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Secukinumab

Updated: March 15, 2021.

OVERVIEW

Introduction

Secukinumab is a human monoclonal antibody to interleukin-17A which acts as an immunosuppressant agent and is used to treat moderate-to-severe plaque psoriasis. Secukinumab has not been linked to serum enzyme elevations during therapy or to instances of idiosyncratic acute liver injury, but is capable of causing reactivation of hepatitis B in susceptible persons.

Background

Secukinumab (sek" ue kin' ue mab) is a recombinant, human IgG1 monoclonal antibody to interleukin (IL)-17A, a cytokine involved in the release of proinflammatory mediators. The binding of the monoclonal antibody blocks the interaction of IL-17A with its receptor and thus decreases immune and inflammatory pathways. Secukinumab is considered an immunomodulatory agent and has been evaluated in several immune mediated diseases. In large clinical trials in severe plaque psoriasis, secukinumab was shown to be beneficial and was subsequently approved for this use in the United States in 2015. Its indications were expanded to include psoriatic arthritis and anklyosing spondylitis in 2016, scalp psoriasis in 2018 and axial spondylarthritis in 2020. Secukinumab is available in single use vials, syringes and pens of 150 mg under the brand name Cosentyx. The recommend dose varies by indication. For plaque psoriasis typical dose regimen is two 150 mg subcutaneous injections at weeks 0, 1, 2, 3 and 4 followed by every 4 weeks. Side effects are not common, but can include upper respiratory symptoms, nausea and diarrhea. Rare, but potentially severe adverse reactions include severe infections, reactivation of tuberculosis, exacerbation of Crohn disease and immediate hypersensitivity reactions.

Hepatotoxicity

In large premarketing clinical trials of secukinumab in more than 3000 patients with psoriasis, serum enzyme elevations during therapy were no more common than with placebo and there were no instances of clinically apparent liver injury attributed to its use. Since its approval there have been no reports of idiosyncratic, clinically apparent liver injury attributed to secukinumab therapy. However, prospective studies have shown that secukinumab can induce reactivation of hepatitis B in persons with preexisting HBsAg or antibody to hepatitis B core antigen (anti-HBc). Most instances reported have been asymptomatic and mild and have arisen in persons with HBsAg in serum, generally within 1 to 6 months of starting therapy. Prophylaxis with oral antiviral agents that are active against HBV prevent reactivation have allowed use of secukinumab in patients with ongoing as well as inactive hepatitis B.

Likelihood score: E* (unlikely cause of clinically apparent liver injury, but possibly able to cause clinically apparent reactivation of hepatitis B in susceptible persons).

Mechanism of Injury

The mechanism by which secukinumab might cause liver injury is unknown. Secukinumab is a monoclonal antibody and, like other proteins, is metabolized into amino acids and is unlikely to have intrinsic toxicity. Because of its immunomodulatory activity, secukinumab might induce an autoimmune reaction against hepatocytes, but this has yet to be shown. On the other hand, the immune effects of inhibition of IL-17 may lead to reactivation of inactive hepatitis B in a proportion of patients.

Outcome and Management

The hepatotoxicity of secukinumab has not been shown, but its mechanism of action suggests that it might result in some instances of reactivation of hepatitis B and possibly induction of immune mediated hepatitis. Because of its potential to cause HBV reactivation, patients who are to receive secukinumab should be prescreened for HBsAg and anti-HBc. Those with HBsAg in serum should receive prophylaxis to prevent HBV reactivation using an oral nucleoside analogue with activity against HBV, such as tenofovir or entecavir. Patients without HBsAg but who have anti-HBc (with or without anti-HBs) are at low risk for significant reactivation and would be candidates for active monitoring at regular intervals for serum HBV DNA and early intervention if viral DNA appears de novo or levels increase in serum.

Other immunomodulatory biologic agents used to treat severe psoriasis include adalimumab, efalizumab, etanercept, golimumab, infliximab and ustekinumab.

Drug Class: Dermatologic Agents, Psoriasis Agents; Monoclonal Antibodies

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Secukinumab – Cosentyx®

DRUG CLASS

Dermatologic Agents, Psoriasis Agents

COMPLETE LABELING

Product labeling at DailyMed, National Library of Medicine, NIH

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NO.	MOLECULAR FORMULA	STRUCTURE
Secukinumab	1229022-83-6	Monoclonal Antibody	Not Available

ANNOTATED BIBLIOGRAPHY

References updated: 15 March 2021

Zimmerman HJ. Drugs used to treat rheumatic and musculospastic disease. In, Zimmerman HJ. Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver. 2nd ed. Philadelphia: Lippincott, 1999, pp. 517-54.

(Expert review of hepatotoxicity published in 1999, well before the availability of most monoclonal antibody therapies).

Reuben A. Hepatotoxicity of immunosuppressive drugs. In, Kaplowitz N, DeLeve LD, eds. Drug-induced liver disease. 3rd ed. Amsterdam: Elsevier, 2011, pp. 569-91.

(Review of hepatotoxicity of immunosuppressive agents; mentions rituximab and problems of reactivation of hepatitis B, but also states that "the biological immunosuppressants are largely free from hepatotoxicity, with the exception of the TNF alpha antagonists"; secukinumab not specifically mentioned).

Krensky AM, Azzi JR, Hafler DA. Immunosuppressants and tolerogens. In, Brunton LL, Hilal-Dandan R, Knollman BC, eds. Goodman & Gilman's the pharmacological basis of therapeutics. 13th ed. New York: McGraw-Hill, 2018, pp. 637-53.

(Textbook of pharmacology and therapeutics).

Efalizumab (Raptiva) for treatment of psoriasis. Med Lett Drugs Ther. 2003;45(1171):97–8. PubMed PMID: 14657802.

(Concise summary of efficacy, safety and costs of efalizumab shortly after its approval for use in psoriasis in the US; no mention of ALT elevations or hepatotoxicity).

Kaiser T, Moessner J, Patel K, McHutchison JG, Tillmann HL. Life threatening liver disease during treatment with monoclonal antibodies. BMJ. 2009;338:b508. PubMed PMID: 19224957.

(66 year old man with psoriasis was treated with efalizumab [anti-CD11a] and then adalimumab [anti-TNF], and 11 days later developed jaundice and severe hepatitis [bilirubin 9.1 rising to 52 mg/dL, ALT 549 U/L, Alk P 131 U/L], with HBsAg being detected and slow but eventual recovery).

Aithal GP. Hepatotoxicity related to antirheumatic drugs. Nat Rev Rheumatol. 2011;7:139–50. PubMed PMID: 21263458.

(Analysis of spontaneous adverse event reporting of progressive PMLE in the US between 2004-2010 identified 635 cases, with higher than expected number of cases from several immunosuppressive monoclonal antibodies including efalizumab [n=12], rituximab [124] and natalizumab [123]).

Papp KA, Langley RG, Sigurgeirsson B, Abe M, Baker DR, Konno P, Haemmerle S, et al. Efficacy and safety of secukinumab in the treatment of moderate-to-severe plaque psoriasis: a randomized, double-blind, placebo-controlled phase II dose-ranging study. Br J Dermatol. 2013;168:412–21. PubMed PMID: 23106107.

(Among 125 patients with plaque psoriasis treated with one of four doses of secukinumab or placebo for 12 weeks, 1 patient was withdrawn from therapy after 9 days because of exacerbation of liver test abnormalities which were present at baseline, but few details were provided).

Rich P, Sigurgeirsson B, Thaci D, Ortonne JP, Paul C, Schopf RE, Morita A, et al. Secukinumab induction and maintenance therapy in moderate-to-severe plaque psoriasis: a randomized, double-blind, placebo-controlled, phase II regimen-finding study. Br J Dermatol. 2013;168:402–11. PubMed PMID: 23362969.

(Among 404 adult patients with plaque psoriasis treated with one of 3 dose regimens of secukinumab or placebo, common side effects were nasopharyngitis, upper respiratory infections and diarrhea; and there were "no significant shifts in clinical chemistry… parameters").

Baeten D, Baraliakos X, Braun J, Sieper J, Emery P, van der Heijde D, McInnes I, et al. Anti-interleukin-17A monoclonal antibody secukinumab in treatment of ankylosing spondylitis: a randomised, double-blind, placebo-controlled trial. Lancet. 2013;382(9906):1705–13. PubMed PMID: 24035250.

(Among 30 patients with ankylosing spondylitis treated with secukinumab or placebo, side effects included nasopharyngitis, respiratory infections and diarrhea; no mention of ALT elevations or hepatotoxicity).

McInnes IB, Sieper J, Braun J, Emery P, van der Heijde D, Isaacs JD, Dahmen G, et al. Efficacy and safety of secukinumab, a fully human anti-interleukin-17A monoclonal antibody, in patients with moderate-to-severe

psoriatic arthritis: a 24-week, randomised, double-blind, placebo-controlled, phase II proof-of-concept trial. Ann Rheum Dis. 2014;73:349–56. PubMed PMID: 23361084.

(Among 42 patients with psoriatic arthritis treated with 2 injections of secukinumab or placebo at 3 week intervals, side effects included headache, nausea, fatigue and dizziness; one patient had single, transient and mild ALT elevation 21 weeks after the last dose of secukinumab).

Genovese MC, Durez P, Richards HB, Supronik J, Dokoupilova E, Aelion JA, Lee SH, et al. One-year efficacy and safety results of secukinumab in patients with rheumatoid arthritis: phase II, dose-finding, double-blind, randomized, placebo-controlled study. J Rheumatol. 2014;41:414–21. PubMed PMID: 24429175.

(Among 237 patients with rheumatoid arthritis treated with secukinumab or placebo for 20 weeks followed by open label therapy for up to 60 weeks, adverse events were mostly mild-to-moderate, 32% of patients had infections, and there were "no notable elevations in liver enzymes or total bilirubin").

Gisondi P, Dalle Vedove C, Girolomoni G. Efficacy and safety of secukinumab in chronic plaque psoriasis and psoriatic arthritis therapy. Dermatol Ther (Heidelb). 2014;4:1–9. PubMed PMID: 24452484.

(Review of the efficacy and safety of secukinumab in severe psoriasis mentions that the major adverse events of concern are infections, but that these are often mild and self-limited; no mention of ALT elevations or hepatotoxicity).

Langley RG, Elewski BE, Lebwohl M, Reich K, Griffiths CE, Papp K, Puig L, et al; ERASURE Study Group. FIXTURE Study Group. Secukinumab in plaque psoriasis--results of two phase 3 trials. N Engl J Med. 2014;371:326–38. PubMed PMID: 25007392.

(Among 1044 patients with plaque psoriasis treated with secukinumab or placebo in two large 52 week clinical trials, common side effects were nasopharyngitis, upper respiratory infection and diarrhea; no mention of ALT elevations or hepatotoxicity).

Paul C, Lacour JP, Tedremets L, Kreutzer K, Jazayeri S, Adams S, Guindon C, et al; JUNCTURE study group. Efficacy, safety and usability of secukinumab administration by autoinjector/pen in psoriasis: a randomized, controlled trial (JUNCTURE). J Eur Acad Dermatol Venereol. 2015;29:1082–90. PubMed PMID: 25243910.

(Among 182 patients with psoriasis treated with secukinumab [150 or 300 mg by autoinjector] or placebo for 12 weeks, adverse events included nasopharyngitis, headache and pruritus, whereas injection site reactions were uncommon; no mention of ALT elevations or hepatotoxicity).

Thaçi D, Humeniuk J, Frambach Y, Bissonnette R, Goodman JJ, Shevade S, Gong Y, et al; STATURE study group. Secukinumab in psoriasis: randomized, controlled phase 3 trial results assessing the potential to improve treatment response in partial responders (STATURE). Br J Dermatol. 2015;173:777–87. PubMed PMID: 25823958.

(Among 43 patients with psoriasis and only a partial response to secukinumab at 12 weeks who were treated with standard doses or more intensive therapy intravenously, response rates after 40 weeks were similar and no new adverse reactions were identified; no mention of ALT elevations or hepatotoxicity).

Nast A, Jacobs A, Rosumeck S, Werner RN. Efficacy and safety of systemic long-term treatments for moderate-to-severe psoriasis: a systematic review and meta-analysis. J Invest Dermatol. 2015;135:2641–8. PubMed PMID: 26046458.

(Systematic review of publications on the efficacy and safety of systemic therapies for psoriasis, states that there are not enough data for the selected safety outcomes for analysis of secukinumab).

McInnes IB, Mease PJ, Kirkham B, Kavanaugh A, Ritchlin CT, Rahman P, van der Heijde D, et al. FUTURE 2 Study Group. Secukinumab, a human anti-interleukin-17A monoclonal antibody, in patients with psoriatic

arthritis (FUTURE 2): a randomised, double-blind, placebo-controlled, phase 3 trial. Lancet. 2015;386:1137–46. PubMed PMID: 26135703.

(Among 397 patients treated with 1 of 3 doses of secukinumab or placebo for at least 24 weeks, response rates were dose related and higher with secukinumab than with placebo and adverse events were largely mild-to-moderate in severity; no mention of ALT elevations or hepatotoxicity).

Drugs for psoriasis. Med Lett Drugs Ther. 2015;57(1470):81–4. PubMed PMID: 26035746.

(Concise summary of current options for therapy of psoriasis including topical agents, phototherapy, oral systemic drugs, and biologic agents including secukinumab, mentions that serious infections occurred in 1.2% of secukinumab treated patients; no mention of hepatotoxicity).

Secukinumab (Cosentyx) for psoriasis. Med Lett Drugs Ther. 2015;57(1465):45–7. PubMed PMID: 25853578.

(Concise summary of the mechanism of action, clinical efficacy, safety and costs of secukinumab shortly after its approval in the US mentions that urticarial and anaphylaxis have occurred with its use, but does not mention ALT elevations or hepatotoxicity).

Mease PJ, McInnes IB, Kirkham B, Kavanaugh A, Rahman P, van der Heijde D, Landewé R, et al. FUTURE 1 Study Group. Secukinumab Inhibition of Interleukin-17A in Patients with Psoriatic Arthritis. N Engl J Med. 2015;373:1329–39. PubMed PMID: 26422723.

(Among 606 patients with psoriatic arthritis treated with secukinumab [75 or 150 mg] or placebo for 24 weeks, response rates were higher with secukinumab [50% and 51%] than placebo [17%], as were adverse event rates [63% vs 58%] including infections [30% vs 23%], but serious adverse event rates were similar [3.5% vs 5%]; no mention of ALT elevations or hepatotoxicity).

Baeten D, Sieper J, Braun J, Baraliakos X, Dougados M, Emery P, Deodhar A, et al. MEASURE 1 Study Group; MEASURE 2 Study Group. Secukinumab, an interleukin-17A inhibitor, in ankylosing spondylitis. N Engl J Med. 2015;373(26):2534–48. PubMed PMID: 26699169.

(Among 590 patients with ankylosing spondylitis who received secukinumab [75 or 150 mg] or placebo in two randomized controlled trials, secukinumab was yielded higher response rates [58% and 65% with 300 mg and 52% and 40% with 75 mg] than placebo [23% and 28%], and adverse events of infections and Crohn's disease were more frequent with secukinumab while "hepatic enzyme elevations" occurred in <1% of treated subjects).

van de Kerkhof PC, Griffiths CE, Reich K, Leonardi CL, Blauvelt A, Tsai TF, Gong Y, et al. Secukinumab long-term safety experience: A pooled analysis of 10 phase II and III clinical studies in patients with moderate to severe plaque psoriasis. J Am Acad Dermatol. 2016;75:83–98.e4. PubMed PMID: 27180926.

(Among 3420 patients who received secukinumab in 10 placebo controlled trials, adverse event rates were 56% with secukinumab vs 50% with placebo and serious adverse events 2.2% vs 1.6%; no mention of ALT elevations or hepatotoxicity).

Pavelka K, Kivitz A, Dokoupilova E, Blanco R, Maradiaga M, Tahir H, Pricop L, et al. Efficacy, safety, and tolerability of secukinumab in patients with active ankylosing spondylitis: a randomized, double-blind phase 3 study, MEASURE 3. Arthritis Res Ther. 2017;19:285. PubMed PMID: 29273067.

(Among 226 patients with ankylosing spondylitis treated with secukinumab [150 or 300 mg] or placebo injections every week for 16 weeks, adverse event rates were similar in all 3 groups [45% and 46% vs 44%]; there were no discontinuations for adverse events and "no clinically relevant" changes in laboratory test results).

Bagel J, Duffin KC, Moore A, Ferris LK, Siu K, Steadman J, Kianifard F, et al. The effect of secukinumab on moderate-to-severe scalp psoriasis: Results of a 24-week, randomized, double-blind, placebo-controlled phase 3b study. J Am Acad Dermatol. 2017;77:667–74. PubMed PMID: 28780364.

(Among 102 patients with scalp psoriasis treated with secukinumab [300 mg] or placebo for 12 weeks, clinical responses were more frequent with secukinumab [53% vs 2%], but so were adverse events [73% vs 49%] including infections [29% vs 20%], but there were "no remarkable differences" in clinical chemistry results between the two groups).

Blanco FJ, Möricke R, Dokoupilova E, Codding C, Neal J, Andersson M, Rohrer S, et al. Secukinumab in active rheumatoid arthritis: a phase III randomized, double-blind, active comparator- and placebo-controlled study. Arthritis Rheumatol. 2017;69:1144–53. PubMed PMID: 28217871.

(Among 551 patients with rheumatoid arthritis treated with secukinumab [75 or 150 mg] or abatacept or placebo for 24 weeks, response rates were higher with secukinumab [28% and 31%] than placebo [18%] but not abatacept [43%], although adverse event rates were similar in all groups and there were no cases of tuberculosis or deaths from liver disease).

Yanagihara S, Sugita K, Yoshida Y, Tsuruta D, Yamamoto O. Psoriasis vulgaris in a hepatitis B virus carrier successfully treated with secukinumab and entecavir combination therapy. Eur J Dermatol. 2017;27:185–6. PubMed PMID: 27965188.

(66 year old man with refractory psoriasis and HBsAg in serum [without HBV DNA] was treated for 9 months with secukinumab and given prophylaxis with entecavir and had no evidence of HBV reactivation and an excellent clinical response).

Snast I, Atzmony L, Braun M, Hodak E, Pavlovsky L. Risk for hepatitis B and C virus reactivation in patients with psoriasis on biologic therapies: A retrospective cohort study and systematic review of the literature. J Am Acad Dermatol. 2017;77:88–97.e5. PubMed PMID: 28495497.

(Among 25 patients with psoriasis and anti-HBc without HBsAg in serum who were treated with biologic agents, including 3 treated with secukinumab, none developed serum ALT elevations or evidence of HBV reactivation).

Peccerillo F, Odorici G, Pellacani G, Conti A. Secukinumab: A positive outcome in a patient with severe psoriasis and HBV-HCV co-infection. Dermatol Ther. 2018;31(4):e12601. PubMed PMID: 29633448.

(42 year old man with severe psoriasis and anti-HBc without HBsAg as well as anti-HCV and HCV RNA in serum, received a 14 month course of secukinumab with marked clinical improvement and, while also receiving lamivudine, had no evidence of HBV reactivation or worsening of liver disease).

Feaster B, Cline A, Feldman SR. Secukinumab for psoriasis in a patient with hepatitis B. Dermatol Online J 2018; 24(9): 13030/qt58t2f0jh.

(48 year old man with psoriasis and HBsAg in serum was successfully treated with secukinumab for two years without evidence of HBV reactivation).

Chiu HY, Hui RC, Huang YH, Huang RY, Chen KL, Tsai YC, Lai PJ, et al. Safety profile of secukinumab in treatment of patients with psoriasis and concurrent hepatitis B or C: a multicentric prospective cohort study. Acta Derm Venereol. 2018;98:829–34. PubMed PMID: 29972221.

(Among 284 patients with psoriasis treated with secukinumab at 4 dermatology centers in Taiwan between 2015 and 2018, 49 had serologic evidence of hepatitis B; among 25 with HBsAg in serum, reactivation occurred in 6 of 22 [27%] not given prophylaxis, but none of 3 given prophylaxis; while among 24 with anti-HBc without HBsAg in serum, only 1 [4%] developed reactivation; but most instances were asymptomatic or mild, arose within 1-9 months of starting therapy, and did not always require antiviral therapy).

Bevans SL, Mayo TT, Elewski BE. Safety of secukinumab in hepatitis B virus. J Eur Acad Dermatol Venereol. 2018;32(3):e120–e121. PubMed PMID: 28960490.

(47 year old woman with psoriasis and chronic hepatitis B was treated with secukinumab for 14 months without evidence of reactivation; no details provided).

Baraliakos X, Braun J, Deodhar A, Poddubnyy D, Kivitz A, Tahir H, Van den Bosch F, et al. Long-term efficacy and safety of secukinumab 150 mg in ankylosing spondylitis: 5-year results from the phase III MEASURE 1 extension study. RMD Open. 2019;5:e001005. PubMed PMID: 31565244.

(Among 274 patients with ankylosing spondylitis enrolled in a long term extension study, 230 [84%] remained on secukinumab therapy for at least 5 years in whom responses were maintained and drug well tolerated; 1 patient developed herpes zoster, 1 tuberculosis, 4 died, but none from liver disease).

Reich K, Armstrong AW, Langley RG, Flavin S, Randazzo B, Li S, Hsu MC, et al. Guselkumab versus secukinumab for the treatment of moderate-to-severe psoriasis (ECLIPSE): results from a phase 3, randomized controlled trial. Lancet. 2019;394(10201):831–9. PubMed PMID: 31402114.

(Among 1048 patients with psoriasis treated with secukinumab or guselkumab for 48 weeks, response rates were 70% vs 84% while adverse event rates were similar including serious adverse events [7% vs 6%], infections [1% vs 1%] and malignancy [1% vs 1%]; no mention of ALT elevations or hepatotoxicity).

Zhang L, Yang H, Chen Q, Zhao J. Adverse drug events observed with 150 mg versus 300 mg secukinumab for the treatment of moderate to severe plaque psoriasis: A systematic review and meta-analysis. Medicine (Baltimore). 2019;98:e14042. PubMed PMID: 30633199.

(Among 7 studies of secukinumab [either 150 or 300 mg weekly] for patients with plaque psoriasis, adverse event rates were similar for the two dose levels; no mention of ALT elevations or hepatotoxicity).

Drugs for psoriatic arthritis. Med Lett Drugs Ther. 2019;61(1588):203–10. PubMed PMID: 31999665.

(Concise review of the mechanism of action, clinical efficacy, safety and costs of drugs for psoriatic arthritis mentions that common adverse events from secukinumab include injection site reactions, respiratory and candida infections, nausea and diarrhea ad uncommon but severe adverse events include tuberculosis, Crohn disease and hypersensitivity reactions).

Drugs for psoriasis. Med Lett Drugs Ther. 2019;61(1574):89–96. PubMed PMID: 31381544.

(Concise review of the mechanism of action, clinical efficacy, safety and costs of drugs for psoriasis mentions three IL-17A antagonists – secukinumab, ixekizumab and brodalumab – all of which are highly effective and relatively well tolerated; no mention of ALT elevations or hepatotoxicity).

Mease PJ, Kavanaugh A, Reimold A, Tahir H, Rech J, Hall S, Geusens P, et al. FUTURE 1 study group. Secukinumab provides sustained improvements in the signs and symptoms of psoriatic arthritis: final 5-year results from the phase 3 FUTURE 1 study. ACR Open Rheumatol. 2020;2:18–25. PubMed PMID: 31943974.

(193 of 236 patients who enrolled in a long term extension study of secukinumab remained on therapy for 5 years in whom improvements were maintained and serious adverse events were uncommon but included serious infections, Crohn disease, candida infections, cardiac events; no mention of hepatotoxicity or ALT elevations).

Moneva-Leniz LM, Sahuquillo-Torralba A, Vila-Payeras A, Mateu-Puchades A. Risk of hepatitis B virus reactivation in patients on secukinumab for psoriasis: a series of 4 cases. Actas Dermosifiliogr. 2020;111:613–4. PubMed PMID: 32589963.

(Among 4 patients identified in Spanish National Databases with psoriasis treated with secukinumab who had HBsAg [n=2] or anti-HBc without HBsAg [n=2] in serum, none developed hepatitis or evidence of reactivation of HBV during 6-30 months of treatment, two on antiviral prophylaxis and two not).

Gerdes S, Pinter A, Papavassilis C, Reinhardt M. Effects of secukinumab on metabolic and liver parameters in plaque psoriasis patients. J Eur Acad Dermatol Venereol. 2020;34:533–41. PubMed PMID: 31599476.

(In analyses of pooled data from 3 controlled trials of secukinumab and etanercept for plaque psoriasis, serum ALT and AST values were stable over 52 weeks of secukinumab therapy but not with etanercept, with which mean levels rose after 16 weeks).