Arthritis in C57BL/6 Mice

C57BL/6 mice are the “most widely used” mice used to develop genetically modified mice for gene function analyses. Regarding arthritis models, these mice are relatively resistant to collagen-induced arthritis and collagen antibody-induced arthritis. To address this issue, Chondrex, Inc. provides three very efficient protocols for inducing arthritis in C57BL/6 mice.

1. Delayed-Type Hypersensitivity (DTH) Arthritis

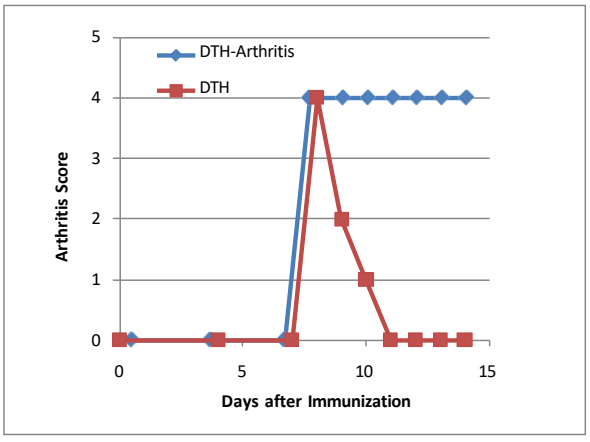
DTH, also known as Type IV hypersensitivity, is distinct from the other hypersensitivity reactions because it is not antibody mediated, but rather is a type of cell-mediated response (T-cells). Immunization and footpad injection of cationic BSA (cBSA) leads to the development of DTH, inducing transient paw swelling by cBSA-activated T-cells. Furthermore, a combination of cBSA-induced DTH and a low dose of Arthrogen-CIA® arthritogenic 5-clone monoclonal antibody cocktail develops sustained inflammatory DTH arthritis.

Standard Protocol

	C57BL/6 mice, Male, 7-8 weeks old
Day 0	Inject mice with 100 µg cBSA (Cat # 9058) emulsified with Complete Freund’s Adjuvant (Cat # 7008) at the abdomen by ID injection
Day 4	Inject 100 µl (1 mg) of 5 clone cocktail (Cat # 53010) by IV injection
Day 7	Inject 50 µl (50 µg) of cBSA into the footpads
After Day 8	Evaluate the severity of arthritis

Benefits:

- No LPS injection is required to induce arthritis.
- Only 1 mg of 5-clone cocktail is required.
- Arthritis develops within 8 days.
- Able to choose specific paws to induce arthritis.



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2. Collagen-Induced Arthritis (CIA)

C57BL/6 mice exhibit low susceptibility to CIA due to their MHC haplotype (H-2b). Therefore, a unique protocol is required to induce arthritis in these mice. Moreover, these mice make IgG2c subtype antibodies rather than IgG2b antibodies, indicating that complement fixable anti-collagen IgG2a and IgG2c autoantibody levels should be measured for the evaluation of procedures and immune responses.

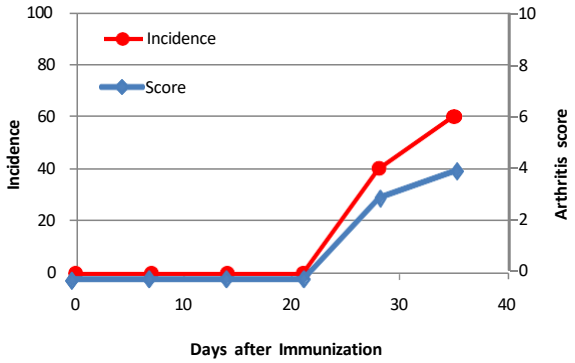
Standard Protocol

C57BL/6 mice, Male, 7-8 weeks old

Day 0 — Inject mice with 100 µg of chick type II collagen emulsified with Complete Freund's adjuvant (TB: 5 mg/ml, Cat # 7023) at the base of the tail by SC injection.

Day 21 — Inject mice with 100 µg of chick type II collagen emulsified with Complete Freund's adjuvant (TB: 5 mg/ml, Cat # 7023) at the base of the tail by SC injection.

After Day 24 — Evaluate the severity of arthritis



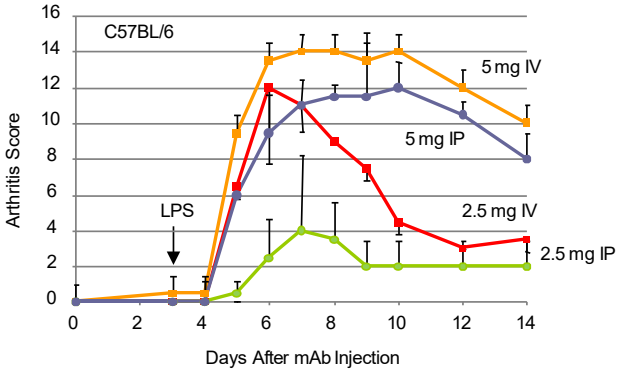
3. Collagen Antibody-Induced Arthritis (CAIA)

C57BL/6 mice are also a CAIA-low responder mouse strain, requiring a higher dose of Arthrogen-CIA® 5-clone cocktail to induce arthritis. However, choosing an appropriate dose and injection route can consistently induce severe arthritis in these mice.

Standard Protocol

C57BL/6 mice, Male, 7-8 weeks old

Day 0 — Inject mice with 2.5 mg or 5 mg of 5 clone cocktail (Cat # 53010) by IV injection

Day 3 — Inject mice with 0.1 ml (50 µg) of LPS solution by IP injection

After Day 4 — Evaluate the severity of arthritis