmingen, San Diego, California, USA) and 5 μg of CEV viral peptide pool 1 mL of 1640 media containing 10% human AB serum. The cultures were incubated at 37°C in a 5% CO₂ incubator for 5 hours with 10 μg/mL of Brefeldin-A20. These cells were stained with antibodies staining CD3, CD8 and other cell surface markers, then fixed, permeabilised with BD FACs fixation and permeabilisation buffer set. Permeabilised cells were stained with fluorochrome-conjugated antibodies against cytotoxic cytokines for 30 min at 4°C.
the background of standard treatment for active SLE. Power calculations using parameters from a previous open-labelled pilot trial\(^1\) had shown that 13 patients per group would provide 90% power, with two-sided \(p=0.05\), to conclude that low-dose IL-2 was superior to placebo to achieve the primary endpoint.

For clinical characteristics and laboratory parameters, the primary efficacy analysis was a modified intention-to-treat (mITT) analysis that included all patients who were randomly assigned to this trial and underwent at least one efficacy assessment. Differences in the changes between baseline and the indicated time points were evaluated with paired-sample \(t\)-test for continuous variables and \(\chi^2\) test for categorical variables. Differences between the two groups at indicated time points were compared with Mann-Whitney \(U\) test for continuous variables and \(\chi^2\) test for categorical variables. The data were also analysed by perprotocol analysis which excluded patients who did not complete treatment and included only patients for whom outcome information was available. The safety population comprised all patients who received at least one cycle of study assessment. Safety variables were analysed descriptively with a between-group comparison of proportions of patients with adverse events. Statistical analysis was performed with the use of SPSS V20.0. \(P\) value <0.05 was considered statistically significant.

**RESULTS**

**Patient characteristics**

Between June 2015 and September 2017, 60 patients with active SLE at 18–65 years of age were included. The patients were randomly assigned in a 1:1 ratio to receive low-dose IL-2 or placebo (figure 1). The characteristics of the patients were shown in online supplementary table S1 and S2. Mean age was 31.6 and 29.8 years, mean body surface area was 1.57 and 1.62 m\(^2\), and mean disease duration was 66.7 and 63.6 in IL-2 and placebo arms, respectively. Baseline disease characteristics were summarised in table 1. Thirteen of 30 in IL-2 group and 12 of 30 in placebo group showed signs of lupus nephritis (LN), with a median 24-hour urinary protein of 1.37 and 1.55, respectively. Other symptoms including rash, oral ulceration, alopecia and so on were showed in table 2. All the baseline characteristics were comparable between the two groups. Concomitant treatments were shown in Table 1, online supplementary table S1. Patients were carefully followed till week 24. The main reason for patient withdrawal in low-dose IL-2 group was inconvenience due to the required frequent hospital visits. In the placebo group, patient withdrawal mainly occurred because of unsatisfying therapeutic effects and development of SLE organ involvement (eg, neuropsychiatric systemic lupus erythematosus (NPSLE)) (figure 1).

**Efficacy**

Improvements of clinical manifestations and laboratory parameters of patients with low-dose IL-2 therapy were shown in figure 2, table 2 and online supplementary table S3. The SRI-4 response rates of IL-2 and placebo groups at week 12 were 55.17% (16/29) and 30.00% (9/30), respectively. The primary endpoint on SRI-4 response was not achieved at week 12 \((p=0.052)\). Notably, the response rates proceeded for further 12 weeks until the end of follow-up period at week 24. At this time point, the SRI-4 response rate was 65.52% (19/29) in low-dose IL-2 group and 36.67% (11/30) in the placebo group \((p=0.027)\) (figure 2A). The response rate of IL-2 group was also significantly higher than that of placebo group at week 6, 8, 10 and 16 \((p<0.05)\) and more reductions in SELENA-SLEDAI scores were observed in IL-2 group (figure 2A, online supplementary table S13, figure 2B).

As part of the clinical responses seen in the patients, the complete remission (CR) rate of LN was also significantly higher in the IL-2 group than the placebo group at both week 12 (53.85% vs 8.33%, \(p=0.013\)) and week 24 (53.85% vs 16.67%, \(p=0.036\)) (figure 2C, online supplementary table S5). Patients showed reduced 24-hour proteinuria in the low-dose IL-2 group from 1.55g at baseline to 0.48g at week 24 \((p=0.002)\). In contrast, there was no significant change in 24-hour proteinuria in the placebo group \((p=0.372)\) (figure 2F). Serum albumin was improved by IL-2 therapy in week 12 \((p=0.046)\) and at the end of follow-up period in week 24 \((p=0.017)\) (figure 2E). The levels of serum C3 and C4 were increased in the low-dose IL-2 group compared with the placebo group. And during the treatment period, more patients achieved normal levels of serum C3 and C4 in the low-dose IL-2 group than that in the placebo group (figure 2G and H).

As shown in table 2 and figure 2, clinical remission was accompanied by tapering corticosteroids in both groups. More reductions in corticosteroid were observed in the IL-2 group than in the placebo group. At week 24, 44.83% (13/29) of patients in the IL-2 group had reduced prednisone dose by \(\geq 50\%\), compared with 33.33% \((10/30)\) in the placebo group (figure 2D). Resolution of clinical manifestations present at baseline was observed in patients with IL-2 treatment, including rash \((11/13)\), oral ulceration \((4/4)\), arthritis \((11/14)\), vasculitis \((4/4)\), alopecia \((7/12)\) and fever \((3/3)\) (table 2, online supplementary table S4). In addition, anti-dsDNA antibody titres decreased in patients with IL-2 treatment, but not in the placebo group (table 2). Low-dose IL-2 treatment also resulted in improvements in the PGA and BILAG scores (table 2, online supplementary table S4). However, there was no significant difference between IL-2 group and placebo group (online supplementary table S4).

Perprotocol analysis was also performed with exclusion of patients lost in follow-up, and the results were similar to those obtained by mITT analysis.

**Safety**

Adverse events during the treatment period were shown in table 23. A lower incidence of infection was recorded in the IL-2 group \((6.9\%, 2/29)\) compared with the placebo group \((20.0\%, 6/30)\), but without statistical significance. No serious adverse events in IL-2 group were observed, while two patients in the placebo group had serious infections and were hospitalised (table 3). The most common adverse events were injection-site reactions, manifested as injection-site pain, redness and swelling, which were observed in 9 of 29 \((31.0\%)\) patients in the IL-2 group and 2 of 30 \((6.7\%)\) patients in the placebo group. Transient influenza-like symptoms and transient fever occurred in 3 \((10.3\%)\) and 4 \((13.8\%)\) patients in IL-2 group, respectively. These symptoms were resolved without intervention (table 3).

**Immunological analysis**

Flow cytometry analysis demonstrated low-dose IL-2 therapy induced a significant expansion of T reg cells \((p<0.05)\), while total CD4\(^+\) and CD8\(^+\) T cells remained unchanged (figures 3A,B,C, online supplementary figure S2 and table S9). A significant increase
Systemic lupus erythematosus

Figure 1  Patient enrolment and treatment assignments. Consolidated standards of reporting trials diagram was based on the 65 contacted SLE patients. Sixty of the patients were enrolled into two arms. Arm 1 (n=30), the IL-2 group, received three treatment cycles. Each cycle included subcutaneous IL-2 administration at a dose of 1 million IU every other day for 2 weeks (a total of seven doses) and a following 2-week break. Participants in arm 2 (n=30), the placebo group, started treatment with the same procedure as arm 1. mITT, modified intention-to-treat; N, no of patients.

![Diagram showing patient enrolment and treatment assignments.]

Of total NK cells was found after IL-2 therapy, from 6.48% at baseline to 12.07% at week 10 (p<0.01), while no obvious changes were detected in the placebo group (figure 3D, online supplementary figure S2 and table S9). Among NK cells, CD56br NK subset increased with IL-2 therapy (p<0.05), which did not change significantly in the placebo group (figure 3E, online supplementary figure S2 and table S9).

To further verify the possible impact of IL-2 treatment on cell subsets involved in infectious immunity, a prospective, open-labelled observational study was conducted (NCT02932137). It showed that low-dose IL-2 activated NK cells and decreased viral titres in patients without antiviral therapy. The results of this study were described in online supplementary materials (online supplementary text; Online supplementary table S4, S6, S9, S11 and S12).

DISCUSSION

After being molecularly cloned in 1983, IL-2 was utilised to treat patients with melanoma and other cancers. Due to its function in supporting T-cell proliferation, survival and effector differentiation, IL-2 treatment, when used in high doses, demonstrated efficacy in a fraction of patients. The
approval of IL-2 therapy in certain types of solid tumours significantly contributed to the establishment of the concept of cancer immunotherapy.27

The management of active SLE is challenging due to the heterogeneous nature of the disease. Current therapy of active SLE relies primarily on corticosteroids and immunosuppressants to reduce disease activity. However, the incompletely effective outcomes achieved with these drugs are offset further by significant adverse effects, especially treatment-related infections.5 6 The concept of low-dose IL-2 therapy in autoimmune and inflammation was inspired by the key role of IL-2 in the development and function of Treg cells, which are essential in maintaining immune tolerance. Instead of promoting immunity by high-dose IL-2, open-labelled trials suggested that low-dose IL-2 suppressed inflammation and autoimmunity in hepatitis C-associated vasculitis, graft-versus-host disease, type 1 diabetes, alopecia areata and SLE.11-17-20

Low-dose IL-2 treatment was reported safe and associated with clinical improvements in these studies. The benefit of low-dose IL-2 therapy is considered to be based on the expansion of immune tolerance-inducing Treg cells and suppression of effector T cells, including Th1 cells and Th17 cells.11 Therefore, randomised and double-blind trials are expected clinically to formally evaluate the safety and efficacy of low-dose IL-2 treatment, which has the potential to become a new therapy to treat a broad range of inflammatory and autoimmune disorders refractory to current therapies.

In this study, we evaluated low-dose IL-2 therapy in a prospective, randomised, double-blind, placebo-controlled clinical trial in patients with active SLE despite standard therapy. The results showed that compared with the placebo group, SLE patients with active disease improved rapidly and significantly with low-dose IL-2 therapy. Remarkably, 65.52% of SLE patients reached SRI-4 response at the end of this study in low-dose IL-2 group, in comparison to 36.67% in the placebo group. Reduced SELENA-SLEDAI scores and resolution of clinical features were observed, along with decreased serological activities in the form of reduced autoantibodies and increased serum complements. The improvement of disease activities was observed across a wide range of SLE manifestations, including skin lesions, joint, fever, nephritis and permitted tapering of corticosteroid during the period of IL-2 treatment. It was clearly shown that the dose of corticosteroid could be reduced more during treatment with IL-2 than with placebo, which is clinically critical in SLE management.

We observed that 76.92% of patients achieved partial remission and 53.85% reached CR after IL-2 treatment (table 1) at week 12. In addition to reduced proteinuria, increased serum albumin was also observed. This placebo-controlled study also confirmed the therapeutic effects of low-dose IL-2 on LN reported in previous non-controlled studies.11 12 29 Since this study was not specifically designed to investigate the effects of IL-2 on LN and the number of patients with LN was limited, future studies on low-dose IL-2 treatment in LN or other autoimmune kidney diseases should be carried out.

One of the clinical observations in this study was the improvement in alopecia with the use of low-dose IL-2. The improvement of alopecia was of interest, given the recent report that low-dose IL-2 was effective in the treatment of severe alopecia areata.17 Seven of 12 patients with alopecia in our study showed significant improvement with low-dose IL-2. Additionally, 11 of 13 patients with rash showed complete resolution of the skin lesion. This was in consistency with a recent study that demonstrated improvement in graft versus host disease (GVHD)-related erythema and scleroderma with low-dose IL-2.15 Therefore, low-dose IL-2 might be an option to treat autoimmune skin diseases.

Distinct from immunosuppressants and biologics which often increased infection incidence,29 low-dose IL-2 treatment was effective in SLE and was probably not accompanied with increased infection incidence. It has been reported that sustained expansion of Tregs by IL-2 inhibited autoimmunity in animal models without impairing immune responses to infection, vaccination and cancer.30 In this study, low-dose IL-2 was shown to expand Treg cells as well as NK cells, while total CD4+ and CD8+ T cells were not affected. Previous studies demonstrated that the function of NK cells was impaired in active SLE,31 and NK cells, especially the CD56bright NK subset, have been reported to be a regulatory controller of autoimmune responses, mainly by inhibiting T-cell proliferation through cytotoxic engagement and immunosuppressive cytokine expression.32 33 35 In this study, the CD56bright NK subset was preferentially expanded by low-dose IL-2, and might contribute to the alleviation of SLE autoimmunity together with expanded Treg cells. NK cells are also important in protection against viral infections.19 20 We observed significantly increased expression of IFNγ, Nkp46 and NKG2D by NK cells in response to low-dose IL-2 treatment (online supplementary table S11), which implicated potential augmentation of anti-infectious cellular immunity. Clinically, in agreement with previous studies,13 we showed that low-dose IL-2 did not increase the incidence of infection, rather reduced the viral loads of BK and HPV viral loads in three SLE patients to

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>IL-2 (n=30)</th>
<th>Placebo (n=30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, year, mean±SD</td>
<td>31.58±9.25</td>
<td>29.83±9.72</td>
<td>0.474</td>
</tr>
<tr>
<td>Female/male</td>
<td>27/3</td>
<td>29/1</td>
<td>0.612</td>
</tr>
<tr>
<td>Weight, kg, mean±SD</td>
<td>54.81±8.33</td>
<td>56.89±8.87</td>
<td>0.117</td>
</tr>
<tr>
<td>Height, cm, mean±SD</td>
<td>162.23±6.81</td>
<td>162.67±5.41</td>
<td>0.743</td>
</tr>
<tr>
<td>Area, m², mean±SD</td>
<td>1.57±0.140</td>
<td>1.62±0.13</td>
<td>0.708</td>
</tr>
<tr>
<td>Duration, months, mean±SD</td>
<td>66.7±57.4</td>
<td>63.6±59.9</td>
<td>0.652</td>
</tr>
<tr>
<td>SLEDAI, median (range)</td>
<td>12 (8–27)</td>
<td>11 (8–22)</td>
<td>0.351</td>
</tr>
<tr>
<td>BILAG, median (range)</td>
<td>10 (8–13)</td>
<td>10.5 (8–13.75)</td>
<td>0.372</td>
</tr>
<tr>
<td>≥1 BILAG A or 2B score (%)</td>
<td>21 (70)</td>
<td>21 (70)</td>
<td>1.000</td>
</tr>
<tr>
<td>PGA, median (range)</td>
<td>2.3 (1.55–2.75)</td>
<td>2.2 (1.2–3.3)</td>
<td>0.446</td>
</tr>
</tbody>
</table>

Medications

| Prednisone dose, mg/day, median (range) | 12.5 (0–50) | 15 (5–50) | 0.331   |
| Hydroxychloroquine | 29 (96.67) | 28 (93.33) | 1.000   |
| Cyclophosphamide | 4 (13.33) | 0 (0) | 0.112   |
| Azathioprine | 1 (3.33) | 4 (13.33) | 0.352   |
| Cyclosporine | 0 (0) | 5 (16.67) | 0.052   |
| Mycophenolate mofetil | 9 (30.00) | 8 (26.67) | 1.000   |
| Tacrolimus | 1 (3.33) | 1 (3.33) | 1.000   |
| Leflunomide | 3 (10.00) | 1 (3.33) | 0.611   |
| Thalidomide | 1 (3.33) | 0 (0) | 1.000   |
| Methotrexate | 1 (3.33) | 1 (3.33) | 1.000   |

Baseline characteristics of SLE patients in this study (n=60)
Table 2  Responses of SLE patients to low-dose IL-2 treatment

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Baseline</th>
<th>Week 12</th>
<th>Week 24</th>
<th>P value (week 0 vs 12)</th>
<th>P value (week 0 vs 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLEDAI, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>12 (8–27)</td>
<td>6 (0–16)</td>
<td>4 (0–18)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo</td>
<td>11 (8–22)</td>
<td>6 (0–25)</td>
<td>8 (0–25)</td>
<td>&lt;0.001</td>
<td>0.002</td>
</tr>
<tr>
<td>BILAG, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>10 (8–13)</td>
<td>6 (4–11)</td>
<td>4 (4–11)</td>
<td>0.014</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo</td>
<td>10.5 (8–13.75)</td>
<td>10 (4–11)</td>
<td>8 (4–10.75)</td>
<td>0.037</td>
<td>0.004</td>
</tr>
<tr>
<td>≥1 BILAG A or 2B score (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>21 (70.00)</td>
<td>2 (6.67)</td>
<td>1 (3.33)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo</td>
<td>21 (70.00)</td>
<td>4 (13.33)</td>
<td>2 (6.67)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>PGA, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>2.3 (1.5–2.75)</td>
<td>0 (0–2)</td>
<td>0 (0–1)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo</td>
<td>2.2 (1–2.3)</td>
<td>1 (0–2)</td>
<td>1 (0–2)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Rash, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>13 (44.83)</td>
<td>2 (6.90)</td>
<td>2 (6.90)</td>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>Placebo</td>
<td>16 (53.33)</td>
<td>6 (20.0)</td>
<td>6 (20.0)</td>
<td>0.015</td>
<td>0.015</td>
</tr>
<tr>
<td>Oral ulceration, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>4 (13.79)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.112</td>
<td>0.112</td>
</tr>
<tr>
<td>Placebo</td>
<td>1 (3.33)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Arthritis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>14 (48.28)</td>
<td>4 (13.79)</td>
<td>3 (10.34)</td>
<td>0.010</td>
<td>0.003</td>
</tr>
<tr>
<td>Placebo</td>
<td>15 (50.0)</td>
<td>9 (30.00)</td>
<td>8 (26.67)</td>
<td>0.187</td>
<td>0.110</td>
</tr>
<tr>
<td>Vasculitis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>4 (13.79)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.112</td>
<td>0.112</td>
</tr>
<tr>
<td>Placebo</td>
<td>2 (6.67)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.492</td>
<td>0.492</td>
</tr>
<tr>
<td>Alopecia, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>12 (41.38)</td>
<td>6 (20.69)</td>
<td>5 (17.24)</td>
<td>0.158</td>
<td>0.082</td>
</tr>
<tr>
<td>Placebo</td>
<td>7 (23.33)</td>
<td>2 (6.67)</td>
<td>2 (6.67)</td>
<td>0.144</td>
<td>0.144</td>
</tr>
<tr>
<td>Fever, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>3 (10.34)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.237</td>
<td>0.237</td>
</tr>
<tr>
<td>Placebo</td>
<td>4 (13.33)</td>
<td>1 (3.33)</td>
<td>0 (0)</td>
<td>0.352</td>
<td>0.167</td>
</tr>
<tr>
<td>Myositis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>1 (3.45)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Placebo</td>
<td>2 (6.67)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0.492</td>
<td>0.492</td>
</tr>
<tr>
<td>Prednisone dose, mg/day, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>15 (0–50)</td>
<td>10 (0–25)</td>
<td>10 (0–20)</td>
<td>0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo</td>
<td>15 (7.5–60)</td>
<td>15 (5–40)</td>
<td>10 (2.5–35)</td>
<td>0.004</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ANA decreased, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>0 (0)</td>
<td>7 (24.14)</td>
<td>8 (27.59)</td>
<td>0.500</td>
<td>0.320</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>0 (0)</td>
<td>11 (36.67)</td>
<td>12 (40.0)</td>
<td>0.036</td>
<td>0.036</td>
</tr>
<tr>
<td>Anti-ds-DNA, IU/mL, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>34.80 (1.0–1783.15)</td>
<td>33.0 (7.0–876.21)</td>
<td>29.0 (1.0–348.50)</td>
<td>0.037</td>
<td>0.063</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>73.30 (1.0–2525.53)</td>
<td>37.60 (1.40–3467.80)</td>
<td>36.3 (1.0–3467.80)</td>
<td>0.196</td>
<td>0.235</td>
</tr>
<tr>
<td>AnuA, IU/mL, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>14.45 (0.87–449.06)</td>
<td>20.84 (1.28–287.07)</td>
<td>16.72 (1.17–287.07)</td>
<td>0.439</td>
<td>0.044</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>41.725 (0.0–315.80)</td>
<td>16.03 (0.0–296.32)</td>
<td>12.08 (0.0–266.740)</td>
<td>0.282</td>
<td>0.149</td>
</tr>
<tr>
<td>Albumin, g/L, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>39.25 (27.60–44.70)</td>
<td>43.90 (37.70–46.90)</td>
<td>43.50 (39.80–47.40)</td>
<td>0.046</td>
<td>0.017</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>39.80 (25.10–44.40)</td>
<td>38.65 (31.90–43.60)</td>
<td>40.40 (32.80–47.50)</td>
<td>0.442</td>
<td>0.848</td>
</tr>
<tr>
<td>LN complete remission, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>0 (0)</td>
<td>7 (53.85)</td>
<td>7 (53.85)</td>
<td>0.005</td>
<td>0.005</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>0 (0)</td>
<td>1 (8.33)</td>
<td>2 (16.67)</td>
<td>1.000</td>
<td>0.478</td>
</tr>
<tr>
<td>LN partial remission, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>0 (0)</td>
<td>10 (76.92)</td>
<td>10 (76.92)</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>0 (0)</td>
<td>3 (25.0)</td>
<td>6 (50.0)</td>
<td>0.217</td>
<td>0.014</td>
</tr>
</tbody>
</table>

Data are median (IQR), n (%) or difference (95% CI).

ANA, antinuclear antibodies; AnuA, antinucleosome antibodies; BILAG, British Isles Lupus Assessment Group; LN, lupus nephritis; PGA, physician’s global assessment of disease activity; SLEDAI, Safety of Estrogens in Lupus Erythematosus National Assessment version of the SLE Disease Activity Index; anti-dsDNA, anti–double-stranded DNA.
There were several limitations in this study, which might affect the outcome of the trial. First, no dose ranging comparison was designed. Although the current low-dose IL-2 dosage of 0.3–3 MIU/day was based on previous open-labelled trials,10 11 13–16 the optimal dosage of IL-2 therapy for individual disease remains to be determined. It is also highly possible that individuals might respond differently to dosage regimen. A better efficacy using optimal dosage regimen might be achieved, which can be tested in future clinical trials.

In this study, background treatments such as calcineurin inhibitors (CNIs) might affect the efficacy of low-dose IL-2 in our study. CNIs including cyclosporine or tacrolimus can impair the function of Treg cells while IL-2 was recently undetectable level (online supplementary table S6). Whether low-dose IL-2 treatment could decrease viral loads in infected patients should be carried out in the future.

Figure 2 Clinical response of SLE patients after treatment with low-dose IL-2 and placebo. (A) The SRI-4 response rate of patients receiving low-dose IL-2 (red) or placebo (blue) treatment during the 12-week treatment and 12-week follow-up period. Grey areas indicate the periods on IL-2 or placebo therapy. (B) SELENA-SLEDAI scores during the 24 weeks. (C) Complete remission (CR) rate in patients with lupus nephritis. (D) Proportion of patients achieving corticosteroid reduction by ≥50% from baseline to 24 weeks. (E) Levels of albumin at week 0, 12 and 24. (F) Proteinuria per 24 hours (24-UPE) of patients with lupus nephritis from baseline to 24 weeks. (G,H) The percentages of patients achieving normal levels of C3 and C4 in the 24 weeks. *p<0.05. The actual data of the results are listed in online supplementary table S13–20 (online supplementary table S13 for (A), online supplementary table S14 for (B), online supplementary table S15 for (C), online supplementary file 1 for (D), online supplementary table S17 for (E), online supplementary table S18 for (F), online supplementary table S19 for (G) and online supplementary file 1 for (H)). SRI-4, SLE Responder Index-4.
Table 3  The adverse events during low-dose IL-2 treatment in SLE patients

<table>
<thead>
<tr>
<th></th>
<th>IL-2 (n=29)</th>
<th>Placebo (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>SAEs</td>
<td>0</td>
<td>3 (10.0)</td>
</tr>
<tr>
<td>NPSLE</td>
<td>0</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Herpes zoster</td>
<td>0</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>AEs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td>2 (6.9)</td>
<td>6 (20.0)</td>
</tr>
<tr>
<td>Upper respiratory infection</td>
<td>2 (6.9)</td>
<td>4 (13.3)</td>
</tr>
<tr>
<td>Severe infections</td>
<td>0</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Herpes zoster</td>
<td>0</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0</td>
<td>1 (3.3)</td>
</tr>
<tr>
<td>Injection site reactions</td>
<td>9 (31.0)</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Fever</td>
<td>4 (13.8)</td>
<td>2 (6.7)</td>
</tr>
<tr>
<td>Flu-like symptoms</td>
<td>3 (10.3)</td>
<td>0</td>
</tr>
</tbody>
</table>

AE, adverse event; SAE, severe adverse events.

**Systemic lupus erythematosus**

reported to restore the survival and suppressive properties of Tregs exposed to CNIs. 34 Therefore, future clinical studies for low-dose IL-2 therapy should recruit a larger cohort and stratify patients based on background treatments, allowing analysing the therapeutic efficacy of low-dose IL-2 without the interference of background treatments.

We observed a more rapid disease improvement in IL-2 group. As the trial proceeded, more patients in IL-2 group improved significantly, and at week 24, the SRI-4 response rate of IL-2 group was 65.52%, compared with 36.67% of the placebo group (p=0.027). However, some severe manifestations such as nephritis were unable to be achieve complete remission in such a short period. Therefore, during the trial, neither of the groups achieved ‘Clinical Remission with No Treatment’ or ‘Clinical Remission On Treatment’ by the DORIS definition. 35 Prolonged treatment should be considered in future studies to evaluate the efficacy of low-dose IL-2 to induce SLE disease remission by DORIS definition.

Collectively, the current study provided supportive evidence that low-dose IL-2 treatment might be effective and well tolerated in

Figure 3  Dynamics of immune cell subsets in SLE during IL-2 treatment. (A,B,C) Changes in percentages of CD4+ T cell, CD8+ T cell and Treg cells at every visit. (D,E) Dynamics of total NK cells and CD56+ NK in SLE patients during 24 weeks. The actual data of the results are listed in online supplementary table S21. Treg, regulatory T.
patients with SLE, which was supportive of further enlarged RCT studies with multiple patient cohorts from separate clinical centres.

Author affiliations
1 Department of Rheumatology and Immunology, Peking University People’s Hospital, Beijing, China
2 Beijing Key Laboratory for Rheumatism and Immune Diagnosis (BZ0135), Beijing, China
3 Center for Applied Statistics and School of Statistics, Renmin University of China, Beijing, China
4 Department of Basic Medical Sciences, Tsinghua University School of Medicine, Beijing, China
5 Department of Medicine, SUNY at Buffalo School of Medicine, Buffalo, New York, USA
6 Department of Rheumatology and Immunology, China-Australia Centre for Personalised Immunology, Shanghai Renji Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China
7 Department of Immunology and Infectious Disease, John Curtin School of Medical Research, Australian National University, Shanghai, China
8 State Key Laboratory of Natural and Biomimetic Drugs, Peking University, Beijing, China

Acknowledgements We thank the patients for their participation in this study and their willingness to share the scientific data resulting from this clinical trial.

Contributors JH, DY, XS and ZL initiated the investigation, led the clinical experiments, and wrote, reviewed and edited the manuscript. RS, MS, XS, JH, DY and YW obtained and analysed the data and wrote, edited and reviewed the manuscript. JA, AJ obtained data and wrote, edited and reviewed the manuscript. YW provided statistical guidance prior to study implementation, conducted statistical analysis, and edited and reviewed the manuscript. XZ, JC, YJ, XL, XZ, CL, YZ, YY, HY, YL and LS implemented the double-armed study and reviewed and edited the manuscript. SZ, LZ, RJ, XZ, NS, JG and XL contributed to the design and implemented FACS experiments of the study. NS reviewed and edited the manuscript. All authors gave final approval of the manuscript version to be published.

Funding The work was supported by the National Natural Science Foundation of China (31400880, 81571790, 81771849) and the National Natural Science Foundation of China (81771787). The funding bodies had no role in the design or conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript.

Competing interests None declared.

Patient consent for publication Obtained.

Ethics approval Peking University People’s Hospital Ethics Committee approved the protocol and all patients provided written informed consent.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non-Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is correctly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID iDs
Jing He orcid.org/0000-0003-3904-8928
Jiapeng Guo orcid.org/0000-0002-5031-3510

REFERENCES
Supplementary Materials

This appendix has been provided by the authors to give readers additional information about their work.

Table of Contents

Impact of IL-2 therapy on NK cell activity .................................................................3

Figure S1. Representative gating of T cell and NK cell subsets .........................4

Figure S2. Immune cell subset dynamics during low-dose IL-2 treatment and follow-up...........................................................................................................5

Table S1. Baseline characteristics of SLE patients in trial NCT02465580 (n=60) ......6

Table S2. Baseline clinical characteristics of the enrolled patients with SLE in the study .................................................................................................................7

Table S3. Clinical responses to IL-2 or placebo treatment in patients with SLE ......14

Table S4. Responses of SLE patients to low-dose IL-2 treatment ....................28

Table S5 Laboratory Improvement in LN patients .................................................30

Table S6. Viral load in SLE with IL-2 treatment ....................................................31

Table S7. Virus examined in sera of SLE patients by real-time PCR ................32

Table S8. Antibodies used in flow cytometric analysis in this study ..................33

Table S9. Immune cell changes in SLE patients with low-dose IL-2 treatment .....34

Table S10. Baseline characteristics of SLE patients in trial NCT02932137 (n=20) ..35

Table S11. Phenotypic change of NK cells in SLE patients ..............................35

Table S12. Phenotype changes of CD8+ T cells in SLE patients .......................36

Table S13. SRI-4 changes in SLE patients .............................................................36

Table S14. SLEDAI score changes in SLE patients .............................................37

Table S15. LN complete remission rates in SLE patients .................................37

Table S16. Proportions of patients achieving corticosteroid reduction by \( \geq 50\% \) from...
baseline to 24 weeks ................................................................. 37
Table S17. Changes of Albumin in SLE patients ......................... 38
Table S18. Changes of proteinuria per 24 hours in SLE patients .......... 38
Table S19. Proportions of patients with recovered C3 levels from baseline to 24 weeks ................................................................. 38
Table S20. Proportions of patients with recovered C4 levels from baseline to 24 weeks ........................................................................................................ 39
Table S21. Changes of immune cell subsets........................................ 40
Impact of IL-2 therapy on NK cell activity

To verify the phenotypic changes of NK cells and CD8+ T cells after IL-2 therapy, we compared the effects of low-dose IL-2 and conventional therapy on NK cell responses and representative virus-specific responses of CD8 T cells with another prospective, open-labelled study (NCT02932137). Ten patients receiving low-dose IL-2 therapy and ten with standard therapy consented for the evaluation of NK cells and CD8+ T cells. Significant increase of IFNγ (P=0.024), NKp46 (P=0.025) and NKG2D (P=0.003) expression by NK cells were observed after low-dose IL-2 treatment, but not in patients receiving standard therapy (Table S11). However, we did not find any significant change in CD8+ T cells after CEF peptide stimulation in IL-2 treated patients and patients under conventional therapy (Supplementary Table S12).

To further examine the impact of low-dose IL-2 on infections in SLE patients, 8 patients receiving low-dose IL-2 therapy consented to have their blood screened for infections (30 viruses, Table S7). One patient was positive for human papillomavirus and 2 were positive for BK virus at baseline (Table S6). The viral titres in patients were measured at week 2 and 10. Despite no anti-viral therapy, the viral loads of these 3 patients decreased to normal at week 10 with low-dose IL-2 treatment (Table S4).
Figure S1. Representative gating of T cell and NK cell subsets

Panel A shows the gating of CD4\(^+\), CD8\(^+\) and regulatory T cells. Panel B shows the gating of total NK cells (CD56\(^{bright}\)CD3\(^{+}\)) and its CD56\(^{bright}\)CD16\(^+\) and CD56\(^{dim}\)CD16\(^{+}\) subsets.
Figure S2. Immune cell subset dynamics during low-dose IL-2 treatment and follow-up

Panel A shows the changes of Treg cell at indicated time during the trial by flow cytometry in low-dose IL-2 group or placebo group. Panel B shows the changes of NK cells. Panel C shows the changes of CD56^{br} and CD56^{dim} NK cell subsets. The detailed results were show in Table S7.
Table S1. Baseline characteristics of SLE patients in trial NCT02465580 (n=60)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>IL-2 (n=30)</th>
<th>Placebo (n=30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, year, mean ±SD</td>
<td>31.58±9.25</td>
<td>29.83±9.72</td>
<td>0.474</td>
</tr>
<tr>
<td>Female/Male</td>
<td>27/3</td>
<td>29/1</td>
<td>0.612</td>
</tr>
<tr>
<td>Weight, kg, mean ±SD</td>
<td>54.81±8.33</td>
<td>58.69±8.87</td>
<td>0.117</td>
</tr>
<tr>
<td>Height, cm, mean ±SD</td>
<td>162.23±6.81</td>
<td>162.67±5.41</td>
<td>0.743</td>
</tr>
<tr>
<td>Area, m², mean ±SD</td>
<td>1.57±0.140</td>
<td>1.62±0.13</td>
<td>0.708</td>
</tr>
<tr>
<td>Duration, year, mean ±SD</td>
<td>66.7±57.4</td>
<td>63.6±59.9</td>
<td>0.652</td>
</tr>
<tr>
<td>SLEDAI, median (range)</td>
<td>12 (8, 27)</td>
<td>11 (8, 22)</td>
<td>0.351</td>
</tr>
<tr>
<td>Medications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone dose, mg/day, median (range)</td>
<td>12.5 (0, 50)</td>
<td>15 (5, 50)</td>
<td>0.331</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>29 (96.67)</td>
<td>28 (93.33)</td>
<td>1.000</td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>4 (13.33)</td>
<td>0 (0)</td>
<td>0.112</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>1 (3.33)</td>
<td>4 (13.33)</td>
<td>0.352</td>
</tr>
<tr>
<td>Cyclosporine</td>
<td>0 (0)</td>
<td>5 (16.67)</td>
<td>0.052</td>
</tr>
<tr>
<td>Mycophenolate Mofetil</td>
<td>9 (30.00)</td>
<td>8 (26.67)</td>
<td>1.000</td>
</tr>
<tr>
<td>Tacrolimus</td>
<td>1 (3.33)</td>
<td>1 (3.33)</td>
<td>1.000</td>
</tr>
<tr>
<td>Leflunomide</td>
<td>3 (10.00)</td>
<td>1 (3.33)</td>
<td>0.611</td>
</tr>
<tr>
<td>Thalidomide</td>
<td>1 (3.33)</td>
<td>0 (0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>1 (3.33)</td>
<td>1 (3.33)</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*For a continuous variable, median (range) and means ±SD, for a categorical variable, count (percentage).
**Table S2. Baseline clinical characteristics of the enrolled patients with SLE in the study**

<table>
<thead>
<tr>
<th>ID</th>
<th>Groups</th>
<th>Baseline</th>
<th>Manifestations</th>
<th>SL ED AI</th>
<th>WB C (10^9/L)</th>
<th>PLT (10^9/L)</th>
<th>A N A</th>
<th>Anti-dsDNA (&lt;25.0 IU/ml)</th>
<th>C3 (0.790-1.520g/L)</th>
<th>C4 (0.160-0.380g/L)</th>
<th>Proteininuria (g/day)</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1= IL-2</td>
<td>2= Placebo</td>
<td>Sex</td>
<td>Age</td>
<td>Duration (m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-1</td>
<td>1</td>
<td>F</td>
<td>26</td>
<td>156</td>
<td>LN, rash</td>
<td>12</td>
<td>7.59</td>
<td>318</td>
<td>0</td>
<td>38.4</td>
<td>0.794</td>
<td>0.205</td>
</tr>
<tr>
<td>SLE-2</td>
<td>2</td>
<td>F</td>
<td>22</td>
<td>1</td>
<td>Arthritis, fever, myalgia</td>
<td>13</td>
<td>3.8</td>
<td>289</td>
<td>640</td>
<td>132.1</td>
<td>0.450</td>
<td>0.050</td>
</tr>
<tr>
<td>SLE-3</td>
<td>1</td>
<td>F</td>
<td>24</td>
<td>2</td>
<td>Arthritis, NPSLE, fever, alopecia</td>
<td>27</td>
<td>3.37</td>
<td>186</td>
<td>320</td>
<td>260.4</td>
<td>0.307</td>
<td>0.048</td>
</tr>
<tr>
<td>SLE-4</td>
<td>2</td>
<td>F</td>
<td>24</td>
<td>9</td>
<td>Arthritis, rash, LN</td>
<td>14</td>
<td>6.7</td>
<td>206</td>
<td>640</td>
<td>321.4</td>
<td>0.326</td>
<td>0.034</td>
</tr>
<tr>
<td>SLE-5</td>
<td>2</td>
<td>M</td>
<td>32</td>
<td>34</td>
<td>LN</td>
<td>10</td>
<td>5.1</td>
<td>142</td>
<td>80</td>
<td>4.3</td>
<td>0.711</td>
<td>0.232</td>
</tr>
<tr>
<td>SLE-6</td>
<td>1</td>
<td>F</td>
<td>58</td>
<td>29</td>
<td>Arthritis, rash, alopecia</td>
<td>12</td>
<td>3.5</td>
<td>130</td>
<td>640</td>
<td>35.6</td>
<td>0.672</td>
<td>0.102</td>
</tr>
<tr>
<td>SLE-7</td>
<td>2</td>
<td>F</td>
<td>43</td>
<td>196</td>
<td>Arthritis, LN, rash</td>
<td>22</td>
<td>5.89</td>
<td>185</td>
<td>640</td>
<td>852.97</td>
<td>0.421</td>
<td>0.074</td>
</tr>
<tr>
<td>--------</td>
<td>---</td>
<td>---</td>
<td>----</td>
<td>-----</td>
<td>---------------------</td>
<td>----</td>
<td>------</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CsA 50mg tid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-8</td>
<td>1</td>
<td>F</td>
<td>25</td>
<td>108</td>
<td>Thrombocytopenia, arthritis, pericarditis</td>
<td>9</td>
<td>12.18</td>
<td>91</td>
<td>160</td>
<td>14.9</td>
<td>0.712</td>
<td>0.164</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.20g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-9</td>
<td>2</td>
<td>F</td>
<td>21</td>
<td>30</td>
<td>Thrombocytopenia, fever, rash, arthritis</td>
<td>8</td>
<td>7.4</td>
<td>74</td>
<td>80</td>
<td>20.2</td>
<td>0.965</td>
<td>0.184</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-10</td>
<td>2</td>
<td>F</td>
<td>24</td>
<td>69</td>
<td>Rash, LN</td>
<td>10</td>
<td>4.89</td>
<td>241</td>
<td>640</td>
<td>223.23</td>
<td>0.356</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-11</td>
<td>1</td>
<td>M</td>
<td>28</td>
<td>84</td>
<td>LN</td>
<td>16</td>
<td>5.08</td>
<td>215</td>
<td>320</td>
<td>2.6</td>
<td>0.806</td>
<td>0.416</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-12</td>
<td>1</td>
<td>F</td>
<td>34</td>
<td>39</td>
<td>Arthritis, myositis, fever, rash</td>
<td>15</td>
<td>5</td>
<td>210</td>
<td>320</td>
<td>60.7</td>
<td>0.513</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-13</td>
<td>2</td>
<td>F</td>
<td>38</td>
<td>2</td>
<td>Alopecia, arthritis</td>
<td>8</td>
<td>8.28</td>
<td>239</td>
<td>320</td>
<td>1</td>
<td>0.718</td>
<td>0.169</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-14</td>
<td>2</td>
<td>F</td>
<td>28</td>
<td>32</td>
<td>Arthritis, oral ulcer</td>
<td>8</td>
<td>4.18</td>
<td>324</td>
<td>0</td>
<td>7.7</td>
<td>0.928</td>
<td>0.152</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-15</td>
<td>1</td>
<td>F</td>
<td>29</td>
<td>14</td>
<td>Vasculitis oral ulcer</td>
<td>16</td>
<td>5.59</td>
<td>323</td>
<td>160</td>
<td>162.8</td>
<td>0.836</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HCQ 0.2g bid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-16</td>
<td>1</td>
<td>F</td>
<td>39</td>
<td>LN, rash, arthritis, alopecia, rash, oral ulcer</td>
<td>10</td>
<td>160</td>
<td>1.0</td>
<td>0.943</td>
<td>0.176</td>
<td>Pred 10mg qd HCQ 0.2g bid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-17</td>
<td>2</td>
<td>F</td>
<td>23</td>
<td>LN, rash, NPSLE, thrombocytopenia</td>
<td>15</td>
<td>13.12</td>
<td>93</td>
<td>164</td>
<td>0.514</td>
<td>0.074</td>
<td>Pred 10mg qd FK506 1g bid AZA 50mg qd</td>
<td></td>
</tr>
<tr>
<td>SLE-18</td>
<td>1</td>
<td>F</td>
<td>35</td>
<td>Alopecia, rash, arthritis</td>
<td>10</td>
<td>4.85</td>
<td>383</td>
<td>22.6</td>
<td>0.701</td>
<td>0.157</td>
<td>Pred 5mg qd HCQ 0.2g bid</td>
<td></td>
</tr>
<tr>
<td>SLE-19</td>
<td>2</td>
<td>F</td>
<td>47</td>
<td>Proteinuria, rash</td>
<td>8</td>
<td>5</td>
<td>170</td>
<td>640</td>
<td>46</td>
<td>1.25</td>
<td>0.208</td>
<td>Pred 10mg qd HCQ 0.2g bid MMF 1g bid</td>
</tr>
<tr>
<td>SLE-20</td>
<td>1</td>
<td>F</td>
<td>22</td>
<td>LN</td>
<td>12</td>
<td>3.17</td>
<td>181</td>
<td>320</td>
<td>1783.15</td>
<td>0.735</td>
<td>0.092</td>
<td>1.8</td>
</tr>
<tr>
<td>SLE-21</td>
<td>2</td>
<td>F</td>
<td>24</td>
<td>LN</td>
<td>12</td>
<td>3.47</td>
<td>239</td>
<td>320</td>
<td>129.2</td>
<td>0.431</td>
<td>0.106</td>
<td>1.63</td>
</tr>
<tr>
<td>SLE-22</td>
<td>1</td>
<td>F</td>
<td>21</td>
<td>Rash, fever, thrombocytopenia, leukopenia</td>
<td>9</td>
<td>1.7</td>
<td>58</td>
<td>80</td>
<td>30.9</td>
<td>1.02</td>
<td>0.153</td>
<td>0.13</td>
</tr>
<tr>
<td>SLE-23</td>
<td>2</td>
<td>F</td>
<td>26</td>
<td>Arthritis, rash, leukopenia</td>
<td>11</td>
<td>2.91</td>
<td>144</td>
<td>0</td>
<td>58.5</td>
<td>0.502</td>
<td>0.094</td>
<td>0.12</td>
</tr>
<tr>
<td>SLE-24</td>
<td>1</td>
<td>F</td>
<td>41</td>
<td>Proteinuria, arthritis, rash</td>
<td>16</td>
<td>5.12</td>
<td>205</td>
<td>320</td>
<td>28.4</td>
<td>1.080</td>
<td>0.163</td>
<td>1.17</td>
</tr>
<tr>
<td>SLE-25</td>
<td>2</td>
<td>F</td>
<td>19</td>
<td>Thrombocytopenia, rash, fever</td>
<td>8</td>
<td>9.3</td>
<td>69</td>
<td>640</td>
<td>37.4</td>
<td>0.722</td>
<td>0.067</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>SLE-26</td>
<td>1</td>
<td>F</td>
<td>32</td>
<td>99</td>
<td>Rash, oral ulcer</td>
<td>8</td>
<td>3.59</td>
<td>199</td>
<td>320</td>
<td>74.3</td>
<td>0.739</td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>---</td>
<td>---</td>
<td>------</td>
<td>----</td>
<td>-----------------</td>
<td>---</td>
<td>------</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>SLE-27</td>
<td>1</td>
<td>F</td>
<td>26</td>
<td>25</td>
<td>Proteinuria, arthritis, rash</td>
<td>10</td>
<td>8.92</td>
<td>207</td>
<td>320</td>
<td>17</td>
<td>1.470</td>
</tr>
<tr>
<td></td>
<td>SLE-28</td>
<td>2</td>
<td>F</td>
<td>53</td>
<td>10</td>
<td>Thrombocytopenia, arthritis, rash</td>
<td>9</td>
<td>8.5</td>
<td>60</td>
<td>80</td>
<td>33.5</td>
<td>0.913</td>
</tr>
<tr>
<td></td>
<td>SLE-29</td>
<td>1</td>
<td>F</td>
<td>26</td>
<td>168</td>
<td>LN</td>
<td>20</td>
<td>4.3</td>
<td>168</td>
<td>640</td>
<td>436.82</td>
<td>0.502</td>
</tr>
<tr>
<td></td>
<td>SLE-30</td>
<td>1</td>
<td>F</td>
<td>27</td>
<td>72</td>
<td>LN</td>
<td>12</td>
<td>13.33</td>
<td>280</td>
<td>640</td>
<td>42.4</td>
<td>1.220</td>
</tr>
<tr>
<td></td>
<td>SLE-31</td>
<td>2</td>
<td>F</td>
<td>48</td>
<td>0.5</td>
<td>Arthritis, headache, thrombocytopenia, leucopenia</td>
<td>18</td>
<td>2.0</td>
<td>83</td>
<td>640</td>
<td>189.46</td>
<td>0.280</td>
</tr>
<tr>
<td></td>
<td>SLE-32</td>
<td>2</td>
<td>F</td>
<td>31</td>
<td>42</td>
<td>Rash, Alopecia</td>
<td>8</td>
<td>6.2</td>
<td>282</td>
<td>640</td>
<td>436.34</td>
<td>0.667</td>
</tr>
<tr>
<td></td>
<td>SLE-33</td>
<td>1</td>
<td>F</td>
<td>51</td>
<td>126</td>
<td>LN</td>
<td>10</td>
<td>4.45</td>
<td>199</td>
<td>80</td>
<td>342.68</td>
<td>0.807</td>
</tr>
<tr>
<td></td>
<td>SLE-34</td>
<td>2</td>
<td>F</td>
<td>31</td>
<td>1</td>
<td>Arthritis, alopecia, fever</td>
<td>11</td>
<td>11.2</td>
<td>208</td>
<td>640</td>
<td>84</td>
<td>0.627</td>
</tr>
<tr>
<td></td>
<td>SLE-35</td>
<td>2</td>
<td>F</td>
<td>21</td>
<td>49</td>
<td>Arthritis,</td>
<td>9</td>
<td>5.86</td>
<td>96</td>
<td>640</td>
<td>1.0</td>
<td>0.863</td>
</tr>
</tbody>
</table>

Supplementary material

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>rash, alopecia, thrombocytopenia,</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>HCQ 0.2g bid</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLE-36</td>
<td>1</td>
<td>F</td>
<td>24</td>
<td>3</td>
<td>Alopecia, LN</td>
<td>14</td>
<td>5.03</td>
<td>144</td>
<td>320</td>
<td>37.7</td>
</tr>
<tr>
<td>SLE-37</td>
<td>1</td>
<td>F</td>
<td>48</td>
<td>1</td>
<td>Alopecia, arthritis vasculitis, thrombocytopenia.</td>
<td>21</td>
<td>5.2</td>
<td>84</td>
<td>320</td>
<td>148.37</td>
</tr>
<tr>
<td>SLE-38</td>
<td>2</td>
<td>F</td>
<td>28</td>
<td>32</td>
<td>Thrombocytopenia, alopecia, hematuria</td>
<td>11</td>
<td>13.82</td>
<td>4</td>
<td>640</td>
<td>103.4</td>
</tr>
<tr>
<td>SLE-39</td>
<td>2</td>
<td>F</td>
<td>41</td>
<td>8</td>
<td>Arthritis, rash</td>
<td>8</td>
<td>4.62</td>
<td>221</td>
<td>320</td>
<td>146.2</td>
</tr>
<tr>
<td>SLE-40</td>
<td>1</td>
<td>M</td>
<td>34</td>
<td>4</td>
<td>Discoid rash, arthritis</td>
<td>8</td>
<td>4.34</td>
<td>233</td>
<td>320</td>
<td>43.9</td>
</tr>
<tr>
<td>SLE-41</td>
<td>1</td>
<td>F</td>
<td>38</td>
<td>1</td>
<td>Vasculitis</td>
<td>12</td>
<td>6.5</td>
<td>221</td>
<td>320</td>
<td>465.78</td>
</tr>
<tr>
<td>SLE-42</td>
<td>1</td>
<td>F</td>
<td>27</td>
<td>40</td>
<td>Rash, alopecia</td>
<td>8</td>
<td>5.43</td>
<td>253</td>
<td>160</td>
<td>1.0</td>
</tr>
<tr>
<td>SLE-43</td>
<td>2</td>
<td>F</td>
<td>25</td>
<td>204</td>
<td>LN</td>
<td>12</td>
<td>4.33</td>
<td>345</td>
<td>320</td>
<td>25.8</td>
</tr>
<tr>
<td>SLE-44</td>
<td>2</td>
<td>F</td>
<td>20</td>
<td>5</td>
<td>LN</td>
<td>12</td>
<td>9.02</td>
<td>338</td>
<td>320</td>
<td>2525.53</td>
</tr>
<tr>
<td>SLE-45</td>
<td>2</td>
<td>F</td>
<td>23</td>
<td>46</td>
<td>Rash, arthritis</td>
<td>10</td>
<td>4.2</td>
<td>149</td>
<td>320</td>
<td>2460.8</td>
</tr>
<tr>
<td>SLE-46</td>
<td>1</td>
<td>F</td>
<td>28</td>
<td>240</td>
<td>LN</td>
<td>12</td>
<td>6.3</td>
<td>202</td>
<td>640</td>
<td>32.8</td>
</tr>
<tr>
<td>--------</td>
<td>---</td>
<td>---</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>------</td>
</tr>
<tr>
<td>SLE-47</td>
<td>2</td>
<td>F</td>
<td>32</td>
<td>52</td>
<td>LN, rash</td>
<td>8</td>
<td>5.09</td>
<td>161</td>
<td>320</td>
<td>19.8</td>
</tr>
<tr>
<td>SLE-48</td>
<td>1</td>
<td>F</td>
<td>37</td>
<td>40</td>
<td>Arthritis, alopecia, LN</td>
<td>12</td>
<td>6.99</td>
<td>163</td>
<td>320</td>
<td>23.5</td>
</tr>
<tr>
<td>SLE-49</td>
<td>2</td>
<td>F</td>
<td>21</td>
<td>120</td>
<td>Alopecia, vasculitis</td>
<td>12</td>
<td>5.22</td>
<td>224</td>
<td>320</td>
<td>394.98</td>
</tr>
<tr>
<td>SLE-50</td>
<td>2</td>
<td>F</td>
<td>25</td>
<td>56</td>
<td>Arthritis, myositis</td>
<td>12</td>
<td>6.39</td>
<td>162</td>
<td>320</td>
<td>73.3</td>
</tr>
<tr>
<td>SLE-51</td>
<td>1</td>
<td>F</td>
<td>23</td>
<td>5</td>
<td>Alopecia, hematouria</td>
<td>10</td>
<td>8.77</td>
<td>267</td>
<td>160</td>
<td>29.6</td>
</tr>
<tr>
<td>SLE-52</td>
<td>1</td>
<td>F</td>
<td>46</td>
<td>10</td>
<td>Arthritis, oral ulcers, thrombocytopenia</td>
<td>9</td>
<td>6.42</td>
<td>62</td>
<td>80</td>
<td>6.2</td>
</tr>
<tr>
<td>SLE-53</td>
<td>1</td>
<td>M</td>
<td>18</td>
<td>30</td>
<td>Thrombocytopenia, rash, arthritis, alopecia</td>
<td>13</td>
<td>4.97</td>
<td>1</td>
<td>320</td>
<td>34.8</td>
</tr>
<tr>
<td>SLE-54</td>
<td>1</td>
<td>F</td>
<td>59</td>
<td>235</td>
<td>Thrombocytopenia, rash, LN</td>
<td>11</td>
<td>4.18</td>
<td>68</td>
<td>640</td>
<td>6.4</td>
</tr>
<tr>
<td>SLE-55</td>
<td>2</td>
<td>F</td>
<td>30</td>
<td>50</td>
<td>LN, vasculitis</td>
<td>18</td>
<td>3.64</td>
<td>283</td>
<td>320</td>
<td>10.5</td>
</tr>
<tr>
<td>SLE-56</td>
<td>2</td>
<td>F</td>
<td>55</td>
<td>0</td>
<td>Arthritis, myositis, rash</td>
<td>12</td>
<td>12.56</td>
<td>256</td>
<td>40</td>
<td>44.3</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>--------------------------</td>
<td>----</td>
<td>-------</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
</tr>
<tr>
<td>SLE-57</td>
<td>2</td>
<td>F</td>
<td>32</td>
<td>135</td>
<td>LN, alopecia, rash</td>
<td>10</td>
<td>8.02</td>
<td>110</td>
<td>320</td>
<td>119.8</td>
</tr>
<tr>
<td>SLE-58</td>
<td>1</td>
<td>F</td>
<td>30</td>
<td>39</td>
<td>Vasculitis, alopecia</td>
<td>14</td>
<td>3.91</td>
<td>239</td>
<td>640</td>
<td>25.4</td>
</tr>
<tr>
<td>SLE-59</td>
<td>2</td>
<td>F</td>
<td>31</td>
<td>110</td>
<td>Headache, rash</td>
<td>12</td>
<td>3.8</td>
<td>159</td>
<td>80</td>
<td>1.0</td>
</tr>
<tr>
<td>SLE-60</td>
<td>1</td>
<td>F</td>
<td>27</td>
<td>16</td>
<td>Alopecia, arthritis</td>
<td>8</td>
<td>4.87</td>
<td>196</td>
<td>320</td>
<td>15.5</td>
</tr>
<tr>
<td>ID</td>
<td>Groups (1=IL-2 2=Placebo)</td>
<td>Clinical Responses</td>
<td>SLEDAI changes Pre and Post therapy</td>
<td>Response description</td>
<td>Description of adverse effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----</td>
<td>---------------------------</td>
<td>--------------------</td>
<td>-------------------------------------</td>
<td>----------------------</td>
<td>--------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| SLE-1 | 1                        | Remission in proteinuria and rash | 12-2=10                          | 1. Rash resolved after week 6.  
2. Renal variables: 24h-UPE decreased from 1.339 to 0.27 g/day after three courses of treatment.  
3. Immune variables: anti-dsDNA antibodies decreased from 38.4 to 34.9 IU/mL, C3 increased from 0.794 to 0.863 g/L; C4 increased from 0.205 to 0.256 g/L after three courses of treatment. | Injection site reactions |
| SLE-2 | 2                        | Remission in fever Withdrawn at week 16 | 13-8=5                           | 1. Fever reduced to normal after week 2.  
3. Immune variables: anti-dsDNA antibodies decreased from 132.1 to 47.7 IU/mL, C3 increased from 0.450 to 0.942 g/L; C4 increased from 0.05 to 0.149 g/L. | None |
| SLE-3 | 1                        | Remission in fever and NPSLE | 27-14=13                         | 1. Fever reduced to normal after week 2 and NPSLE was controlled after three courses of treatment.  
3. Renal variables: 24h-UPE increased from 0.09 to 0.47 g/day; RBC increased from 10 to 1072/ml; serum albumin increased from 29.4 to 41.5 g/L.  
4. Immune variables: anti-dsDNA antibodies decreased from 260.4 to 111.1 IU/mL. | None |

Supplementary material

Ann Rheum Dis


<table>
<thead>
<tr>
<th>SLE</th>
<th>2</th>
<th>No remission in arthritis, rash and LN</th>
<th>14-14=0</th>
<th>anti-Rib-p antibodies decreased from 217.79 to 57.09 IU/mL; C3 increased from 0.307 to 0.681 g/L; C4 increased from 0.048 to 0.142 g/L after three courses of treatment. None</th>
</tr>
</thead>
</table>
| SLE  | 5   | Partial remission in proteinuria     | 10-6=4  | 1. Renal variables: 24h-UPE decreased from 6.54 to 2.15 g/day; RBC decreased from 72 to 2.7 L; serum albumin changed from 35.4 to 40.1 g/L.  
2. Immune variables:  
anti-dsDNA antibodies decreased from 3.2 to 2.3 IU/mL; anti-Rib-p antibodies decreased from 217.79 to 57.09 IU/mL; C3 decreased from 0.711 to 0.625 g/L; C4 increased from 0.232 to 0.255 g/L. Upper respiratory infection |
| SLE  | 6   | Remission in arthritis, rash and alopecia | 12-4=8  | 1. Rash and arthritis resolved after 1 course; alopecia improved after week 8.  
2. Immune variables:  
anti-dsDNA antibodies increased from 35.6 to 58.3 IU/mL; C3 increased from 0.672 to 0.787 g/L; C4 increased from 0.102 to 0.156 g/L after three courses of treatment. None |
| SLE  | 7   | Remission in arthritis and proteinuria | 22-16=6 | 1. Arthritis relieved after week 16.  
2. Renal variables: 24h-UPE decreased from 5.75 to 2.71 g/day; WBC decreased from 433 to 50.2 L; RBC changed from 104 to 104.2 L; serum albumin increased from 25.1 to 31.9 g/L. None |
<table>
<thead>
<tr>
<th>SLE-8</th>
<th>1</th>
<th>Remission in thrombocytopenia, arthritis and pericarditis</th>
<th>9-0=9</th>
<th>3. Immune variables: anti-dsDNA antibodies decreased from 852.97 to 205.82 IU/mL; anti-Rib-p antibodies decreased from 36.73 to 15.03 IU/mL; C3 decreased from 0.421 to 0.478 g/L; C4 increased from 0.074 to 0.093 g/L.</th>
</tr>
</thead>
</table>
| SLE-9  | 2 | Remission in thrombocytopenia, fever, rash and arthritis | 8-0=8 | 1. Pericarditis improved after week 6 and arthritis relieved after week 10.  
2. PLT increased from 96 to 124×10^9/L.  
3. Immune variables: anti-dsDNA antibodies changed from 14.9 to 16.2 IU/mL, C3 increased from 0.712 to 0.841 g/L; C4 increased from 0.164 to 0.179 g/L after three courses of treatment. |
| SLE-10 | 2 | Withdrew at week 8 | 10-21=-11 | None |
| SLE-11 | 1 | Remission in proteinuria | 16-16=0 | None |

| 1. Rash disappeared and fever reduced to normal after week 2; arthritis relieved after week 8.  
2. PLT increased from 76 to 135×10^7/ml after week 10.  
3. Immune variables: anti-dsDNA antibodies changed from 20.2 to 19.9 IU/mL, C3 changed from 0.965 to 0.893 g/L; C4 increased from 0.184 to 0.202 g/L. | None |
| 1. Rash did not improved after treatment.  
2. Developed to NPSLE and fever at week 8  
3. Renal variables: 24h-UPE increased from 0.35 to 0.41g/day.  
4. WBC decreased from 4.89 to 2.8×10^9/L; PLT decreased from 241 to 100×10^9/L. | NPSLE |
| 1. Renal variables: 24h-UPE decreased from 2.14 to 1.02g/day; WBC decreased from 42 to 27/□L; RBC decreased from 21 to 25/□L; | None |
| SLE-12 | 1 | Remission in arthritis, fever, rash, myositis | 15-4=11 | 1. Fever reduced to normal after week 2; arthritis and myositis improved after week 8; rash disappeared after week 12.  
2. Immune variables:  
anti-dsDNA antibodies changed from 2.6 to 6.8 IU/mL; C3 changed from 0.806 to 0.790 g/L; C4 changed from 0.416 to 0.289 g/L after three courses of treatment. | None |
| SLE-13 | 2 | Remission in alopecia and arthritis | 8-2=6 | 1. Alopecia resolved after week 2; arthritis relieved after week 6.  
2. Immune variables:  
anti-dsDNA antibodies changed from 60.7 to 59 IU/mL, C3 changed from 0.718 to 0.842 g/L; C4 increased from 0.080 to 0.139 g/L after three courses of treatment. | Herpes zoster |
| SLE-14 | 2 | Remission in arthritis and oral ulcer | 8-2=6 | 1. Oral ulcer recovered after week 4; arthritis relieved after week 6.  
2. Immune variables:  
anti-dsDNA antibodies changed from 7.7 to 9.4 IU/mL, C3 changed from 0.928 to 1.040 g/L; C4 changed from 0.152 to 0.164 g/L. | None |
| SLE-15 | 1 | Remission in vasculitis and oral ulcer | 16-4=12 | 1. Oral ulcer recovered after week 2; fingertip vasculitis improved after week 6.  
2. Immune variables:  
anti-dsDNA antibodies decreased from 162.8 to 36.45 IU/mL, anti-Rib-p antibodies decreased from 319.89 to 273.65 IU/mL; C3 changed from 0.836 to 0.985 g/L; C4 changed from 0.086 to 0.108 g/L after three courses of treatment. | Injection site reactions |
<table>
<thead>
<tr>
<th>SLE</th>
<th>No.</th>
<th>Status</th>
<th>Count</th>
<th>Changes</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLE-16</td>
<td>1</td>
<td>Withdraw at week 2</td>
<td></td>
<td>—</td>
<td>Without using study drug.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remission in thrombocytopenia and rash, no remission in proteinuria</td>
<td>15-12=3</td>
<td>1. Rash resolved after week 4. 2. PLT increased from 93 to 167×10^9/L. 3. Renal variables: 24h-UPE increased from 2.61 to 4.98 g/day; WBC decreased from 48 to 33×10^9/L; serum albumin decreased from 41.5 to 37.6 g/L. 4. Immune variables: anti-dsDNA antibodies decreased from 164 to 80.9 IU/mL; C3 decreased from 0.514 to 0.553 g/L; C4 decreased from 0.074 to 0.060 g/L.</td>
<td>None</td>
</tr>
<tr>
<td>SLE-17</td>
<td>2</td>
<td>Remission in rash, alopecia and arthritis</td>
<td>10-4=6</td>
<td>1. Arthritis relieved after week 2; rash and alopecia improved after week 4. 2. Immune variables: anti-dsDNA antibodies increased from 22.6 to 31.4 IU/mL; C3 increased from 0.701 to 0.765 g/L; C4 increased from 0.157 to 0.177 g/L after three courses of treatment.</td>
<td>Flu-like symptoms</td>
</tr>
<tr>
<td>SLE-18</td>
<td>1</td>
<td>Remission in proteinuria and rash</td>
<td>8-6=2</td>
<td>1. Rash resolved after week 2. 2. Renal variables: 24h-UPE decreased from 1.42 to 1.38 g/day. 3. Immune variables: anti-dsDNA antibodies decreased from 46 to 27.6 IU/mL; C3 changed from 1.250 to 1.020 g/L; C4 changed from 0.208 to 0.161 g/L.</td>
<td>Injection site reactions; Upper respiratory infection</td>
</tr>
<tr>
<td>SLE-19</td>
<td>2</td>
<td>Remissive in proteinuria</td>
<td>12-12=0</td>
<td>1. Renal variables: 24h-UPE decreased from 1.80 to 1.33 g/day; WBC changed from 32 to 43×10^9/L after three courses of treatment. 3. Immune variables: anti-dsDNA antibodies decreased from 1783.15 to 876.21 IU/mL; C3 decreased from 0.735 to 0.477 g/L; C4 changed from 0.092 to 0.055 g/L after three courses of treatment.</td>
<td>Flu-like symptoms</td>
</tr>
<tr>
<td>Study</td>
<td>Year</td>
<td>Symptom</td>
<td>Treatment Results</td>
<td>Complications</td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>---------</td>
<td>-------------------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>SLE-21</td>
<td>2019</td>
<td>No remission in proteinuria</td>
<td>12-12=0</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>SLE-22</td>
<td>2019</td>
<td>Remission in rash, fever,</td>
<td>9-4=5</td>
<td>Upper respiratory infection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>thrombocytopenia and leukopenia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLE-23</td>
<td>2019</td>
<td>Remission in arthritis Withdraw at week 12</td>
<td>11-4=7</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>SLE-24</td>
<td>2019</td>
<td>Remission in proteinuria, arthritis and rash</td>
<td>16-4=12</td>
<td>Injection site reactions; Upper respiratory infection</td>
<td></td>
</tr>
</tbody>
</table>

1. Renal variables: 24h-UPE increased from 1.63g/day to 7.89g/day; WBC changed from 70 to 432/μL.  
2. Immune variables: anti-dsDNA antibodies decreased from 129.2 to 50.2 IU/mL; C3 increased from 0.431 to 0.649 g/L; C4 increased from 0.106 to 0.134 g/L.  
3. Immune variables: anti-dsDNA antibodies increased from 30.9 to 37.8 IU/mL; C3 changed from 1.02 to 0.847 g/L; C4 decreased from 0.153 to 0.147 g/L after three courses of treatment.  

1. Fever reduced to normal after week 2; rash disappeared after week 4.  
2. Hematological variables: WBC increased from 1.7 to 6.67×10^9/ml; PLT increased from 58 to 102×10^9/ml after one course of treatment.  
3. Immune variables: anti-dsDNA antibodies increased from 58.5 to 37.6 IU/mL; C3 changed from 0.502 to 0.872 g/L; C4 decreased from 0.094 to 0.137 g/L after three courses of treatment.  

1. Arthritis relieved after week 6.  
2. Hematological variables: WBC increased from 2.89 to 3.67×10^9/ml.  
3. Immune variables: anti-dsDNA antibodies increased from 30.9 to 37.8 IU/mL; C3 changed from 1.02 to 0.847 g/L; C4 decreased from 0.153 to 0.147 g/L after three courses of treatment.  

1. Remission of arthritis and rash after week 2, remission of proteinuria after week 24.  
2. Renal variables: 24h-UPE decreased from 1.17 to 0.38g/day; RBC changed from 102 to 20/μL after week 24.  
3. Immune variables: anti-dsDNA antibodies decreased from 28.4 to 15.3 IU/mL; C3
<table>
<thead>
<tr>
<th>SLE</th>
<th>No.</th>
<th>Condition</th>
<th>Week</th>
<th>Changes</th>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLE-25</td>
<td>2</td>
<td>Remission in rash and fever</td>
<td>8-4=4</td>
<td>changed from 1.080 to 1.160 g/L; C4 changed from 0.163 to 0.163 g/L after three courses of treatment.</td>
<td>Pneumonia</td>
</tr>
</tbody>
</table>
| SLE-26 | 1   | Remission in rash and oral ulcer | 8-4=4| 1. Rash improved and fever reduced to normal after week 2.  
2. Hematological variables: PLT increased from 118 to 267×10^9/ml.  
3. Immune variables: anti-dsDNA antibodies decreased from 37.4 to 3.6 IU/mL; C3 increased from 0.722 to 0.885 g/L; C4 changed from 0.067 to 0.180 g/L. | Injection site reactions   |
| SLE-27 | 1   | Remission in rash             | 10-8=2| 1. Rash disappeared after week 2.  
2. Renal variables: 24h-UPE changed from 1.79 to 1.66g/day after three courses of treatment.  
3. Immune variables: anti-dsDNA antibodies changed from 17 to 13.4 IU/mL; C3 changed from 1.470 to 1.620 g/L; C4 changed from 0.272 to 0.352 g/L after three courses of treatment. | Injection site reactions; Transient fever |
<p>| SLE-28 | 2   | Withdrew at week 2             | —    |                                                                                           |                            |
| SLE-29 | 1   | Remission in proteinuria       | 20-4=16| 1. Renal variables: 24h-UPE changed from 1.40 to 3.03g/day; WBC decreased from 119 to 9×10^9/L; WBC changed from 34 to 10×10^9/L; cylindruria 6 to 0 serum albumin increased from 34.9 to 46.9g/L after three courses of treatment. | Injection site reactions   |</p>
<table>
<thead>
<tr>
<th>SLE-30</th>
<th>1</th>
<th>Remission in proteinuria</th>
<th>12-8=4</th>
<th>2. Immune variables: anti-dsDNA antibodies decreased from 436.82 to 36.4 IU/mL; C3 increased from 0.502 to 0.776 g/L; C4 increased from 0.094 to 0.180 g/L after three courses of treatment.</th>
<th>None</th>
</tr>
</thead>
</table>
| SLE-31 | 2 | Remission in arthritis, thrombocytopenia and leukopenia | 18-2=16 | 1. Arthritis relieved after week 2.  
2. Hematological variables: WBC increased from 2.0 to 4.08×10^9/ml after week 8; PLT increased from 83 to 231×10^9/ml after week 8.  
2. Immune variables: anti-dsDNA antibodies decreased from 189.46 to 23 IU/mL; C3 increased from 0.280 to 0.710 g/L; C4 increased from 0.038 to 0.126 g/L. | None |
| SLE-32 | 2 | Remission in rash and alopecia | 8-4=4 | 1. Rash and alopecia resolved after week 12.  
2. Immune variables: anti-dsDNA antibodies decreased from 436.34 to 146.5 IU/mL; C3 increased from 0.667 to 0.838 g/L; C4 increased from 0.062 to 0.107 g/L. | Injection site reactions; Upper respiratory infection |
| SLE-33 | 1 | Remission in proteinuria | 10-4=6 | 1. Renal variables: 24h-UPE changed from 0.36 to 0.28g/day after week 24; RBC decreased from 147 to 12/C mm.  
2. Immune variables: anti-dsDNA antibodies decreased from 342.68 to 149.7 IU/mL; C3 | Fatigue |
<table>
<thead>
<tr>
<th>SLE-34</th>
<th>2</th>
<th>Remission in alopecia and fever</th>
<th>11-6=5</th>
<th>changed from 0.807 to 0.738 g/L; C4 changed from 0.191 to 0.197 g/L after three courses of treatment.</th>
</tr>
</thead>
</table>
| SLE-35  | 2 | Remission in rash and thrombocytopenia | 9-4=5  | 1. Rash resolved after week 4.  
2. PLT increased from 96 to 153×10⁹/ml after week 8.  
3. Immune variables: anti-dsDNA antibodies changed from 1 to 1 IU/mL; C3 changed from 0.863 to 0.943 g/L; C4 changed from 0.176 to 0.185 g/L. |
| SLE-36  | 1 | Remission in leucocyturia | 14-4=10 | 1. Renal variables: WBC decreased from 51 to 16/µL after three courses of treatment.  
3. Immune variables: anti-dsDNA antibodies changed from 37.7 to 33 IU/mL; C3 increased from 0.666 to 0.708 g/L; C4 increased from 0.103 to 0.145 g/L after three courses of treatment. |
| SLE-37  | 1 | Remission in alopecia, arthritis, vasculitis and thrombocytopenia | 21-8=13 | 1. Vasculitis improved after week 4; alopecia and arthritis resolved after three courses of treatment.  
2. PLT increased from 84 to 207×10⁹/ml after week 24;  
3. Immune variables: anti-dsDNA antibodies changed from 148.37 to 60.7 IU/mL; C3 increased from 0.375 to 0.855 g/L; C4 increased from 0.040 to 0.138 g/L after three courses of treatment. |
| SLE-38 | 2 | Remission in alopecia, thrombocytopenia and hematouria | 11-4=7 | 1. Alopecia improved after week 6.  
2. Hematological variables: PLT increased from 4.0 to $79 \times 10^7$/ml after week 24.  
3. Immune variables: anti-dsDNA antibodies changed from 103.4 to 41.5 IU/mL; C3 increased from 0.284 to 0.761 g/L; C4 increased from 0.025 to 0.133 g/L. | None |
| SLE-39 | 2 | Withdrew at week 4 | — | |
| SLE-40 | 1 | Remission in arthritis | 8-2=6 | 1. Arthritis relieved after week 2.  
2. Immune variables: anti-dsDNA antibodies changed from 43.9 to 66.2 IU/mL; C3 changed from 1.030 to 1.220 g/L; C4 changed from 0.211 to 0.231 g/L after three courses of treatment. | Transient fever |
| SLE-41 | 1 | Remission in vasculitis | 12-6=6 | 1. Lupus mesenteric vasculitis improved after week 2.  
2. Immune variables: anti-dsDNA antibodies changed from 465.78 to 51.8 IU/mL; C3 increased from 0.447 to 0.697 g/L; C4 increased from 0.127 to 0.152 g/L after three courses of treatment. | None |
| SLE-42 | 1 | Remission in alopecia and rash | 8-0=8 | 1. Alopecia and rash resolved after week 4.  
2. Immune variables: anti-dsDNA antibodies changed from 1 to 1 IU/mL; C3 changed from 1.040 to 0.993 g/L; C4 changed from 0.200 to 0.197 g/L after three courses of treatment. | Injection site reactions |
| SLE-43 | 2 | Remission in proteinuria | 12-8=4 | 1. Renal variables: 24h-UPE decreased from 1.47 to 0.81 g/day.  
2. Immune variables: anti-dsDNA antibodies changed from 25.8 to 39.8 IU/mL; C3 increased from 0.535 to 0.621 g/L; C4 changed from 0.193 to 0.252 | None |
| SLE-44 | 2 | No remission in proteinuria | 12-8=4 | 1. Renal variables: 24h-UPE increased from 0.27 to 0.35 g/day after treatment.  
2. Immune variables:  
anti-dsDNA antibodies increased from 2525.53 to 3467.8 IU/mL; C3 increased from 0.563 to 0.594 g/L; C4 changed from 0.017 to 0.107 g/L. | None |
| SLE-45 | 2 | Remission in rash and arthritis | 10-4=6 | 1. Rash resolved after week 2; arthritis relieved after week 8.  
2. Immune variables:  
anti-dsDNA antibodies changed from 2460.8 to 173.6 IU/mL; C3 decreased from 0.586 to 0.541 g/L; C4 changed from 0.101 to 0.103 g/L. | None |
| SLE-46 | 1 | Remission in proteinuria  
Withdrawn at week 12 | 12-10=2 | 1. Renal variables: 24h-UPE increased from 7.36 to 3.57 g/day after treatment.  
2. Immune variables:  
anti-dsDNA antibodies decreased from 32.8 to 17.4 IU/ml; C3 increased from 0.781 to 0.796 g/L; C4 changed from 0.225 to 0.24 g/L after three courses of treatment. | None |
| SLE-47 | 2 | Remission in rash and proteinuria | 8-6=2 | 1. Rash resolved after week 2.  
2. Renal variables: 24h-UPE decreased from 2.54 to 1.18 g/day.  
3. Immune variables:  
anti-dsDNA antibodies changed from 19.8 to 17.8 IU/mL; C3 decreased from 0.640 to 0.593 g/L; C4 increased from 0.158 to 0.188 g/L. | None |
2. Immune variables:  
anti-dsDNA antibodies changed from 23.5 to 11 IU/mL; C3 increased | Injection site reactions |
2. Immune variables:
   - anti-dsDNA antibodies decreased from 394.98 to 54.5 IU/mL; C3 decreased from 0.829 to 0.761 g/L; C4 changed from 0.179 to 0.216 g/L. | Upper respiratory infection (Pharyngitis) |
| SLE-50 | 2 | Remission in myositis | 12-4=8 | 1. Myositis improved after week 4; arthritis relieved after week 24.  
2. Immune variables:
   - anti-dsDNA antibodies increased from 73.3 to 117.8 IU/mL; C3 decreased from 0.767 to 0.551 g/L; C4 decreased from 0.103 to 0.078 g/L. | None |
| SLE-51 | 1 | Remission in hematuria | 10-8=2 | 1. Renal variables: RBC decreased from 250 to 4/μL; WBC decreased from 24 to 6/μL after three courses of treatment.  
2. Immune variables:
   - anti-dsDNA antibodies changed from 29.6 to 31.9 IU/mL; C3 decreased from 0.72 to 0.633 g/L; C4 increased from 0.104 to 0.117 g/L after three courses of treatment. | Flu-like symptoms |
| SLE-52 | 1 | Remission in arthritis and oral ulcers | 9.5=4 | 1. Oral ulcers improved after week 4; arthritis relieved after week 6.  
2. Hematological variables: PLT increased from 62 to 83×10^9/ml after three courses of treatment.  
3. Immune variables:
   - anti-dsDNA antibodies changed from 6.2 to 11.1 IU/mL; C3 changed from 0.989 to 0.870 g/L; C4 increased from 0.147 to 0.166 g/L after three courses of treatment. | Injection site reactions |
| SLE-53 | 1 | Remission in rash, alopecia and arthritis | 13-7=6 | 1. Alopecia and rash improved after week 2; arthritis relieved after week 4. | None |
| SLE-54 | 1 | Remission in rash and proteinuria | 11-9=2 | 2. Hematological variables: PLT increased from 70 to $102 \times 10^9$/ml after three course of treatment. 
3. Immune variables: 
anti-dsDNA antibodies changed from 34.8 to 26.6 IU/mL; C3 increased from 0.616 to 0.668 g/L; C4 increased from 0.123 to 0.187 g/L after three courses of treatment. |
|--------|---|---------------------------------|-------|---------------------------------|
|        |   | 1. Rash improved after week 2.  
2. Renal variables: 24h-UPE decreased from 0.39 to 0.28 g/day after two courses of treatment. 
3. Hematological variables: PLT increased from 68 to $100 \times 10^9$/ml after two courses of treatment, but decreased to $60 \times 10^9$/ml after three courses of treatment. 
4. Immune variables: 
anti-dsDNA antibodies changed from 6.4 to 10.8 IU/mL; C3 changed from 1.090 to 1.520 g/L; C4 changed from 0.343 to 0.417 g/L after three courses of treatment. |
|        |   | Transient fever |

2. Renal variables: 24h-UPE increased from 4.48 to 5.48 g/day; serum albumin decreased from 35.3 to 33.8 g/day. 
4. Immune variables: 
anti-dsDNA antibodies increased from 10.5 to 34.6 IU/mL; C3 changed from 0.536 to 0.576 g/L; C4 changed from 0.101 to 0.101 g/L. |
|        |   | None |

| SLE-56 | 2 | Remission in arthritis and myositis | 12-6=6 | 1. Arthritis and myositis improved after week 20. 
2. Immune variables: 
anti-dsDNA antibodies decreased from 44.3 to 37 IU/mL; C3 decreased from 1.140 to 0.946 g/L; C4 changed from 0.225 to 0.200 |
<p>|        |   | Urinary tract infection |</p>
<table>
<thead>
<tr>
<th>Case</th>
<th>Dose</th>
<th>Response</th>
<th>Immune Variables</th>
<th>Adverse Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLE-57</td>
<td>2</td>
<td>Remission in rash and proteinuria</td>
<td>10-3=7</td>
<td>1. Rash improved after week 2. 2. Renal variables: 24h-UPE decreased from 0.64 to 0.38 g/day. 3. Immune variables: anti-dsDNA antibodies increased from 119.8 to 173.2 IU/mL; C3 changed from 0.922 to 0.808 g/L; C4 changed from 0.268 to 0.300 g/L.</td>
</tr>
<tr>
<td>SLE-58</td>
<td>1</td>
<td>Remission in vasculitis and alopecia</td>
<td>14-6=8</td>
<td>1. Alopecia improved after week 4; vasculitis improved after week 10. 2. Immune variables: anti-dsDNA antibodies increased from 25.4 to 43.5 IU/mL; C3 changed from 1.250 to 0.909 g/L; C4 changed from 0.158 to 0.151 g/L after three courses of treatment.</td>
</tr>
<tr>
<td>SLE-59</td>
<td>2</td>
<td>Remission in rash</td>
<td>12-2=10</td>
<td>1. Rash improved after week 2. 2. Immune variables: anti-dsDNA antibodies increased from 1 to 7.2 IU/mL; C3 increased from 0.564 to 0.912 g/L; C4 increased from 0.056 to 0.222 g/L.</td>
</tr>
<tr>
<td>SLE-60</td>
<td>1</td>
<td>No remission in alopecia and arthritis</td>
<td>8-10=2</td>
<td>1. Immune variables: anti-dsDNA antibodies increased from 15.5 to 28.8 IU/mL; C3 changed from 0.789 to 0.764 g/L; C4 changed from 0.129 to 0.143 g/L after three courses of treatment.</td>
</tr>
</tbody>
</table>
Table S4. Responses of SLE patients to low-dose IL-2 treatment

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Baseline</th>
<th>Week 12</th>
<th>Week 24</th>
<th>week 0 vs 12 vs 24</th>
<th>IL-2 vs placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLEDAI, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>12 (8-27)</td>
<td>6 (0-16)aa</td>
<td>4 (0-18)aa</td>
<td>F=18.561,</td>
<td>F=0.251,</td>
</tr>
<tr>
<td>Placebo</td>
<td>11 (8-22)</td>
<td>6 (0-25)aa</td>
<td>8 (0-25)a</td>
<td>P&lt;0.001</td>
<td>P=0.628</td>
</tr>
<tr>
<td>≥1 BLAG A or 2B score, % (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>21 (72.41)</td>
<td>2 (6.9)</td>
<td>1 (3.45)</td>
<td>X²=0.843,</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>21 (70)</td>
<td>4 (13.33)</td>
<td>2 (6.67)</td>
<td>P=0.656</td>
<td></td>
</tr>
<tr>
<td>PGA, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>2.3 (1.55-2.75)</td>
<td>0 (0-2)aa</td>
<td>0 (0-1)aaab</td>
<td>F=54.898,</td>
<td>F=2.705,</td>
</tr>
<tr>
<td>Placebo</td>
<td>2.2 (1-2.3)</td>
<td>1 (0-2)aa</td>
<td>1 (0-1)a</td>
<td>P&lt;0.001</td>
<td>P=0.112</td>
</tr>
<tr>
<td>Rash, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>13 (44.83)</td>
<td>2 (6.90)</td>
<td>2 (6.90)</td>
<td>X²=1.781,</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>16 (53.33)</td>
<td>6 (20.0)</td>
<td>6 (20.0)</td>
<td>P=0.411</td>
<td></td>
</tr>
<tr>
<td>Oral ulceration, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>4 (13.79)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>1 (3.33)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthritis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>14 (48.28)</td>
<td>4 (13.79)</td>
<td>3 (10.34)</td>
<td>X²=2.067,</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>15 (50.0)</td>
<td>9 (30.00)</td>
<td>8 (26.67)</td>
<td>P=0.356</td>
<td></td>
</tr>
<tr>
<td>Vasculitis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>4 (13.79)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>2 (6.67)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alopecia, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>12 (41.38)</td>
<td>6 (20.69)</td>
<td>5 (17.24)</td>
<td>X²=0.425,</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>7 (23.33)</td>
<td>2 (6.67)</td>
<td>2 (6.67)</td>
<td>P=0.809</td>
<td></td>
</tr>
<tr>
<td>Fever, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>3 (10.34)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>X²=0.024,</td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>4 (13.33)</td>
<td>1 (3.33)</td>
<td>0 (0)</td>
<td>P=0.312</td>
<td></td>
</tr>
<tr>
<td>Myositis, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>1 (3.45)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>2 (6.67)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone dose, mg/day, median (range)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2</td>
<td>15 (0-50)</td>
<td>10 (0-25)aa</td>
<td>10 (0-20)aa</td>
<td>F=13.872,</td>
<td>F=0.232,</td>
</tr>
<tr>
<td>Placebo</td>
<td>15 (7.5-60)</td>
<td>15 (5-40)</td>
<td>10 (2.5-35)a</td>
<td>P&lt;0.001</td>
<td>P=0.634</td>
</tr>
<tr>
<td>ANA decreased, n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>0 (0)</td>
<td>7 (24.14)</td>
<td>8 (27.59)</td>
<td>X²=0.005,</td>
<td></td>
</tr>
</tbody>
</table>
### Anti-ds-DNA, IU/ml, median (range)

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=30</td>
<td>34.80 (1.0-1783.15)</td>
<td>0.944</td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>33.0 (7.0-876.21)</td>
<td>0.067</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>73.30 (1.0-2525.53)</td>
<td>0.005</td>
</tr>
<tr>
<td>Anti-ds-DNA, IU/ml, median (range)</td>
<td>29.0 (1.0-348.50)</td>
<td>0.807</td>
</tr>
</tbody>
</table>

### IL-2, n=29

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=30</td>
<td>34.80 (1.0-1783.15)</td>
<td>0.944</td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>33.0 (7.0-876.21)</td>
<td>0.067</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>73.30 (1.0-2525.53)</td>
<td>0.005</td>
</tr>
<tr>
<td>Anti-ds-DNA, IU/ml, median (range)</td>
<td>29.0 (1.0-348.50)</td>
<td>0.807</td>
</tr>
</tbody>
</table>

### AnuA, IU/ml, median (range)

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=30</td>
<td>14.45 (0.87-449.06)</td>
<td>0.451</td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>20.84 (1.28-287.07)</td>
<td>0.456</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>41.725 (0.0-315.80)</td>
<td>0.456</td>
</tr>
<tr>
<td>Anti-ds-DNA, IU/ml, median (range)</td>
<td>16.72 (1.17-287.07)</td>
<td>0.456</td>
</tr>
</tbody>
</table>

### Albumin, g/L, median (range)

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=30</td>
<td>39.25 (27.60,44.70)</td>
<td>0.276</td>
</tr>
<tr>
<td>IL-2, n=29</td>
<td>43.90 (37.70,46.90)</td>
<td>0.302</td>
</tr>
<tr>
<td>Placebo, n=30</td>
<td>43.50 (39.80,47.20)</td>
<td>0.302</td>
</tr>
<tr>
<td>Anti-ds-DNA, IU/ml, median (range)</td>
<td>43.50 (39.80,47.20)</td>
<td>0.302</td>
</tr>
</tbody>
</table>

### LN Complete remission, n (%)

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>X²-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=12</td>
<td>0 (0)</td>
<td>0.596</td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>0 (0)</td>
<td>0.281</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>1 (8.33)</td>
<td>0.596</td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>7 (53.85)</td>
<td>0.281</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>2 (16.67)</td>
<td>0.596</td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>7 (53.85)</td>
<td>0.281</td>
</tr>
</tbody>
</table>

### LN Partial remission, n (%)

<table>
<thead>
<tr>
<th>Group</th>
<th>Median (Range)</th>
<th>X²-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo, n=12</td>
<td>0 (0)</td>
<td>0.400</td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>0 (0)</td>
<td>0.708</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>3 (25.0)</td>
<td>0.400</td>
</tr>
<tr>
<td>IL-2, n=13</td>
<td>10 (76.92)</td>
<td>0.708</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>6 (50.0)</td>
<td>0.400</td>
</tr>
</tbody>
</table>

-a means α<0.05, aa means α<0.01, compared to Baseline

-b means α<0.05, compared to week 12
Table S5 Laboratory Improvement in LN patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>12 Weeks of Treatment</th>
<th>24 Weeks of Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IL-2 (n=13)</td>
<td>Placebo (n=12)</td>
</tr>
<tr>
<td>PRO, g/24hr</td>
<td>0.78 (0.06,2.39)</td>
<td>1.765 (0.17,5.48)</td>
</tr>
<tr>
<td>Alb, g/L</td>
<td>43.90 (37.70,46.90)</td>
<td>38.65 (31.90,43.60)</td>
</tr>
<tr>
<td>Cr, μmol/L</td>
<td>53.5 (43.298)</td>
<td>64.5 (40,138)</td>
</tr>
<tr>
<td>Routine urianlysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WBC, /μl</td>
<td>2 (2,357)</td>
<td>11 (4,89)</td>
</tr>
<tr>
<td>RBC, /μl</td>
<td>11 (3,241)</td>
<td>18 (2,104)</td>
</tr>
<tr>
<td>casts,n(%)</td>
<td>2 (15.38)</td>
<td>3 (25)</td>
</tr>
<tr>
<td>C3, mg/L</td>
<td>0.855 (0.70, 1.62)</td>
<td>0.623 (0.54, 1.02)</td>
</tr>
<tr>
<td>C4, mg/L</td>
<td>0.1800 (0.14, 0.42)</td>
<td>0.1745 (0.06, 0.30)</td>
</tr>
<tr>
<td>Anti-dsDNA,IU/ml</td>
<td>22.25 (1.00,53.20)</td>
<td>59.85 (1.00,200.91)</td>
</tr>
</tbody>
</table>

(*:P<0.05)
Table S6. Viral load in SLE with IL-2 treatment

<table>
<thead>
<tr>
<th></th>
<th>Week 0</th>
<th>Week 2</th>
<th>Week 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK virus</td>
<td>$10^8$ copy/ml</td>
<td>$10^3$ copy/ml</td>
<td>$&lt;10^3$ copy/ml</td>
</tr>
<tr>
<td>BK virus</td>
<td>$10^7$ copy/ml</td>
<td>$10^5$ copy/ml</td>
<td>$&lt;10^3$ copy/ml</td>
</tr>
<tr>
<td>HPV</td>
<td>++</td>
<td>N/A</td>
<td>—</td>
</tr>
</tbody>
</table>
Table S7. Virus examined in sera of SLE patients by real-time PCR

<table>
<thead>
<tr>
<th>No.</th>
<th>Virus</th>
<th>Normal values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Influenza A virus – H1N1</td>
<td>&lt;1.0×10³ PFU/ml</td>
</tr>
<tr>
<td>2</td>
<td>Influenza B virus</td>
<td>&lt;1.5×10² PFU/ml</td>
</tr>
<tr>
<td>3</td>
<td>Influenza A virus</td>
<td>&lt;1.6×10² PFU/ml</td>
</tr>
<tr>
<td>4</td>
<td>Parainfluenza virus</td>
<td>&lt;1.0×10⁶ copies/ml</td>
</tr>
<tr>
<td>5</td>
<td>Coxsackie virus</td>
<td>&lt;CCID standard: 1.0×10⁻²CCID₅₀/0.1ml; plaque calculate: 1.0×10³ PFU/ml</td>
</tr>
<tr>
<td>6</td>
<td>Mycoplasma pneumoniae</td>
<td>&lt;1.0×10⁶ copies/ml</td>
</tr>
<tr>
<td>7</td>
<td>Legionella pneumophilia</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>8</td>
<td>Respiratory syncytial virus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>9</td>
<td>Human bocavirus</td>
<td>&lt;1.0×10⁶ copies/ml</td>
</tr>
<tr>
<td>10</td>
<td>Human metapneumovirus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>11</td>
<td>Human coronavirus - 229E</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>12</td>
<td>Human coronavirus - HKU1</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>13</td>
<td>Human coronavirus - NL63</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>14</td>
<td>Human coronavirus - 229E</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>15</td>
<td>Herpes simplex virus</td>
<td>&lt;5.0×10⁴ copies/ml</td>
</tr>
<tr>
<td>16</td>
<td>Human herpes virus-6</td>
<td>&lt;4.0×10⁵ copies/ml</td>
</tr>
<tr>
<td>17</td>
<td>Human herpes virus-8</td>
<td>&lt;5.0×10⁴ copies/ml</td>
</tr>
<tr>
<td>18</td>
<td>Enterovirus</td>
<td>&lt;CCID standard: 5.0×10⁻² CCID₅₀/0.1ml; plaque calculate: 2.0×10³ PFU/ml</td>
</tr>
<tr>
<td>19</td>
<td>Norwalk virus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>20</td>
<td>Enterovirus-71</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>21</td>
<td>Rotavirus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>22</td>
<td>BKV</td>
<td>&lt;5.0×10³ copies/ml</td>
</tr>
<tr>
<td>23</td>
<td>JC virus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>24</td>
<td>Adenoviridae</td>
<td>&lt;1.0×10⁴ copies/ml</td>
</tr>
<tr>
<td>25</td>
<td>Cytomegalovirus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>26</td>
<td>Varicella Zoster Virus</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
<tr>
<td>27</td>
<td>Mycobacterium</td>
<td>&lt;10⁵ Bacteria / PCR reaction</td>
</tr>
<tr>
<td>28</td>
<td>Human coronavirus -OC43</td>
<td>&lt;1.0×10⁴ copies/ml</td>
</tr>
<tr>
<td>29</td>
<td>Epstein-Barr Virus</td>
<td>&lt;5.0×10³ copies/ml</td>
</tr>
<tr>
<td>30</td>
<td>Human Parovirus B19</td>
<td>&lt;1.0×10³ copies/ml</td>
</tr>
</tbody>
</table>
Table S8. Antibodies used in flow cytometric analysis in this study

<table>
<thead>
<tr>
<th>Target antigen</th>
<th>Clone</th>
<th>Fluorochrome</th>
<th>Vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD3</td>
<td>OKT3</td>
<td>Alexa Fluor 700</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD4</td>
<td>SK3</td>
<td>FITC</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD8</td>
<td>SK1</td>
<td>PerCP</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD25</td>
<td>BC96</td>
<td>PE</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD127</td>
<td>A019D5</td>
<td>Brilliant Violet 605</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD45RA</td>
<td>HI100</td>
<td>Brilliant Violet 510</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CXCR3</td>
<td>G025H7</td>
<td>PECF 594</td>
<td>BD</td>
</tr>
<tr>
<td>CXCR5</td>
<td>J252D4</td>
<td>Alexa Fluor 647</td>
<td>BD</td>
</tr>
<tr>
<td>CCR6</td>
<td>G034E3</td>
<td>Brilliant Violet 650</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CCR7</td>
<td>G043H7</td>
<td>Brilliant Violet 421</td>
<td>Biolegend</td>
</tr>
<tr>
<td>PD-1</td>
<td>EH12_2H7</td>
<td>PE-Cy7</td>
<td>Biolegend</td>
</tr>
<tr>
<td>CD56</td>
<td>HCD56</td>
<td>APC</td>
<td>eBiosense</td>
</tr>
<tr>
<td>CD16</td>
<td>3G8</td>
<td>Brilliant Violet 421</td>
<td>Biolegend</td>
</tr>
</tbody>
</table>
Table S9. Immune cell changes in SLE patients with low-dose IL-2 treatment

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>Week 10</th>
<th>Week 12</th>
<th>Week 24</th>
<th>P value (Week 0 vs 10)</th>
<th>P value (Week 0 vs 12)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CD4+ T cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>43.37±11.19</td>
<td>41.27±11.56</td>
<td>43.82±14.7</td>
<td>42.70±12.93</td>
<td>0.220</td>
<td>0.387</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>41.61±11.24</td>
<td>40.68±11.61</td>
<td>45.02±10.3</td>
<td>39.97±14.76</td>
<td>0.403</td>
<td>0.085</td>
</tr>
<tr>
<td><strong>Treg cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>12.77±10.25</td>
<td>16.79±8.60</td>
<td>14.19±6.07</td>
<td>12.11±6.27</td>
<td>0.007</td>
<td>0.020</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>11.02±3.51</td>
<td>10.51±3.79</td>
<td>10.97±4.59</td>
<td>11.16±4.69</td>
<td>0.534</td>
<td>0.814</td>
</tr>
<tr>
<td><strong>CD8+ T cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>46.17±12.37</td>
<td>47.54±13.0</td>
<td>46.42±13.6</td>
<td>46.19±12.06</td>
<td>0.580</td>
<td>0.677</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>45.78±13.83</td>
<td>46.07±14.8</td>
<td>45.16±13.2</td>
<td>49.62±14.18</td>
<td>0.931</td>
<td>0.905</td>
</tr>
<tr>
<td><strong>NK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>6.48±4.85</td>
<td>12.07±8.01</td>
<td>10.2±8.05</td>
<td>7.28±4.15</td>
<td>0.003</td>
<td>0.012</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>6.49±6.02</td>
<td>6.80±6.42</td>
<td>5.44±4.47</td>
<td>6.30±5.31</td>
<td>0.967</td>
<td>0.516</td>
</tr>
<tr>
<td><strong>CD56 bri in NK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>6.68±4.45</td>
<td>10.40±6.49</td>
<td>6.54±4.07</td>
<td>6.70±5.46</td>
<td>0.011</td>
<td>0.938</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>8.10±6.99</td>
<td>6.56±4.65</td>
<td>7.43±5.67</td>
<td>9.41±7.53</td>
<td>0.476</td>
<td>0.737</td>
</tr>
<tr>
<td><strong>CD56 dim inNK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>76.20±9.47</td>
<td>68.27±17.5</td>
<td>78.77±9.48</td>
<td>78.22±9.21</td>
<td>0.059</td>
<td>0.423</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>66.41±21.7</td>
<td>71.1±17.96</td>
<td>69.87±19.7</td>
<td>66.78±21.25</td>
<td>0.421</td>
<td>0.627</td>
</tr>
</tbody>
</table>
Table S10. Baseline characteristics of SLE patients in trial NCT02932137 (n=20)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>IL-2 (n=10)</th>
<th>Placebo (n=10)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, year, mean ±SD</td>
<td>35.2±11.76</td>
<td>32.9±11.96</td>
<td>0.670</td>
</tr>
<tr>
<td>Female/Male</td>
<td>9/1</td>
<td>10/0</td>
<td>1.000</td>
</tr>
<tr>
<td>Duration, year, mean ±SD</td>
<td>74.8±45.2</td>
<td>66.0±49.4</td>
<td>0.683</td>
</tr>
<tr>
<td>SLEDAI, median (range)</td>
<td>8.6±4.6</td>
<td>9.4±8.0</td>
<td>0.787</td>
</tr>
<tr>
<td>Medications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prednisone dose, mg/day, median (range)</td>
<td>15.13±10.35</td>
<td>17.75±20.19</td>
<td>0.719</td>
</tr>
<tr>
<td>Hydroxychloroquine</td>
<td>9 (90.0)</td>
<td>8 (80.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Cyclophosphamide</td>
<td>1 (10.0)</td>
<td>2 (20.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Cyclosporine</td>
<td>3 (30.0)</td>
<td>2 (20.0)</td>
<td>1.000</td>
</tr>
<tr>
<td>Mycophenolate Mofetil</td>
<td>4 (40.0)</td>
<td>2 (20.0)</td>
<td>0.626</td>
</tr>
</tbody>
</table>

Table S11. Phenotypic change of NK cells in SLE patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>Post Treatment</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IFN-γ⁺ NK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>68.92±16.92</td>
<td>82.81±12.22</td>
<td>0.024</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>65.76±14.46</td>
<td>73.51±17.26</td>
<td>0.254</td>
</tr>
<tr>
<td><strong>NKp46⁺ NK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>92.68±4.40</td>
<td>96.87±2.71</td>
<td>0.025</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>92.11±6.56</td>
<td>94.07±6.85</td>
<td>0.562</td>
</tr>
<tr>
<td><strong>NKG2D⁺ NK cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>83.84±4.47</td>
<td>91.11±6.14</td>
<td>0.003</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>88.46±6.18</td>
<td>88.02±6.92</td>
<td>0.748</td>
</tr>
</tbody>
</table>

* IL-2 group (n=10); standard treatment group (n=10).
Table S12. Phenotype changes of CD8+ T cells in SLE patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>Post Treatment</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IFN-γ+ CD8+ T cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>82.30±8.48</td>
<td>85.42±15.57</td>
<td>0.540</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>74.29±12.89</td>
<td>77.87±15.06</td>
<td>0.553</td>
</tr>
<tr>
<td><strong>TNF-α+ CD8+ T cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>1.43±1.85</td>
<td>1.53±1.73</td>
<td>0.464</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>2.03±3.05</td>
<td>2.35±3.21</td>
<td>0.493</td>
</tr>
<tr>
<td><strong>Perforin+ CD8+ T cells (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>10.07±6.27</td>
<td>8.46±5.57</td>
<td>0.248</td>
</tr>
<tr>
<td>Standard treatment, mean±SD</td>
<td>12.54±18.56</td>
<td>17.14±17.74</td>
<td>0.242</td>
</tr>
</tbody>
</table>

*IL-2 group (n=10); standard treatment group (n=10).

Table S13. SRI-4 changes in SLE patients

<table>
<thead>
<tr>
<th>SRI-4 (%)</th>
<th>Week0</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Week16</th>
<th>Week20</th>
<th>Week24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2</td>
<td>0</td>
<td>10.34</td>
<td>17.24</td>
<td>34.48</td>
<td>37.93</td>
<td>48.28</td>
<td>55.17</td>
<td>58.62</td>
<td>65.52</td>
<td>65.52</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>6.67</td>
<td>6.67</td>
<td>10.0</td>
<td>13.33</td>
<td>23.33</td>
<td>30.0</td>
<td>30.0</td>
<td>30.0</td>
<td>36.67</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>0.968</td>
<td>0.394</td>
<td>0.023</td>
<td>0.030</td>
<td>0.045</td>
<td>0.052</td>
<td>0.027</td>
<td>0.06</td>
<td>0.027</td>
</tr>
</tbody>
</table>
### Table S14. SLEDAI score changes in SLE patients

<table>
<thead>
<tr>
<th>SLEDAI, media n (range)</th>
<th>Week0</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Week16</th>
<th>Week20</th>
<th>Week24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2</td>
<td>12 (8-27)</td>
<td>8 (2-20)</td>
<td>7 (1-18)</td>
<td>6 (0-16)</td>
<td>6 (0-16)</td>
<td>4 (0-12)</td>
<td>4 (0-12)</td>
<td>4 (0-12)</td>
<td>4 (0-18)</td>
<td>4 (0-18)</td>
</tr>
<tr>
<td>Placebo</td>
<td>11 (8-22)</td>
<td>8 (0-20)</td>
<td>8 (0-20)</td>
<td>8 (0-16)</td>
<td>6 (0-25)</td>
<td>6 (2-25)</td>
<td>6 (0-25)</td>
<td>6 (0-25)</td>
<td>7 (0-25)</td>
<td>8 (0-25)</td>
</tr>
<tr>
<td>P value</td>
<td>0.378</td>
<td>0.921</td>
<td>0.192</td>
<td>0.290</td>
<td>0.198</td>
<td>0.052</td>
<td>0.618</td>
<td>0.177</td>
<td>0.013</td>
<td>0.027</td>
</tr>
</tbody>
</table>

### Table S15. LN complete remission rates in SLE patients

<table>
<thead>
<tr>
<th>LN Complete remission, n (%)</th>
<th>Week 0</th>
<th>Week 12</th>
<th>Week 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2, n=13</td>
<td>0 (0)</td>
<td>7 (53.85)</td>
<td>7 (53.85)</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>0 (0)</td>
<td>1 (8.33)</td>
<td>2 (16.67)</td>
</tr>
<tr>
<td>P value</td>
<td>1.000</td>
<td>0.013</td>
<td>0.036</td>
</tr>
</tbody>
</table>

### Table S16. Proportions of patients achieving corticosteroid reduction by ≥50% from baseline to 24 weeks

<table>
<thead>
<tr>
<th>(%)</th>
<th>Week0</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Week16</th>
<th>Week20</th>
<th>Week24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.45</td>
<td>6.90</td>
<td>24.14</td>
<td>37.93</td>
<td>41.38</td>
<td>44.83</td>
<td>44.83</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3.33</td>
<td>13.33</td>
<td>20.0</td>
<td>30.0</td>
<td>30.0</td>
<td>33.33</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.492</td>
<td>0.487</td>
<td>0.233</td>
<td>0.109</td>
<td>0.261</td>
<td>0.182</td>
<td>0.262</td>
</tr>
</tbody>
</table>
### Table S17. Changes of Albumin in SLE patients

<table>
<thead>
<tr>
<th>Albumin, g/L, median (range)</th>
<th>Week 0</th>
<th>Week 12</th>
<th>Week 24</th>
<th>P value (Week 0 vs 12)</th>
<th>P value (Week 0 vs 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2, n=13</td>
<td>40.50</td>
<td>38.30</td>
<td>40.40</td>
<td>0.386</td>
<td>0.293</td>
</tr>
<tr>
<td>(25.10,44.40)</td>
<td></td>
<td>(31.90,43.60)</td>
<td>(32.80,47.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>39.25</td>
<td>43.90</td>
<td>43.50</td>
<td>0.013</td>
<td>0.006</td>
</tr>
<tr>
<td>(27.60,44.70)</td>
<td></td>
<td>(37.70,46.90)</td>
<td>(39.80,47.20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P value</td>
<td>0.712</td>
<td>0.002</td>
<td>0.186</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

### Table S18. Changes of proteinuria per 24 hours in SLE patients

<table>
<thead>
<tr>
<th>PRO, g/24hr</th>
<th>Week 0</th>
<th>Week 12</th>
<th>Week 24</th>
<th>P value (Week 0 vs 12)</th>
<th>P value (Week 0 vs 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2, n=13</td>
<td>1.55±1.87</td>
<td>0.79±0.75</td>
<td>0.48±0.47</td>
<td>0.058</td>
<td>0.002</td>
</tr>
<tr>
<td>Placebo, n=12</td>
<td>2.42±2.09</td>
<td>2.21±1.83</td>
<td>3.44±2.68</td>
<td>0.466</td>
<td>0.372</td>
</tr>
<tr>
<td>P value</td>
<td>0.283</td>
<td>0.023</td>
<td>0.002</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

### Table S19. Proportions of patients with recovered C3 levels from baseline to 24 weeks

<table>
<thead>
<tr>
<th>(%)</th>
<th>Week0</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Week16</th>
<th>Week20</th>
<th>Week24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2</td>
<td>0</td>
<td>31.25</td>
<td>43.75</td>
<td>50</td>
<td>31.25</td>
<td>56.25</td>
<td>25</td>
<td>25</td>
<td>31.25</td>
<td>31.25</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>15</td>
<td>28.57</td>
<td>38.10</td>
<td>38.10</td>
<td>42.86</td>
<td>33.33</td>
<td>28.57</td>
<td>23.81</td>
<td>23.81</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>0.223</td>
<td>0.270</td>
<td>0.348</td>
<td>0.468</td>
<td>0.317</td>
<td>0.429</td>
<td>0.550</td>
<td>0.445</td>
<td>0.445</td>
</tr>
</tbody>
</table>
Table S20. Proportions of patients with recovered C4 levels from baseline to 24 weeks

<table>
<thead>
<tr>
<th>(%)</th>
<th>Week 0</th>
<th>Week2</th>
<th>Week4</th>
<th>Week6</th>
<th>Week8</th>
<th>Week10</th>
<th>Week12</th>
<th>Week16</th>
<th>Week20</th>
<th>Week24</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-2</td>
<td>0</td>
<td>11.76</td>
<td>5.885</td>
<td>35.29</td>
<td>17.65</td>
<td>47.06</td>
<td>29.41</td>
<td>41.18</td>
<td>41.18</td>
<td>35.29</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>201</td>
<td>20</td>
</tr>
<tr>
<td>P value</td>
<td>-</td>
<td>0.580</td>
<td>0.562</td>
<td>0.147</td>
<td>0.420</td>
<td>0.038</td>
<td>0.140</td>
<td>0.034</td>
<td>0.034</td>
<td>0.072</td>
</tr>
</tbody>
</table>
Table S21. Changes of immune cell subsets

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline</th>
<th>Week 2</th>
<th>Week 4</th>
<th>Week 6</th>
<th>Week 8</th>
<th>Week 10</th>
<th>Week 12</th>
<th>Week 16</th>
<th>Week 20</th>
<th>Week 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>CD4+ T cells (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>43.37±11.19</td>
<td>46.15±11.13</td>
<td>40.19±12.35</td>
<td>41.86±10.75</td>
<td>39.38±11.56</td>
<td>41.27±11.56</td>
<td>43.82±14.70</td>
<td>46.19±14.32</td>
<td>41.97±14.59</td>
<td>42.70±12.93</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>41.61±11.24</td>
<td>40.70±13.64</td>
<td>41.20±12.43</td>
<td>39.11±13.68</td>
<td>40.16±12.25</td>
<td>40.68±11.61</td>
<td>45.02±10.35</td>
<td>44.72±9.14</td>
<td>43.06±10.40</td>
<td>39.97±14.76</td>
</tr>
<tr>
<td>P value</td>
<td>0.689</td>
<td>0.138</td>
<td>0.742</td>
<td>0.410</td>
<td>0.775</td>
<td>0.942</td>
<td>0.461</td>
<td>0.848</td>
<td>0.800</td>
<td>0.661</td>
</tr>
<tr>
<td>Treg cells (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>11.02±3.51</td>
<td>10.95±4.10</td>
<td>10.47±4.36</td>
<td>11.14±5.15</td>
<td>10.64±4.16</td>
<td>10.51±3.79</td>
<td>10.97±4.59</td>
<td>12.22±5.68</td>
<td>11.10±4.69</td>
<td>11.16±4.69</td>
</tr>
<tr>
<td>P value</td>
<td>0.516</td>
<td>&lt;0.001</td>
<td>0.300</td>
<td>&lt;0.001</td>
<td>0.222</td>
<td>0.003</td>
<td>0.062</td>
<td>0.357</td>
<td>0.779</td>
<td>0.810</td>
</tr>
<tr>
<td>CD8+ T cells (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>46.17±12.37</td>
<td>41.94±12.16</td>
<td>46.68±13.23</td>
<td>46.32±12.00</td>
<td>48.76±13.62</td>
<td>47.54±13.06</td>
<td>46.42±13.68</td>
<td>45.21±12.62</td>
<td>47.93±13.69</td>
<td>46.19±12.06</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>45.78±13.83</td>
<td>43.77±14.40</td>
<td>45.98±15.55</td>
<td>46.75±17.44</td>
<td>47.80±15.65</td>
<td>46.07±14.85</td>
<td>45.16±13.20</td>
<td>46.29±14.40</td>
<td>49.40±11.33</td>
<td>49.62±14.18</td>
</tr>
<tr>
<td>P value</td>
<td>0.774</td>
<td>0.550</td>
<td>0.856</td>
<td>0.824</td>
<td>0.912</td>
<td>0.742</td>
<td>0.740</td>
<td>0.712</td>
<td>0.795</td>
<td>0.438</td>
</tr>
<tr>
<td>NK cells (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IL-2, mean±SD</td>
<td>6.48±4.85</td>
<td>10.40±7.13</td>
<td>7.99±5.68</td>
<td>10.51±6.09</td>
<td>9.44±4.52</td>
<td>12.07±8.01</td>
<td>10.20±8.05</td>
<td>9.13±5.83</td>
<td>8.93±6.24</td>
<td>7.28±4.15</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>6.49±6.02</td>
<td>5.66±4.98</td>
<td>6.22±6.63</td>
<td>6.38±6.79</td>
<td>5.98±6.22</td>
<td>6.80±6.42</td>
<td>5.44±4.47</td>
<td>6.32±6.43</td>
<td>6.35±5.30</td>
<td>6.30±5.31</td>
</tr>
<tr>
<td>P value</td>
<td>0.786</td>
<td>0.001</td>
<td>0.101</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.005</td>
<td>0.001</td>
<td>0.012</td>
<td>0.053</td>
</tr>
<tr>
<td>Placebo, mean±SD</td>
<td>8.10±6.99</td>
<td>9.15±8.86</td>
<td>7.89±7.70</td>
<td>6.18±5.66</td>
<td>7.70±6.81</td>
<td>6.56±4.65</td>
<td>7.43±5.67</td>
<td>7.90±6.74</td>
<td>7.98±6.07</td>
<td>9.41±7.53</td>
</tr>
<tr>
<td>P value</td>
<td>0.635</td>
<td>0.030</td>
<td>0.743</td>
<td>0.004</td>
<td>0.737</td>
<td>0.022</td>
<td>0.712</td>
<td>0.376</td>
<td>0.078</td>
<td>0.140</td>
</tr>
</tbody>
</table>