Psoriasis: Targets and Therapy

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REVIEW

Bimekizumab: The First FDA-Approved Dual IL-17A/IL-17F Inhibitor for Plaque Psoriasis – A Comprehensive Literature Review

Sukainah Ahmed Al Alshaikh, Zahra Mohammad Almarhoon, Hisham Momattin, Mahdi Aleid, Zahra H Almousa, Ali Kamal Alqaisum, Fatimah Ismail Mobarki, Sarah Aon Almakki, Hamzah Alturfi, Kouther Jamil Almajed

Department of Pharmacy, Mouwasat Hospital, Dammam, Saudi Arabia

Correspondence: Mahdi Aleid, Department of Pharmacy, Mouwasat Hospital, Dammam, Saudi Arabia, Tel +966 558105954, Email mahdi14195@gmail.com

Abstract: Psoriasis is a chronic inflammatory immune-mediated disease that affects 1–3% of the worldwide population. It is now known that interleukin IL-17F and IL-17A have a role in the pathophysiology of immune-mediated inflammatory disorders, such as psoriasis. According to recent data, neutralizing IL-17A and −17F together may be more effective than neutralizing IL-17A alone in treating psoriasis. Bimekizumab is a humanized IgG1 monoclonal antibody that selectively binds and diminishes the biological functions of both IL-17A and −17F. Current biologics for treating psoriasis lack complete skin clearance and reliable quick response. Bimekizumab's efficacy was evaluated in four randomized controlled trials involving around 2,200 patients with plaque psoriasis. The results showed that bimekizumab outperformed placebo, adalimumab, secukinumab, and ustekinumab, with higher response rates for both PASI 90 and PASI 100 at 16 weeks. Furthermore, Bimekizumab has shown superiority in direct comparative clinical studies (RCTs) performed. When compared to other biologics, Bimekizumab has shown a more rapid onset in terms of rapid response and better efficacy with a comparable safety profile as the most frequent adverse events include oral candidiasis, upper respiratory tract infections, and nasopharyngitis. These features of Bimekizumab provide advantages for the patients in term of better efficacy with rapid response and safe profile which ultimately affect the selection and treatment algorithm for management of plaque psoriasis.

Keywords: psoriasis, biologics, cytokine, inflammatory disease, dual inhibition

Introduction

Psoriasis is a chronic inflammatory disease that occurs in patients with autoimmune backgrounds. Globally, the prevalence is approximately 2–4% and up to 9.7% in Scandinavian countries. Several studies have mentioned the pathogenesis of psoriasis, which is related to the genetic background of the affected people, the immune system, and the environment. Nowadays, psoriasis is not considered only a skin disease; it has been defined as a systemic chronic condition. This is demonstrated by high numbers of circulating lymphocytes, excessive activation levels of peripheral blood mononuclear cells, and high gene expression of transcription factors and cytokines involved in the differentiation of Th1, Th17, and Th22 cells. Psoriasis vulgaris (plaque psoriasis) is the most common clinical variant of this disease, which is reported in approximately 85–90% of cases. Hyperproliferation and altered differentiation of keratinocytes are the most apparent characteristics of plaque psoriasis, which result in erythematous and thick-scaling plaques.[1] Most manifestations of plaque psoriasis are thick silver scales on the trunk, scalp, and extensor surfaces. Inverse or flexural psoriasis, which exists without scaling and commonly affects axillary, inframammary, and genital areas, guttate is considered one of face cutaneous manifestations. Moreover, psoriasis is linked with other comorbidities such as gastrointestinal, cardiovascular, and renal diseases. Some resources also link malignancy, mood disorders, inflammatory arthritis, and infections. Most of these diseases are prevalent in patients with psoriasis.[2] The severity of psoriasis can be classified as mild, moderate, or severe based on symptom profile, location, and intensity. Around twenty percent

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of patients with Plaque psoriasis have moderate to severe disease. This stage of severity is defined as involving ten percent of the body or affecting the main body's areas. Severe disease is associated with a high mortality rate, a major impact on quality of life, and an economic burden to health systems.[3] Furthermore, the classification of severity of Psoriasis is often dependent on the utilization of measurements such as Psoriasis Area and Severity Index (PASI) or body surface area (BSA). One of the quality-of-life assessments used by dermatologists is the Dermatology Life Quality Index—DLQI. This assessment is used in parallel with other measurements to avoid underestimating disease severity such as previous treatment response and presence of comorbidities. Also, involvement of affected areas including faces, scalps, soles, palms are considered.[1]

Psoriasis is a long-term disease, and spontaneous improvement is rarely achieved. Many patients require long-term treatment with non-biologic or biologic treatment. In recent years, improvement in understanding the pathogenesis of psoriasis especially with immunopathogenesis led to the development of new remedies including biologics. As a result of this development, treatment with biologics results in a significant number of patients achieving a PASI improvement of 75% (PASI75) and 90% (PASI90) in all conducted trials. Several practice guidelines in dermatology specialty including the Joint American Academy of Dermatology and the British Association of Dermatologists guidelines for the management of psoriasis recommended Conventional therapies, including systemic non-biologic drugs such as Cyclosporine and methotrexate. However, the efficacy of these options in the treatment of patients with moderate to severe Plaque psoriasis is limited. Furthermore, they are associated with a risk of major toxicities.[3] A therapy that offers both high rates of total skin clearance and less frequent dosage is still lacking.[4] Novel biologics offer benefits for patients with moderate to severe plaque psoriasis in terms of effectiveness and tolerability. Patient preferences and satisfaction with treatment significantly impact adherence. Adherence to psoriasis therapy is influenced by more than just clinical benefits, highlighting the importance of considering patient perspectives. Generally, biologics are recommended for patients who have a PASI score of 10, a DLQI score of 10, or do not respond to treatment with traditional systematic drugs.[5] Currently, the approved biological treatments for moderate to severe plaque psoriasis include TNF-alpha inhibitors (Adalimumab, infliximab), interleukin (IL) antagonists, including the IL-12/23p40 antibody (ustekinumab), and, more recently, inhibitors of IL-17A (secukinumab and ixekizumab), IL-17RA (brodalumab), and IL-23p19 (guselkumab, tildrakizumab, and risankizumab).[3]

On October 18, 2023, bimekizumab was approved for use in psoriasis in Saudi Arabia, Switzerland, the European Union, Japan, Australia, and the United Kingdom.[6] The only approved selective dual inhibitor of both IL-17A and IL-17F is bimekizumab. It is effective in reducing the symptoms of plaque psoriasis by inhibiting these cytokines from binding to their targets and then inhibiting their inflammatory reactions. Because of its novel dual inhibition mechanism of IL-17A and IL-17F, bimekizumab demonstrates rapid and durable skin healing in patients with moderate to severe plaque psoriasis.[3] Bimekizumab's longer administration interval makes it a convenient option for patients with adherence issues or difficulty accessing treatment. Its potential for rapid and complete response also makes it suitable for patients with severe psoriasis impacting their quality of life.[7] In four clinical trials involving approximately 2,200 patients with plaque psoriasis, bimekizumab demonstrated superior efficacy compared to placebo and other treatments (adalimumab, secukinumab, and ustekinumab), achieving higher rates of significant skin clearance (PASI 90 and PASI 100) at 16 weeks.[2] Bimekizumab treatment should not be initiated in patients with significant active infections. Those with chronic or recurring infections should use it cautiously. If a severe infection develops and does not respond to antimicrobial treatment, bimekizumab should be discontinued immediately.[8]

This article aims to review the role of IL-17A and IL-17F in the pathogenesis of psoriasis, the pharmacological profile of bimekizumab, its practical use and impact in patient satisfaction and to compare its efficacy and safety to other biologics for the treatment of moderate to severe plaque psoriasis as demonstrated in clinical trials, systematic reviews, and meta-analysis.

Role of IL-17A and IL-17F in Pathogenesis of Psoriasis

The IL-17 axis has a crucial role in protection against extracellular bacteria and fungi. This mechanism is achieved through the release of chemokines involved in the recruitment of neutrophils and monocytes. With many murine disease models, IL-17A has been shown to have an important function in enhancing autoimmunity and chronic inflammation. Interleukin (IL)-17A was the first known member of a family of almost six cytokines; IL-17A, IL-17B, IL-17C, IL-17D, IL-17E (also known as IL-25), and IL-17F.[1]

Originally, IL-17A was cloned in 1993 as a cytokine derived from activated T cells and currently is known as an essential pro-inflammatory cytokine in chronic inflammatory diseases that are immune-mediated, especially psoriasis, and spondylarthritis.[9] Among all these cytokines, IL-17F is almost structurally homologous by 50% to IL-17A. Both have existence as homodimers (ie, IL-17A/A or IL-17F/F) or as heterodimers of IL-17A/IL-17F. Moreover, they have common signalling pathways by the same heterodimeric complex of IL-17 receptors A and C (IL-RA/RC) and biological function (Figure 1). IL-17F is thirty times less biologically potent than IL-17A. However, both of them work synergistically with TNF and IL-6, IL-8, boosting the inflammatory response. In psoriasis pathogenesis, both IL-17A and IL-17F are increased in synovial samples, blood, and skin.[7] IL-17A and IL-17F are mainly produced by activated T-helper 17 cells which in both cytokines come in the form of dimeric isoforms (homodimers IL-17A/A and IL-17F/F, and heterodimer IL-17A/F). Each dimer binds with IL receptor complex, IL-17RA/IL-RC. Ultimately, this binding can transduce the same signaling and activation of target genes. Psoriasis lesions are created by the production of IL-17 in active plaque psoriasis which has the potential to stimulate "downstream" activation of keratinocytes.[4] The effects of IL-17 family cytokines on monolayer keratinocytes were evaluated in vitro, and the results showed that IL-17A and IL-17F had similar impacts on AMP expressions (such as DEFB4, S100A9, LCN2, and S100A7A), chemokines (such as CCL20, CXCL8), and cytokines (such as IL-36γ). The psoriasis transcriptome and the in vitro keratinocyte transcriptomes produced by IL-17A and IL-17F showed a substantial correlation, indicating their role in the psoriasis phenotype.[10] Specifically, IL-17A produces inflammatory reverberating loops that are essential for sustaining skin inflammation, working in concert with TNF-α and IL-22.[11,12] Dual inhibition obtained by bimekizumab led to a substantial reduction of IL-6, IL-8, and expression of other inflammatory genes including CXCL1, CXCL2, CXCL3, and IL-15RA, compared to the expressed reduction obtained by the IL-17A blockade.[13]

Pharmacological Profile of Bimekizumab

Mechanism of Action

Apart from the well-established data on IL-17A inhibition, recent developments in biology have shown the potential significance of IL-17F in inflammatory disorders including psoriasis and spondylarthritis. Because of the overlapping functions that IL-17A and IL-17F, a medication that blocks both cytokines may be more successful in preventing ethology and alleviating symptoms in inflammatory disorders like psoriasis and spondylarthritis.[14]

The innovative rational design was used in the development of bimekizumab to significantly increase an antibody's affinity for IL-17F. This led to the development of a humanized monoclonal immunoglobulin (Ig) G1 antibody that

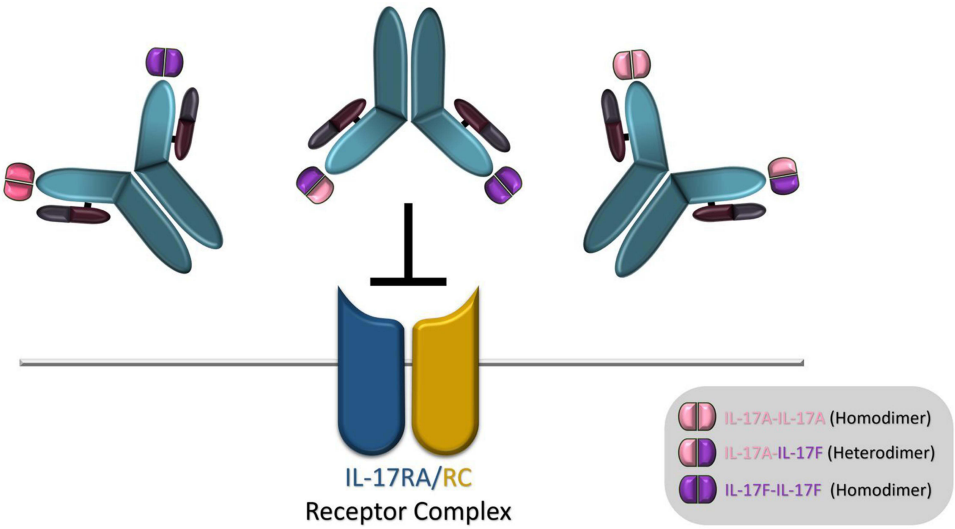

Figure 1 Common signalling pathways by the same heterodimeric complex of IL-17 receptors A and C (IL-RA/RC). By selectively binding to IL-17A, IL-17F, and the IL-17A/F heterodimer, bimekizumab inhibits the activation of the IL-17RA/RC receptor complex by these cytokines, and the subsequent inflammatory cascade.

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specifically inhibits IL-17F in addition to IL-17A and displays dual specificity within each variable region. In comparison to currently available IL-17A inhibitors, Bimekizumab binds IL-17A with an equal to or greater affinity and has the unique feature of being able to neutralize the biological activity of IL-17F in addition to IL-17A. In contrast to a bispecific antibody that possesses distinct binding arms for every molecule, bimekizumab's structure enables it to bind IL-17A or IL-17F optimally and inhibit pro-inflammatory signaling regardless of the proportions of the two cytokines.[6] Extensive suppression of inflammation is achieved by this mechanism of action which ultimately reduces gene expression and migration of inflammatory cells and cytokines.[14]

A rapid and deep clinical response was seen in patients receiving bimekizumab in Phase I trials. Also, this clinical response has been observed consistently in patients treated with bimekizumab up to and including Phase III trials.[6]

Pharmacokinetics

During the first-in-human randomized placebo-controlled study of bimekizumab, pharmacokinetic was studied. Every participant who received a single dosage of bimekizumab at baseline—either 8 mg, 40 mg, 160 mg, 480 mg, or 640 mg—was monitored for 20 weeks and finished the trial, except two who withdrew due to adverse events (AE). Bimekizumab concentrations in plasma were measured using a sandwich ligand-binding assay. The quantification range for the test was 150–18,000 ng mL–1. The coefficient of variance indicated that the assay accuracy was ≤20%. There was no assessment of the interference's impact. Blood samples were taken before dosing, then at 0–48 h, 72 h, and 96 h after dosing, and during Weeks 1–20 of the SFU.[14]

Bimekizumab showed a biphasic disposition and a linear elimination across the whole dosage range examined after the medication infusion ended. In the bimekizumab dosage groups, there was moderate-to-high interindividual variability for the area under the curve (AUC; geometric coefficient of variation [%] range: 22.0–64.1%). The half-lives of the geometric mean (GeoMean) varied between 17 and 22 days for each treatment group. In the final phase, the GeoMean volume of distribution varied between 4.25 and 5.82 liters. The range of the GeoMean for total body clearance was 0.15 L day–1 to 0.19 L day–1. GeoMean AUC0–∞ is increased proportionally while increasing doses of bimekizumab.[14] Notably, five participants out of twenty-six produced anti-bimekizumab antibodies throughout the follow-up period, although one person had anti-bimekizumab antibodies identified and validated before dose administration. Nevertheless, pharmacokinetic characteristics were unaffected by the discovery of anti-bimekizumab antibodies.[10]

Treatment-Emergent Adverse Events (TEAEs)

During the phase I trial, adverse events were noted. 61.5% of TEAEs in all bimekizumab groups and 53.8% in the placebo group were mildly intense. There was only one significant adverse event (AE). However, it was not linked to the medication. The most frequently reported treatment-emergent adverse events (TEAEs) in ≥10% of bimekizumab-treated participants included headache, oropharyngeal discomfort, nasopharyngitis, and ECG abnormalities (not clinically significant). There were no recorded deaths, severe TEAEs, infusion-site reactions, or study discontinuation because of TEAEs. Between treatment groups, mean neutrophil counts were comparable, and no subject's neutrophil count changed in a clinically significant way. Bimekizumab has a tolerable safety profile and is well tolerated.[14]

A pooled analysis of the safety findings from eight randomized clinical trials—four of which were in Phase 2 and four of which were in Phase 3. This analysis included 1789 individuals with moderate-to-severe plaque psoriasis who had taken bimekizumab at least once. Nasopharyngitis (19.1 per 100 person-years), oral candidiasis (12.6 per 100 person-years), and upper respiratory tract infection (8.9 per 100 person-years) were the most common treatment-emergent adverse events (AEs). At 5.9 per 100 person-years, there were 30 serious adverse events (AEs). The majority of AEs that resulted in treatment termination happened in the first year of the medication, accounting for 3.8 per 100 person-years of incidence overall.[13]

Guidelines Recommendations and Dosing Regimen of Bimekizumab for the Treatment of Plaque Psoriasis

The National Institutes for Health and Care Excellence (NICE) recommends bimekizumab as a treatment option for adults with moderate to severe plaque psoriasis with circumstances including Psoriasis Area and Severity Index (PASI) of

10 or higher, Dermatology Life Quality Index (DLQI) of 10 or higher, and the disease has either no response or contraindication to other systemic agents like methotrexate, and cyclosporin.[15]

For the dosing regimen, adult patients with plaque psoriasis should take 320 mg (given as two 160 mg subcutaneous injections) during weeks 0, 4, 8, 12, 16, and every eight weeks thereafter. According to the product characteristics summary, certain patients weighing 120 kg or more did not achieve complete skin clearance at week 16 (PASI100). This could be improved further if the dose is increased (320 mg every 4 weeks rather than every 8 weeks). The company clarified that only a small number of patients in bimekizumab trials had a body weight of 120 kg or more and had not achieved a PASI 100 response.[15]

Practical Considerations

The BE BRIGHT open-label extension study results show that in terms of long-term effectiveness, the majority of patients with moderate-to-severe psoriasis receiving bimekizumab retain their clinical response from week 16 to year 3. Using modified non-responder imputation (mNRI) of missing data, Strober et al demonstrated that 93% of patients who reached PASI 90, 81% of patients with PASI 100, and 94% of those with an absolute PASI ≤2 at week 16 sustained the response throughout three years.[8] Bimekizumab has also been shown to exhibit sustained skin clearance beyond pharmacokinetic expectations following treatment withdrawal, which is thought to be a hallmark of some IL-23 inhibitors. The median time to loss of PASI75 and PASI90 response following the last dose of bimekizumab is 32 weeks and 28 weeks, respectively.[7]

Bimekizumab's suppression of IL-17A and IL-17F results in greater rates of full lesion clearance than IL-23 inhibitors. This might be attributed to innate lymphoid cells' ability to produce IL-17 isoforms independently of IL-23 receptor activation. Patients with any clinically significant active infection should not begin bimekizumab treatment; patients with chronic or recurrent infections should use it with caution; and patients should stop using it immediately if they develop a severe infection that is not improving with antimicrobial therapy. Patients with active tuberculosis (TB) should not begin bimekizumab treatment; instead, patients with latent TB or previously untreated active TB should consider starting anti-TB medication before beginning bimekizumab treatment.[8]

Patients' adherence to therapy is crucial for achieving the success of psoriasis treatment. Up to forty percent of psoriasis patients are thought to not take their medications as directed.[16] The preferences and level of satisfaction of patients with the therapy have a major impact on adherence. Clinical benefit is not the sole factor that influences patients' adherence to psoriasis therapy. In their systematic evaluation of psoriasis patients' treatment choices and satisfaction, Florek et al found that patients' preferences varied over time and were diverse. Patients' preferences were also related to some characteristics, such as the location of the therapy, the method of administration, or the possibility of side outcomes.[5] Compared to other biological therapies, bimekizumab may have some benefits, particularly for certain patient groups. Because bimekizumab has a longer administration interval than other IL-17 inhibitors, it is a suitable option for patients who have a history of non-compliance or who have difficulty obtaining therapy. Patients who need a rapid and complete response, particularly those whose quality of life is significantly diminished, might consider using bimekizumab. Furthermore, people who have psoriasis in areas where the quality of life is greatly affected (such as the nails, scalp, or palmoplantar) or who have previously not responded well to other biological treatments for the disease would benefit from bimekizumab, which has demonstrated high rates of sustained complete or nearly complete clearance in patient subgroups.[7]

Comparative Efficacy and Safety of Bimekizumab with Placebo and Other Biologics for the Treatment of Moderate to Severe Plaque Psoriasis

Bimekizumab has been studied in four randomized controlled trials, including approximately 2,200 patients with plaque psoriasis (Table 1). One of these studies was conducted to compare bimekizumab with placebo (BE READY). In another trial, bimekizumab was compared with placebo and ustekinumab (BE VIVID). The last two studies were conducted to directly compare bimekizumab with adalimumab (BE SURE) and with secukinumab (BE RADIANT). Consequently, bimekizumab demonstrated better response rates in comparison to placebo, adalimumab, secukinumab, and ustekinumab, for both PASI 90 and PASI 100 at week 16.[15]

Table 1 Efficacy and Safety Results from Phase III Clinical Trials

Trial Name	Comparator(s)	Design & Duration	Patients (n)	Primary Endpoints	Key Efficacy Findings	Key Safety Findings
BE READY[17]	Placebo	Phase III, RCT, 56 weeks	435	PASI 90 at Week 16	PASI 90: 91% (Bim) vs 1% (placebo) at Week 16	Oral candidiasis, upper respiratory tract infections, nasopharyngitis most common; no new safety signals
BE SURE[18]	Adalimumab	Phase III, RCT, 56 weeks	478	PASI 90 at Week 16	PASI 90: 86.2% (Bim) vs 47.2% (ADA) at Week 16; DLQI 0/1: 67.1% vs 47.8%	Higher rates of oral candidiasis in Bim group
BE RADIANT[19]	Secukinumab	Phase IIIb, RCT, 48 weeks	743	PASI 100 at Week 16	PASI 100: 61.7% (Bim) vs 48.9% (Sec); maintained through Week 48	Oral candidiasis: 19.3% in Bim vs 3% in Sec group; all mild/ moderate
BE VIVID[20]	Ustekinumab, Placebo	Phase III, RCT, 52 weeks	567	PASI 90 at Week 16	PASI 90: 85% (Bim) vs 50% (Ustek) vs 5% (placebo); PASI 100 at Week 52: 65% (Bim) vs 38% (Ustek)	Most frequent adverse events: oral candidiasis, upper respiratory tract infections, and nasopharyngitis

Abbreviations: RCT, Randomized Controlled Trial; PASI, Psoriasis Area and Severity Index; Bim, Bimekizumab; ADA, Adalimumab; Sec, Secukinumab; Ustek, Ustekinumab.

In BE READY trial which was a randomized, double-blind, multicenter, placebo-controlled phase III trial, the efficacy and safety of bimekizumab were assessed in 435 participants with moderate to severe plaque psoriasis for at least 6 months, with PASI ≥12, ≥10% BSA, and IGA ≥3. Randomly, all participants were assigned to receive either bimekizumab 320 mg Q4W (n=349) or placebo Q4W (n=86). The percentage of patients who achieved PASI90 and IGA 0/1 after 16 weeks of treatment was the primary endpoint. By week 16, most of the patients treated with bimekizumab achieved PASI90 (91%, 317 patients) and IGA success (93%, 323 patients), in comparison to placebo (1% for both, 86 patients; p <.0001 for both). Additionally, in week 16, participants who received bimekizumab treatment and achieved PASI90 were reassigned in a 1:1:1 manner to receive either a placebo until week 56 or bimekizumab 320 mg Q4W, every 8 weeks (Q8W). At week 56, PASI90 was maintained by 87% of the patients who assigned to bimekizumab Q4W maintained PASI90, by 91% of the patients who assigned to bimekizumab 320 mg Q8W, and by 16% of the patients who assigned to the placebo group. During the first 16 weeks of treatment, 213 (61%) out of 349 patients receiving bimekizumab 320 mg every 4 weeks and 35 (41%) out of 86 patients receiving a placebo every 4 weeks reported treatment-emergent adverse events. 78 (74%) of 106 patients receiving bimekizumab 320 mg every 4 weeks, 77 (77%) of 100 patients receiving bimekizumab 320 mg every 8 weeks, and 72 (69%) of 105 patients receiving placebo reported treatment-emergent adverse events between week 16 and week 56.[17]

In BE SURE study, bimekizumab was compared to adalimumab in a 56-week phase 3 clinical trial conducted at 77 sites in 9 countries. Screening was conducted for 2 to 5 weeks, followed by an initial treatment period of 16 weeks and a maintenance treatment period of 40 weeks. An estimated 614 patients were enrolled in the study, with 478 enrolled in the clinical trial. Patients were assigned to treatment regimens, with 158 patients receiving bimekizumab every 4 weeks 161 bimekizumab every 4 weeks followed by 8 weeks, and 159 receiving bimekizumab every 2 weeks, with a 4-week cycle beginning at week 24. In comparison to patients receiving adalimumab (75 of 159 (47.2%), bimekizumab patients (275 of 319 (86.2%) had a PASI 90 response (first primary endpoint) at week 16 (adjusted risk difference, 39.3 percentage points; 95% confidence interval [CI], 30.9 to 47.7; P<0.001 for noninferiority and superiority). Comparing the combined bimekizumab groups, 91 of 159 patients (57.2%) had an IGA score of 0 or 1 at week 16 (the second primary endpoint); the adjusted risk difference for the adalimumab group was 28.2 percentage points (95% CI, 19.7 to 36.7; P<0.001 for noninferiority and superiority). At week 56, a PASI 90 response was shown in 134 out of 158 patients (84.8%) receiving bimekizumab every 4 weeks, and in 133 out of 161 patients (82.6%) receiving bimekizumab every 4 weeks and subsequently every 8 weeks. At week 24, 106 of the 158 patients (67.1%) who were given bimekizumab every four weeks, 108 of the 161 patients (67.1%) who were given bimekizumab every four weeks and subsequently every eight

weeks, and 76 of the 159 patients (47.8%) who were given adalimumab all had DLQI scores of 0 or 1. A total of 116 out of 159 patients (73.0%) who switched from adalimumab to bimekizumab every four weeks at week 24 had a DLQI score of 0 or 1 at week 56. A total of 111 patients (69.8%) were assigned to adalimumab, 116 of 161 (72.0%) were allocated to bimekizumab every 4 weeks and subsequently every 8 weeks, and 112 of 158 patients (70.9%) were assigned to bimekizumab every 4 weeks had adverse events between weeks 0 and 24. During the same period, individuals receiving bimekizumab had diarrhea and oral candidiasis at higher rates than those receiving adalimumab. Of the patients allocated to bimekizumab every 4 weeks, 1 of 161 (0.6%) had serious adverse events, 5 of 159 (3.1%) had adalimumab, and 4 of 158 (2.5%) had bimekizumab every 4 weeks and subsequently every 8 weeks.[18]

In BE RADIANT, efficacy and safety of secukinumab and bimekizumab were compared to each other in a 48-week phase 3b study. A total of 1005 individuals were screened between June 13, 2018, and May 7, 2019. 743 patients were enrolled, and 373 were randomly allocated to receive bimekizumab once every four weeks, while 370 received secukinumab once a week until week four, after which they would get it once every four weeks. On May 6, 2020, last week 48 visits took place. In the bimekizumab group, 97.1% of patients finished the first 16 weeks of treatment; at week 16, 147 patients were still receiving bimekizumab once every 4 weeks, while 215 patients were randomly allocated to receive bimekizumab once every 8 weeks. 95.7% (354 patients) of the patients on secukinumab finished the first phase up to week 16 and continued their secukinumab medication. In both treatment groups, the rates of adverse events, major adverse events, and discontinuation were comparable. Adverse events were documented in 81.4% of patients receiving secukinumab and 86.1% of those receiving bimekizumab during 48 weeks of treatment. As for the primary endpoint, the PASI 100 response at week 16 was recorded by 230 patients (61.7%) who received bimekizumab and 181 patients (48.9%) who received secukinumab (adjusted risk difference, 12.7 percentage points; 95% confidence interval [CI], 5.8 to 19.6; P<0.001 for noninferiority and superiority). As compared with 171 (48.3%) who continued to receive secukinumab after week 16, a total of 108 patients (73.5%) in the maintenance population at week 48 continued to receive bimekizumab every 4 weeks, while 142 patients (66.0%) switched to bimekizumab every 8 weeks. This group of patients had a PASI 100 response (adjusted risk difference, bimekizumab every 4 weeks vs secukinumab, 26.5 percentage points; 95% CI, 17.9 to 35.1; P<0.001). Oral candidiasis, urinary tract infections, and upper respiratory tract infections were the most frequent adverse events that occurred throughout therapy, with over 5% of patients in any group reporting these conditions. Patients on bimekizumab had a higher incidence of oral candidiasis infections (19.3% [72 patients] vs 3.0% [11 patients]) than those on secukinumab. The majority of bimekizumab-treated oral candidiasis infections were mild (36 of 72 instances) or moderate (34 of 72 cases); none were deemed significant by the site investigators using the criteria outlined in Methods, and none resulted in treatment discontinuation. Of the patients with oral candidiasis, 4 (36.4%) treated with secukinumab and 31 (43.1%) treated with bimekizumab reported having the infection more than once. For the treatment of moderate-to-severe plaque psoriasis, bimekizumab's dual suppression of interleukin-17A and interleukin-17F was superior to secukinumab's inhibition of interleukin-17A, although it was also linked to oral candidiasis.[19]

In the BE VIVID study, the efficacy, and safety of bimekizumab 320 mg Q4W (n = 321), ustekinumab 45 mg for patients ≤100 kg and 90 mg for patients >100 kg at week 0, 4 and Q12W thereafter (n = 163), and placebo (n = 83) were evaluated in a 52-week multicenter, placebo-controlled trial. Adults aged 18 years or more who were diagnosed with moderate to severe plaque psoriasis in 105 sites including hospitals, clinics, research units, and private hospitals in 11 countries in Asia, Australia, Europe, and North America. All these patients had Psoriasis Area and Severity Index [PASI] score ≥12, ≥10% body surface area affected by psoriasis, and Investigator's Global Assessment [IGA] score ≥3 on a five-point scale). Patients on placebo were switched to bimekizumab 320 mg Q4W at week 16. Thirteen At week 16, the bimekizumab-treated group had a considerably larger proportion of patients reaching PASI90 response (85% vs 50% vs 5%, respectively) than the ustekinumab and placebo groups ($p < 0.0001$). For PASI100 and IGA responses, comparable outcomes were reported. Furthermore, in week four, bimekizumab patients responded more rapidly than ustekinumab and placebo patients. Clinical efficacy in the bimekizumab group was maintained until week 52. In addition, 207 (65%) of the patients taking bimekizumab at week 52 had PASI100, compared to 62 (38%) in the ustekinumab cohort ($p < 0.0001$). Lastly, at week 52, patients who had switched to bimekizumab at week 16 showed comparable responses to those who had been taking the medication from baseline in all efficacy outcomes. Regarding safety, adverse events (AEs) were recorded in individuals receiving bimekizumab, ustekinumab, and placebo, respectively, in 181 (56%), 83 (51%) and 39 (47%) cases. Throughout the trial, the bimekizumab cohort had oral candidiasis, upper respiratory tract infections, and nasopharyngitis as the most frequent adverse events.[20]

Network meta-analysis was performed to compare the beneficial and harmful effects of non-biologics, small molecules, and biologics for patients with moderate-to-severe psoriasis, and to offer a classification of these treatments according to their benefits and harms. The selection criteria were RCTs of systemic treatments in adults above 18 years with moderate-to-severe plaque psoriasis, at any stage of treatment. All the treatments were compared to placebo or another active agent. The primary outcomes were the proportion of patients who achieved clear skin with at least PASI 90. In this Network meta-analysis at each class level, all interventions including non-biologics, small molecules, and biologics demonstrated a higher proportion of participants achieving PASI 90 than placebo. In comparison to all interventions, anti-IL17 treatment showed a higher proportion of participants achieving PASI 90. Biological agents including anti-IL17, anti-IL12/23, anti-IL23, and anti-TNF alpha demonstrated a higher proportion of participants achieving PASI 90 compared to the non-biological systemic agents. The most effective treatments for reaching PASI 90 when compared to placebo were infliximab (risk ratio (RR) 49.16, 95% CI 20.49 to 117.95), bimekizumab (RR 27.86, 95% CI 23.56 to 32.94), ixekizumab (RR 27.35, 95% CI 23.15 to 32.29), and risankizumab (RR 26.16, 95% CI 22.03 to 31.07). These drugs were ranked in order by Sucra rank order and all showed a high degree of certainty. When these medications were compared to each other, their clinical effectiveness was similar. In comparison to secukinumab, bimekizumab and ixekizumab had a considerably higher chance of reaching PASI 90. Moreover, Bimekizumab, ixekizumab, and risankizumab were significantly more likely to reach PASI 90 compared to guselkumab and brodalumab.[21]

A group of researchers conducted a systematic review which included 34,476 patients with moderate to severe plaque psoriasis in Eighty-six randomized controlled trials. All these RCTs were identified through Embase, MEDLINE, the Cochrane Central Register of Controlled Trials, the Database of Systematic Reviews, and PsycINFO. A comparison among different degrees of efficacy including 50%, 75%, 90%, and 100% improvement from baseline Psoriasis and severity was evaluated by an enhanced multinomial Bayesian NMA model. The base case model has shown that IL-17 and IL-23 inhibitors (including bimekizumab 320 mg, ixekizumab 80 mg, risankizumab 150 mg, brodalumab 210 mg, secukinumab 300 mg, guselkumab 100 mg) had the highest efficacy among PASI response levels. At 10–16 weeks, bimekizumab 320 mg has demonstrated the highest probability of achieving PASI 75, 90 and 100. In comparison with all other treatments, the superiority of Bimekizumab 320 mg was achieved with PASI 90 and 100 at the specific thresholds. Moreover, all the differences between the treatments were statistically significant. Except for ixekizumab 80 mg and risankizumab 150 mg for achieving PASI 75, the benefit of bimekizumab was statistically significant in achieving PASI 75. Moreover, Bimekizumab had the lowest number of needs to treat in achieving PASI 75, PASI 90, and PASI 100 when compared with other treatments including placebo. The NNTs for bimekizumab to achieve PASI 75, was 1.16 PASI 90 was 1.22, and PASI 100 was 1.74.[3]

Conclusion

Bimekizumab is a dual-specific humanized monoclonal antibody showing a molecular structure that allows it to bind to both IL-17A and IL-17F at one site. Bimekizumab produced a profound and rapid clinical response for the treatment of moderate to severe plaque psoriasis, as shown in phase I study participants. This clinical response was continuously seen in individuals receiving bimekizumab treatment throughout phase III studies. Bimekizumab is a treatment of choice for individuals with chronic diseases like moderate-to-severe psoriasis because of its high safety profile, tolerable side effects, convenient posology, and long-term efficacy as most patients treated with Bimekizumab retain the response for up to three years.

Compared to other IL-17 inhibitors, bimekizumab has longer administration intervals, making it an appropriate choice for patients with a history of non-compliance or those who experience difficulties accessing medicine. Researchers in different regions compared bimekizumab to other biologics for the treatment of moderate to severe plaque psoriasis. Bimekizumab has shown better efficacy and comparable safety in all direct comparative clinical studies (RCTs) conducted, whether against adalimumab (TNF inhibitor), ustekinumab (IL-12/23 inhibitor), or secukinumab (IL-17A inhibitor). With the use of bimekizumab in clinical practice, the treatment outcomes are expected to be enhanced significantly. However, Additional research or real-world data are still needed for long-term safety, effectiveness in diverse populations, cost and access issues for bimekizumab. These issues will influence the clinical decision-making process or treatment algorithm for patients with moderate to severe plaque psoriasis.

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References

1. Ten Bergen LL, Petrovic A, Krogh Aarebrot A, Appel S. The TNF/IL-23/IL-17 axis—head-to-head trials comparing different biologics in psoriasis treatment. *Scand J Immunol*. 2020;92(1):e12946. doi:10.1111/sji.12946
2. Koppu S, Singh R, Kaur K, Feldman SR. Review of bimekizumab in the treatment of psoriasis. *Hum Vaccin Immunother*. 2022;18(1):2119767. doi:10.1080/21645515.2022.2119767
3. Armstrong A, Fahrbach K, Leonardi C, et al. Efficacy of bimekizumab and other biologics in moderate to severe plaque psoriasis: a systematic literature review and a network meta-analysis. *Dermatol Ther*. 2022;12(8):1777–1792. doi:10.1007/s13555-022-00760-8
4. Oliver R, Krueger JG, Glatt S, et al. Bimekizumab for the treatment of moderate-to-severe plaque psoriasis: efficacy, safety, pharmacokinetics, pharmacodynamics and transcriptomics from a phase IIa, randomized, double-blind multicentre study. *Br J Dermatol*. 2022;186(4):652–663. doi:10.1111/bjd.20827
5. Florek AG, Wang CJ, Armstrong AW. Treatment preferences and treatment satisfaction among psoriasis patients: a systematic review. *Arch Dermatol Res*. 2018;310(4):271–319. doi:10.1007/s00403-018-1808-x
6. Tanaka Y, Shaw S. Bimekizumab for the treatment of psoriatic arthritis. *Expert Rev Clin Immunol*. 2023;19(1):1–14. doi:10.1080/1744666X.2023.2125380
7. Camiña-Conforto G, Mateu-Arrom L, López-Ferrer A, Puig L. Bimekizumab in the treatment of plaque psoriasis: focus on patient selection and perspectives. *Patient Prefer Adherence*. 2023;17:1541–1549. doi:10.2147/PPA.S350760
8. Gordon KB, Langley RG, Warren RB, et al. Bimekizumab safety in patients with moderate to severe plaque psoriasis. *JAMA Dermatol*. 2022;158(7):735–745. doi:10.1001/jamadermatol.2022.1185
9. Adams R, Maroof A, Baker T, et al. Bimekizumab, a novel humanized IgG1 antibody that neutralizes both IL-17A and IL-17F. *Front Immunol*. 2020;11:1894. doi:10.3389/fimmu.2020.01894
10. Chiricozzi A, De Simone C, Fossati B, Peris K. Emerging treatment options for the treatment of moderate to severe plaque psoriasis and psoriatic arthritis: evaluating bimekizumab and its therapeutic potential. *Psoriasis*. 2019;9:29–35. doi:10.2147/PTT.S179283
11. Chiricozzi A, Guttman-Yassky E, Suárez-Fariñas M, et al. Integrative responses to IL-17 and TNF-α in human keratinocytes account for key inflammatory pathogenic circuits in psoriasis. *J Invest Dermatol*. 2011;131(3):677–687. doi:10.1038/jid.2010.340
12. Guilloteau K, Paris I, Pedretti N, et al. Skin inflammation induced by the synergistic action of IL-17A, IL-22, oncostatin M, IL-1α, and TNF-α recapitulates some features of psoriasis. *J Immunol*. 2010;184(9):5263–5270. doi:10.4049/jimmunol.0902464
13. Maroof A, Baeten D, Archer S, Griffiths M, Shaw S. IL-17F contributes to human chronic inflammation in synovial tissue: preclinical evidence with dual IL-17A and IL-17F inhibition with bimekizumab in psoriatic arthritis. *Ann Rheum Dis*. 2017;76(Suppl 2):A13.1–A13. doi:10.1136/annrheumdis-2017-eular.4966
14. Glatt S, Helmer E, Haier B, et al. First-in-human randomized study of bimekizumab, a humanized monoclonal antibody and selective dual inhibitor of IL-17A and IL-17F, in mild psoriasis. *Br J Clin Pharmacol*. 2017;83(5):991–1001. doi:10.1111/bcp.13185
15. National Institute for Health and Care Excellence (NICE). Bimekizumab for treating moderate to severe plaque psoriasis. NICE Guideline TA723. Available from: https://www.nice.org.uk/guidance/ta723. Accessed August 1, 2025.
16. Belinchon I, Rivera R, Blanch C, Comellas M, Lizan L. Adherence, satisfaction and preferences for treatment in patients with psoriasis in the European Union: a systematic review of the literature. *Patient Prefer Adherence*. 2016;10:2357–2367. doi:10.2147/PPA.S117006
17. Gordon KB, Foley P, Krueger JG, et al. Bimekizumab efficacy and safety in moderate to severe plaque psoriasis (BE READY): a multicentre, double-blind, placebo-controlled, randomised withdrawal phase 3 trial. *Lancet*. 2021;397(10273):475–486. doi:10.1016/S0140-6736(21)00126-4
18. Warren RB, Blauvelt A, Bagel J, et al. Bimekizumab versus adalimumab in plaque psoriasis. *N Engl J Med*. 2021;385(2):130–141. doi:10.1056/NEJMoa2102388
19. Reich K, Warren RB, Lebwohl M, et al. Bimekizumab versus secukinumab in plaque psoriasis. *N Engl J Med*. 2021;385(2):142–152. doi:10.1056/NEJMoa2102383
20. Reich K, Papp KA, Blauvelt A, et al. Bimekizumab versus ustekinumab for the treatment of moderate to severe plaque psoriasis (BE VIVID): efficacy and safety from a 52-week, multicentre, double-blind, active comparator and placebo-controlled phase 3 trial. *Lancet*. 2021;397(10273):487–498. doi:10.1016/S0140-6736(21)00125-2
21. Sbidian E, Chaimani A, Guelimi R, et al. Systemic pharmacological treatments for chronic plaque psoriasis: a network meta-analysis. *Cochrane Database Syst Rev*. 2023;2023(3):CD011535.