Atinvicitinib Significantly Reduces Pruritus in a Canine Interleukin-31 Model

European Veterinary Dermatology Congress
12 September 2025, Bilbao, Spain

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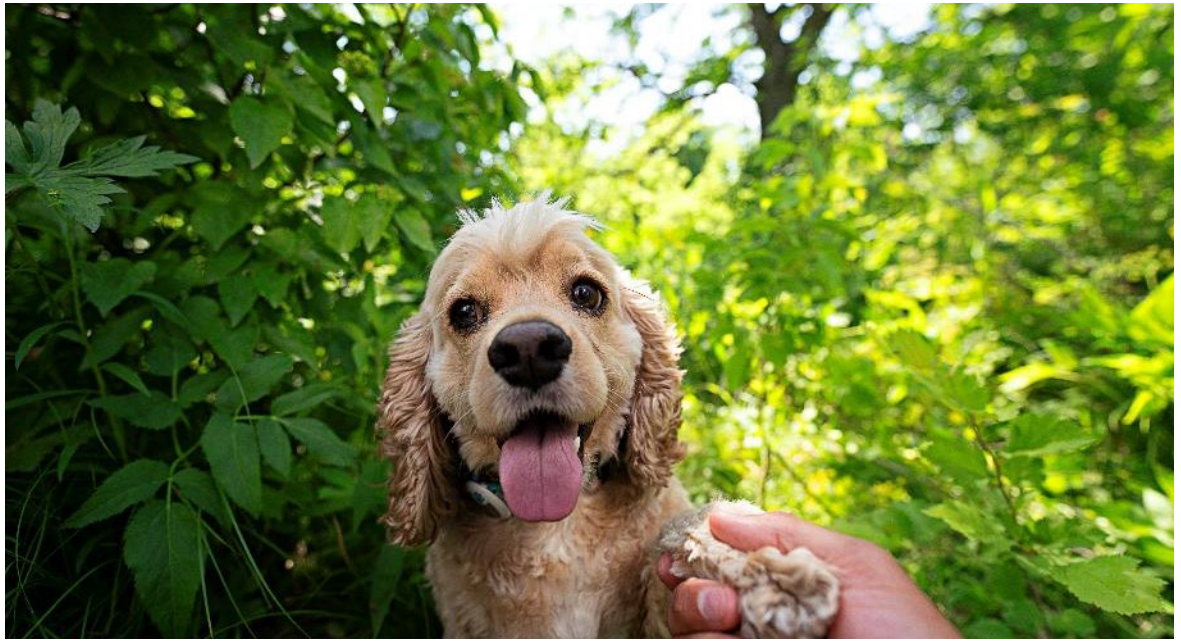
Interleukin 31

- IL-31 induces itching behavior in dogs[1] and several other species[2-4]
- Administration of oclacitinib suppressed pruritus induced by the administration of canine IL-31 in dogs[5]



1. Gonzales AJ, Humphrey WR, Messamore JE, et al. Vet Dermatol. 2013;24(1):48-53. 2. Arai I, Tsuji M, Takeda H, et al. Exp Dermatol. 2013;22(10):669-671. 3. Hawro T, Saluja R, Weller K, et al. Allergy. 2014;69(1):113-117. 4. Lewis KE, Holdren MS, Maurer MF, et al. J Eur Acad Dermatol Venereol. 2017;31(1):142-150. 5. Gonzales AJ, Fleck TJ, Humphrey WR, et al. Vet Dermatol. 2016;27(1):34-e10.

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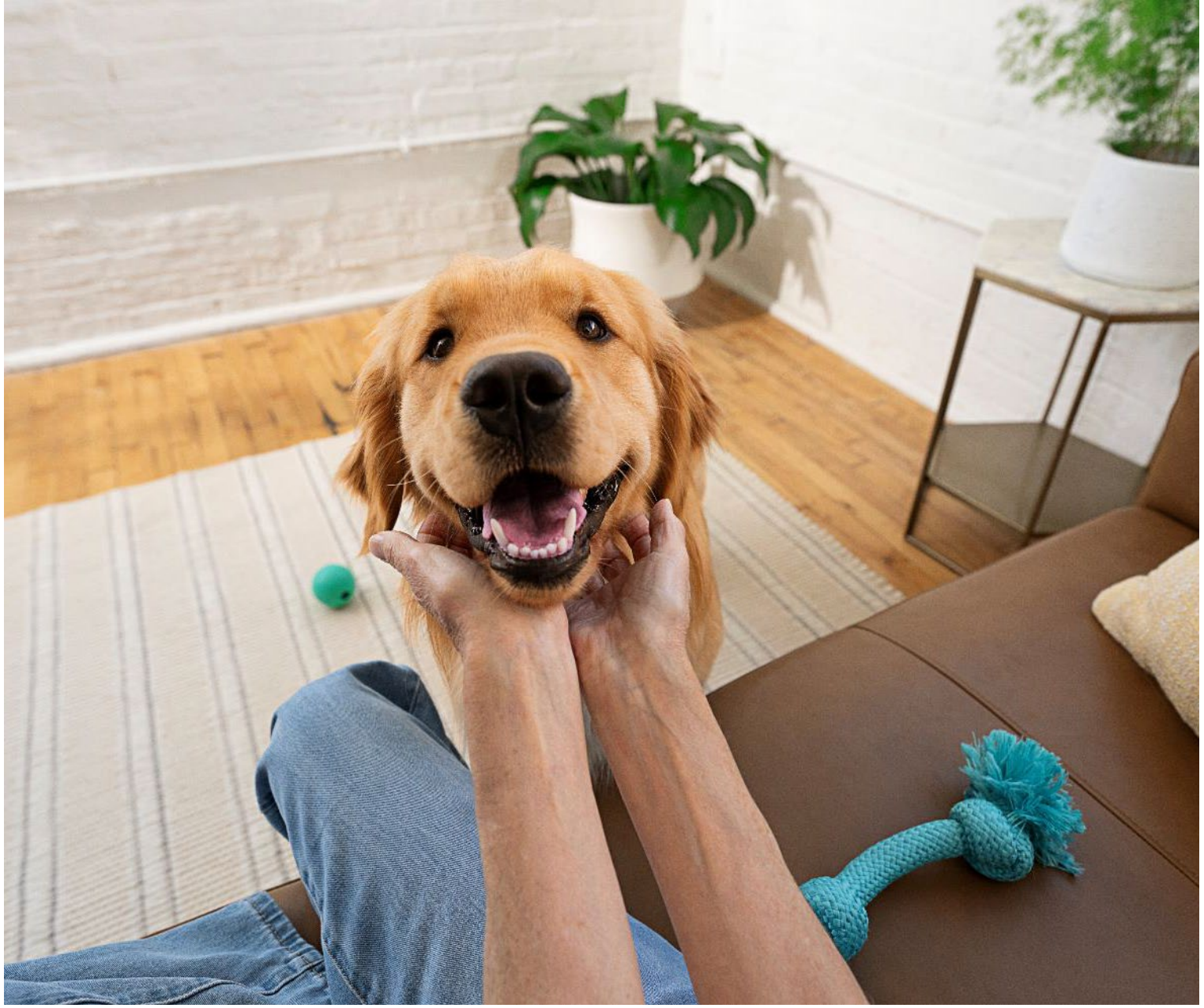
Objective

Confirm the efficacy of atinvicitinib at the targeted dose of 1.0 mg/kg, and evaluate the duration of efficacy, in a laboratory model of pruritus



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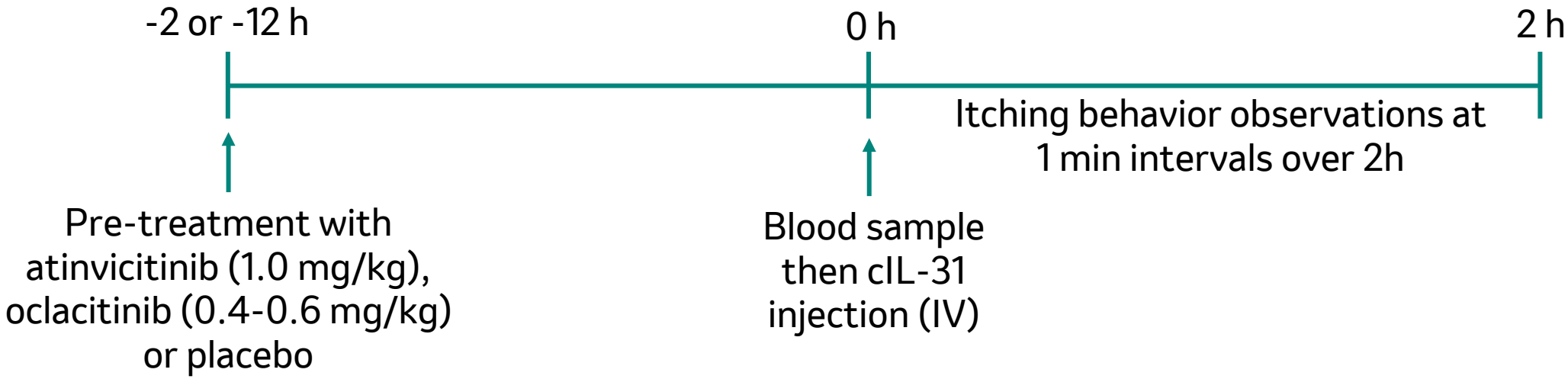
Model of Canine IL-31-Induced Pruritus in Dogs



Two studies were performed

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Study 1

Cross-over design with 8 Beagle dogs

All dogs were treated with placebo or drug **2 hours** prior to IL-31 challenge

Treatment Group (n)	Period 1 Day 0	Period 2 Day 7	Period 3 Day 14
1 (4)	Placebo	1.0 mg/kg Atinvicitinib	0.4-0.6 mg/kg Oclacitinib*
2 (4)	Placebo	0.4-0.6 mg/kg Oclacitinib*	1.0 mg/kg Atinvicitinib

*Oclacitinib - Apoquel®, Zoetis

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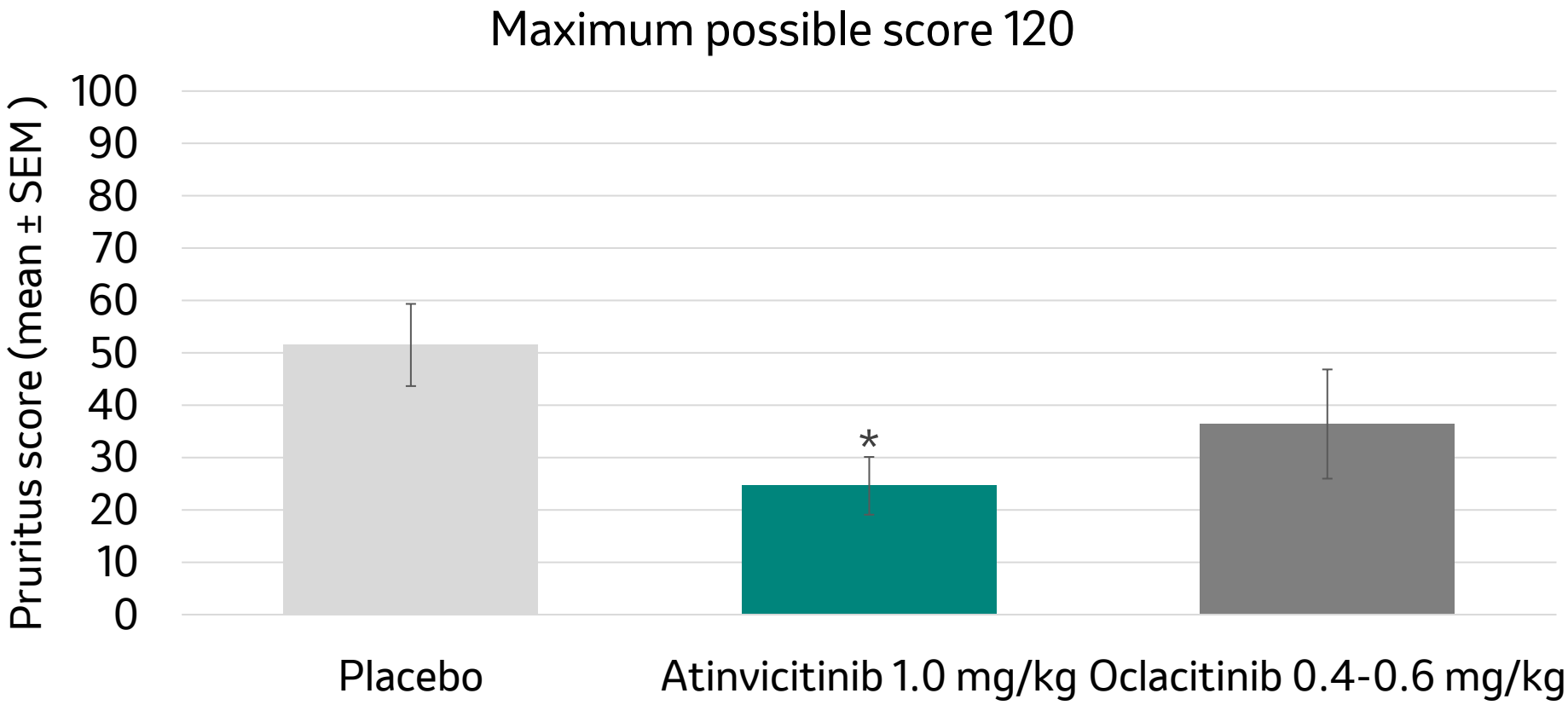
Study 2

Parallel design with 24 Beagle dogs assessing duration of efficacy

Group	Treatment Group (n)	Day 1	Day 14
1	Placebo tablet (8)	Drug or placebo treatment 12 hours prior to IL-31 challenge	Drug or placebo treatment 2 hours prior to IL-31 challenge
2	1.0 mg/kg Atinvicitinib (8)		
3	0.4-0.6 mg/kg Oclacitinib* (8)		

*Oclacitinib - Apoquel®, Zoetis

Study 1 Results: Inhibition of IL-31-Induced Pruritus



*Atinvicitinib was significantly different from placebo

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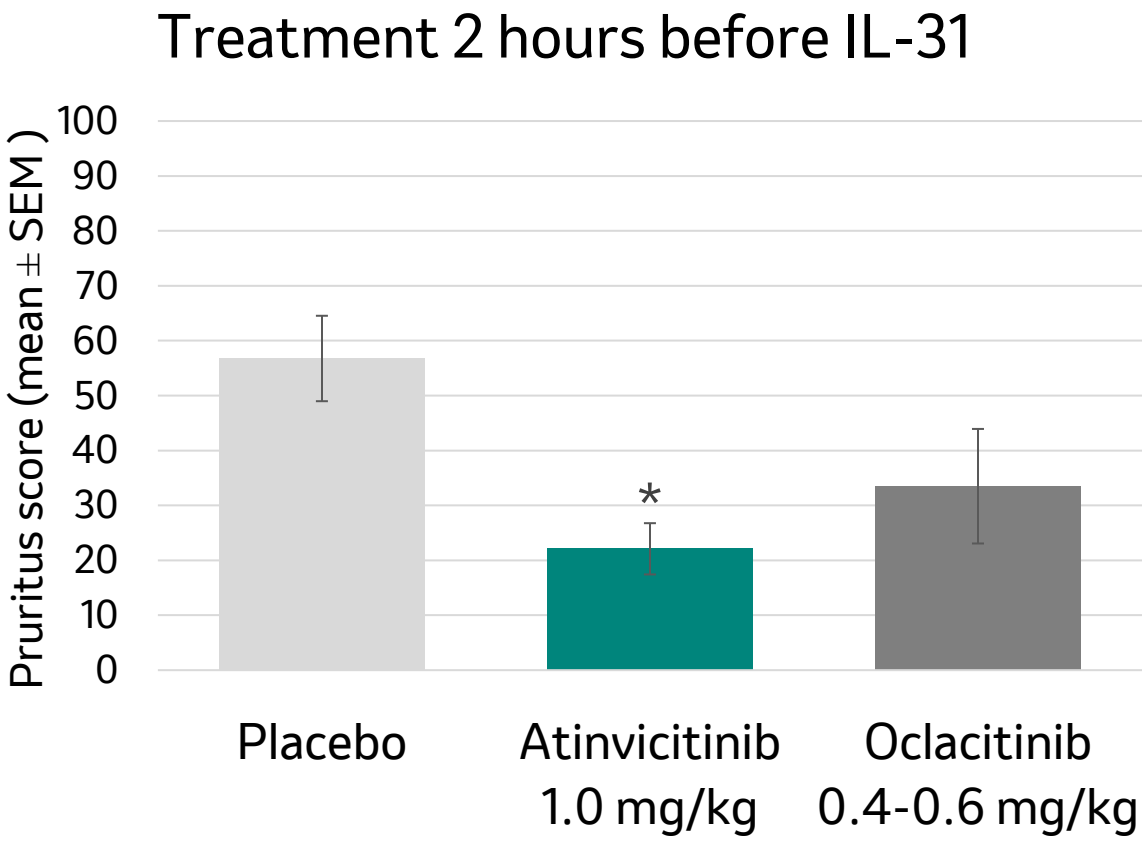
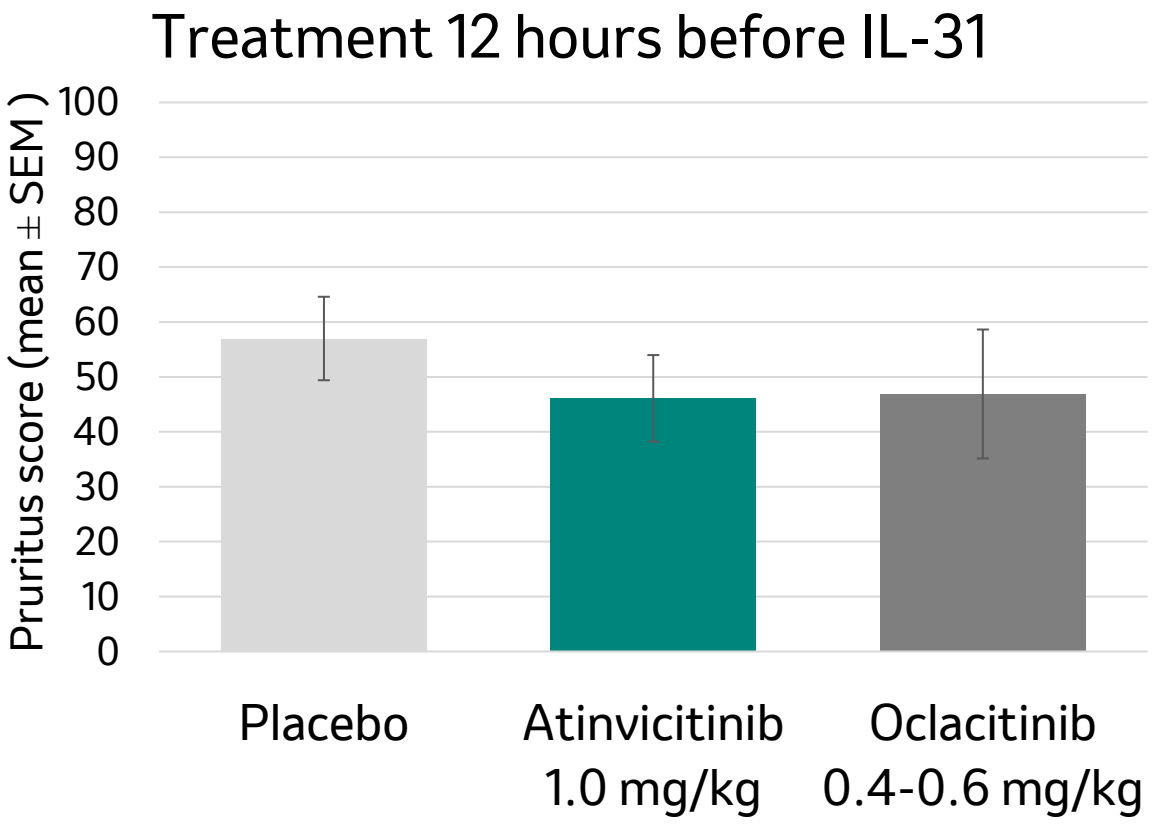
Study 2 Results: Inhibition of IL-31-Induced Pruritus





*Atinvicitinib was significantly different from placebo

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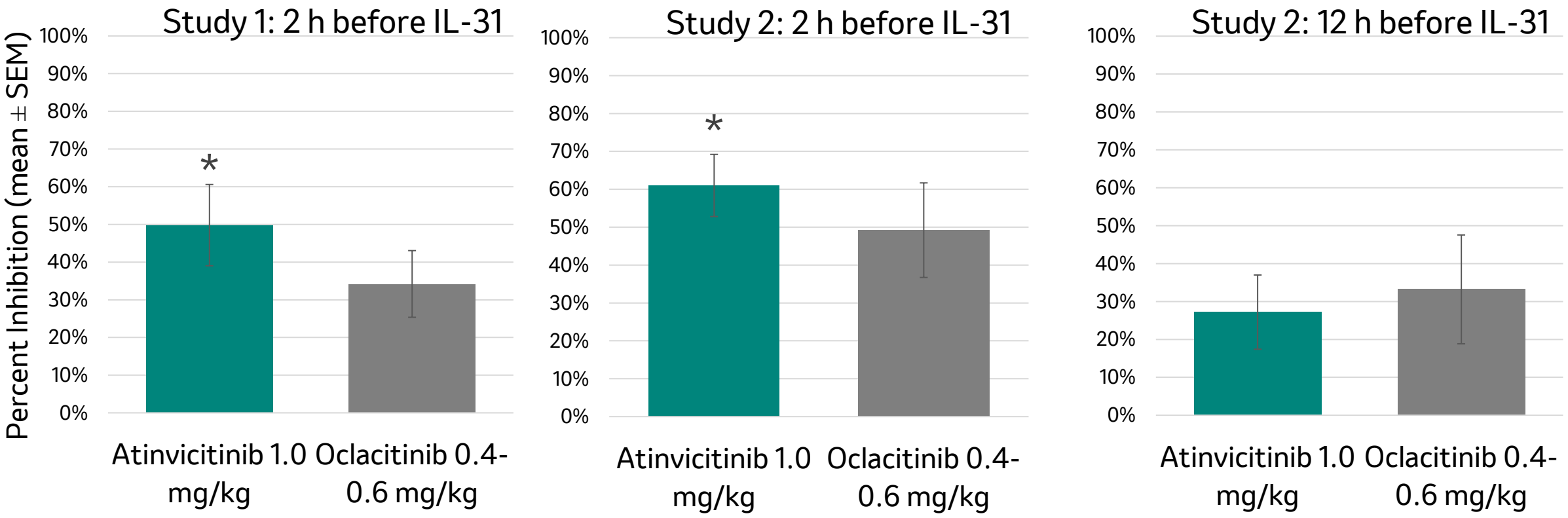
Percent Inhibition of Pruritus Relative to Placebo Following Treatment 2 or 12 Hours Prior to Canine IL-31 Challenge in Dogs



Itch inhibition was calculated within animals for crossover studies or using the average placebo itch score for parallel design studies

$$1 - \left(\frac{\text{Test Agent Itch Score}}{\text{Placebo Itch Score}} \right) \times 100$$

*Atinvicitinib was significantly different from placebo

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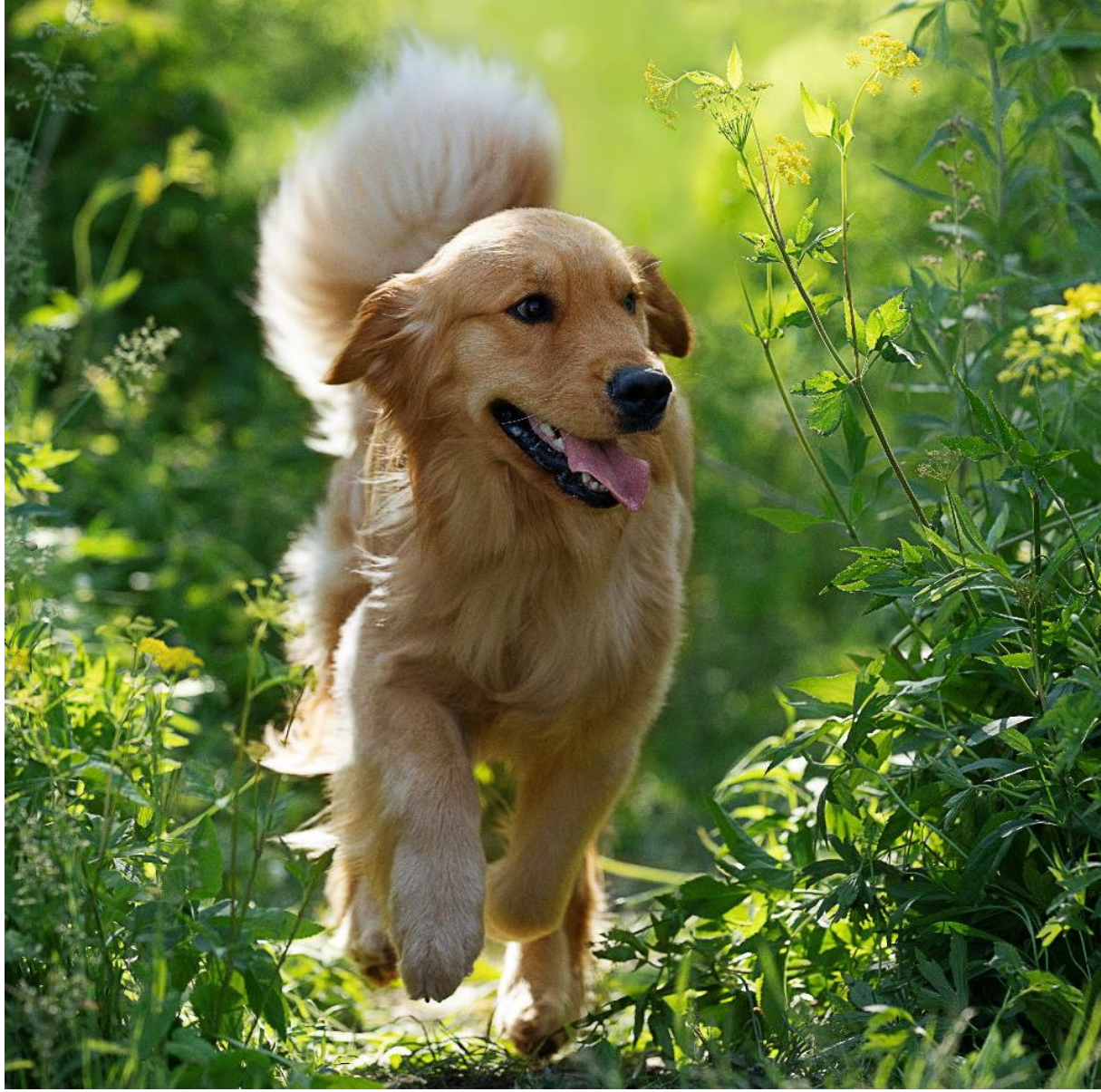
These studies confirmed that a single dose of atinvicitinib at 1.0 mg/kg reduced cIL-31-induced pruritus 2-4 hours after dosing in dogs significantly more than placebo

The cIL-31-induced pruritus model did not replicate the clinical efficacy of atinvicitinib (Numelvi™) observed in dogs with allergic dermatitis including atopic dermatitis day one after dosing[1]

The second-generation JAK1 inhibitor atinvicitinib has potential for the treatment of pruritus associated with allergic dermatitis in dogs



1. Jirjis F, Domann V, Overbey L, et al. The Second-Generation Janus Kinase 1 Selective Inhibitor Atinvicitinib: A Safe and Effective Once-Daily Treatment for Pruritus in Dogs with Allergic Dermatitis. 35th European Veterinary Dermatology Congress, 11-13 September 2025, Bilbao, Spain. [Poster]

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Thank you

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The second-generation Janus kinase inhibitor atinvicitinib significantly reduces pruritus 2-4 hours after dosing dogs in a canine interleukin-31 model

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[2] MSD Santé Animale, Beaucouzé, France

Reduction of pruritus is a primary objective in managing allergic dermatitis, particularly atopic dermatitis, in dogs. A canine interleukin-31 (cIL-31)-induced pruritus model was used to evaluate antipruritic efficacy of atinvicitinib, a second-generation Janus kinase (JAK) inhibitor, that is highly selective for JAK1, which mediates signaling of cytokines involved in itch and inflammation. Two study designs were employed: a crossover design comparing a single dose of atinvicitinib (1 mg/kg), oclacitinib (Apoquel®, Zoetis, 0.4-0.6 mg/kg (reference drug)) or placebo, and a parallel design using the same dose groups. Beagle dogs (n=8 per group) were used. Canine IL-31 was administered intravenously 2 hours (around maximum plasma concentrations of drug) after placebo or drug treatment. Dogs were monitored for pruritic behaviors (scratching, head shaking, licking, and scooting) every minute over a 120-minute observation period. A pruritus score was generated, ranging from 0 (no itching) to 120 (continuous itching). Administration of atinvicitinib significantly reduced itch by an average of 56% in comparison to placebo ($P<0.05$), whereas oclacitinib showed a non-significant average reduction of 42% ($P>0.05$). Plasma concentrations of oclacitinib were comparable to published data. These studies confirmed that a single dose of atinvicitinib at 1.0 mg/kg reduced cIL-31-induced pruritus 2-4 hours after dosing in dogs significantly more than placebo. The second-generation JAK1 inhibitor atinvicitinib has potential for the treatment of pruritus associated with allergic dermatitis in dogs.

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Conflict of interest:
Authors are employed by MSD Animal Health