SUPPLEMENTARY METHODS

Synthesis of SCD-153 and analytical measurements

4-methyl itaconate (11 g, 76.3 mmol), chloromethyl isopropyl carbonate (11.2 mL, 83.9 mmol), sodium iodide (2.28 g, 15.0 mmol), and potassium carbonate (15.82 g, 114.0 mmol) were mixed in anhydrous acetonitrile (120 mL) and the mixture was stirred for 16 hours at 55 °C. Volatiles were evaporated, residue was redissolved in ethyl acetate (200 mL) and the mixture was washed with brine (100 mL) and saturated solution of sodium thiosulfate (30 mL). The organic phase was dried over Na_2SO_4, volatiles were evaporated, and the residue was subjected to flash column chromatography (Silicagel 60 mesh 70-230, solvent: cyclohexane/ethyl acetate 5:1) to afford 18.6 g (94%) of compound SCD-153 as colorless oil.

^{1}H NMR (401 MHz, $CDCl_3$):δ_H 1.31 (d, *J* = 6.3 Hz, 6H), 3.35 (s, 2H), 3.69 (s, 3H), 4.91 (p, *J* = 6.2 Hz, 1H), 5.81 – 5.83 (m, 3H), 6.43 (s, 1H).

^{13}C NMR (101 MHz, $CDCl_3$): δ_C 21.64, 37.20, 52.12, 73.10, 82.20, 130.50, 132.76, 153.29, 164.52, 170.77.

ESI MS**:** 283.0 ($[M + Na]^+$).

HRMS (ESI)**:** Calcd. for $C_{11}H_{16}O_7Na$ 283.07882. Found: 283.07911.

SUPPLEMENTARY TABLES

Table S1. Quantification of itaconate release with high resolution mass spectrometry in studies on the metabolic stability of SCD-153 in mouse and human skin homogenates

Sample Name	Type	Vol.	Pos.	RT	Area	Itaconic Acid Final Conc.
Itaconic acid (100 ng/mL)	Cal	4	Vial 2	3.611	939861.3	100.63852
Itaconic acid (20 ng/mL)	Cal	4	Vial 3	3.609	282325	19.209151
Itaconic acid (4 ng/mL)	Cal	4	Vial 4	3.609	71328.84	4.5090231
Itaconic acid (0.8 ng/mL)	Cal	4	Vial 5	3.604	15111.8	0.8936816
Itaconic acid (0.16 ng/mL)	Cal	4	Vial 6	3.608	2968.155	0.1268338
Blank	Blank	4	Vial 7	3.727	184.1349	**BLQ**
SCD-153 Mouse Skin Homogenate, 0 min, replicate #1	Sample	4	P1-A1			**BLQ**
SCD-153 Mouse Skin Homogenate, 0 min, replicate #2	Sample	4	P1-A2	3.711	243.1378	**BLQ**
SCD-153 Human Skin Homogenate, 0 min, replicate #1	Sample	4	P1-B1	3.754	165.9919	**BLQ**
SCD-153 Human Skin Homogenate, 0 min, replicate #2	Sample	4	P1-B2	3.711	366.3168	**BLQ**
SCD-153 Mouse Skin Homogenate, 30 min, replicate #1	Sample	4	P1-C1	3.606	217.7789	**BLQ**
SCD-153 Mouse Skin Homogenate, 30 min, replicate #2	Sample	4	P1-C2	3.701	236.2433	**BLQ**
SCD-153 Human Skin Homogenate, 30 min, replicate #1	Sample	4	P1-D1	3.734	206.9302	**BLQ**
SCD-153 Human Skin Homogenate, 30 min, replicate #2	Sample	4	P1-D2	3.725	149.624	**BLQ**
SCD-153 Mouse Skin Homogenate, 60 min, replicate #1	Sample	4	P1-E1	3.606	1099.623	**BLQ**
SCD-153 Mouse Skin Homogenate, 60 min, replicate #2	Sample	4	P1-E2	3.611	1022.227	**BLQ**
SCD-153 Human Skin Homogenate, 60 min, replicate #1	Sample	4	P1-F1	3.704	259.8477	**BLQ**
SCD-153 Human Skin Homogenate, 60 min, replicate #2	Sample	4	P1-F2	3.703	104.8361	**BLQ**

BLQ, below limit of quantification

SUPPLEMENTARY FIGURES

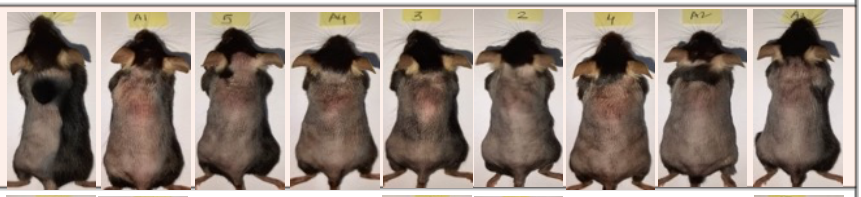
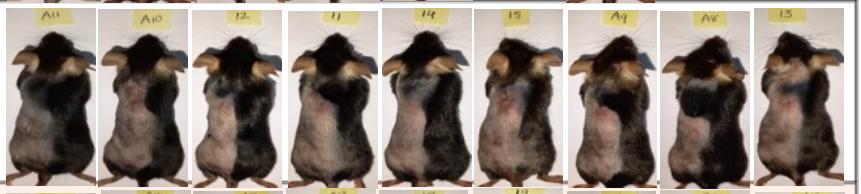
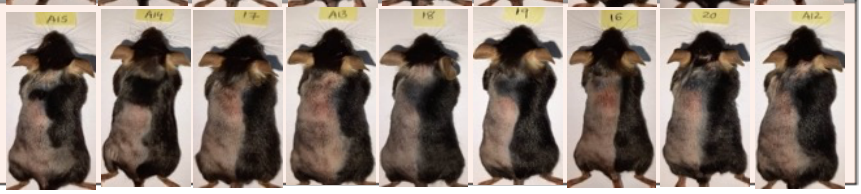
Treatments	Strength (%)	n	Hair growth on day 28	Photographs on Day 28
Vehicle (DMSO), QD x 23 days	0	9	1/9	
Tofacitinib, QD x 23 days	3	9	9/9	
Tofacitinib, QD x 23 days	5	9	9/9	

Figure S1. Topical application of 3% or 5% tofacitinib daily for 23 days induces significant hair growth in C57BL/6 mice. Female C57BL/6 mice underwent hair clipping at 8 weeks after birth (during telogen phase of hair growth cycle), followed by daily treatment on the dorsal right side with vehicle (DMSO), 3% tofacitinib, or 5% tofacitinib for 23 days. Photographs were taken 5 days after the last dose. QD, daily.