inf sion and has a terminal half-life of 8 to 10 da s. Hence it is administered e er 4 to 8 eeks and the dosage lies bet een 3 to 5 (to 10) mg/kg.

e e cac of in i-mab ith MTX has been demonstrated in se eral trials (Table1). Patients recei ing combination therap achie ed ob io sl higher median impro ements in ACR-N than those in the MTX pl s placebo gro p [16-18]. In addition, the clinical e cac is similar in di erent dosage of in i-mab gro p [16-18]. In terms of radiographic image, the combination of in i-mab and MTX pre ented the radiographic progression and led to lasting clinical amelioration [16]. In i-mab treatment inhibited progression of joint damage e en in patients take lo of MTX in the RISING st d [18]. Compared ith the MTX-onl -treated patients, both erosions and joint space narro ing ob io sl red ced from baseline in the in i-mab pl s MTX-treated patients e cept in i-mab 3 mg/kg e er 8 eeks. ere ere fe er ne l eroded joints per patient in the in i-mab pl s MTX treatment gro ps than in the MTX-onl gro p [17]. e st dies b St Clair EW ill strated that HAQ scores accelerated more in the gro p cond cted in i-mab than in the gro p recei ing MTX alone [16].

e most common ad erse e ents fo nd in clinical trials of in i-mab incl ded inf sion reactions, infection. e therap of in i-mab might increase the risk of malignancies t mors and cardio asc lar [19]. e incidence of serio s infections, ac te inf sion reactions, and death as similar bet een patients treated ith in i-mab pl s MTX and those adopted MTX onl [17]. Among the serio s infections, pne monia, t berc losis occ rred more freq entl in the in i-mab-treated patients than in those treated ith MTX alone [16,19].

Etanercept is a geneticall engineered protein consisting of t o molec les of the e tracell lar domain of TNF receptor II (p75) and the Fc portion of IgG1 [20]. O e to its half-life of appro imatel 3-5.5 da s, etanercept is administered s bc taneo sl (s. c) either eekl (50mg) or t ice a eek (25mg) [21].

e s periorit of the combination therap of etanercept pl s MTX o er etanercept or MTX monotherap in patients ith RA has been demonstrated (Table 2) [22-24]. e 2- ear data from the TEMPO st d con rmed that apparentl larger proportion of patients treated ith combination therap achie ed the clinical response than that recei ing either monotherap [22]. Moreo er, the combination-treated patients had predominantl lo er erosion change scores (-0.67) than patients treated ith etanercept alone (0.39) or MTX alone (3.25) [25]. erefore, treatment ith a combination of etanercept and MTX halted joint damage and patients achie ed disease remission [25]. S stained e cac and decreased rate of radiographic progression gained in patients ith earl aggressi e RA ho se long-term treatment ith etanercept [26]. Patients adopted combination therap enhanced greatl in f nction stat s than in gro p of monotherap [27]. Additional , etanercept 50 mg once eekl is an optimal in most patients ith RA. Increasing the dosage of etanercept from 50mg once a eek to 50 mg t ice a eek in s boptimal responders did not dramaticall impro e response rates [28]. ere as no ob io s impro ement bet een etanercept as monotherap at 50 mg t ice eekl and 25 mg t ice eekl ith regard to the safet and e cac [29].

Injection-site reactions and h pertension ere more common ith etanercept than ith MTX or ith combination therap [22]. ese e ents ere mostl mild or moderate. Na sea and omiting ere more o en concerned ith MTX than ith etanercept or combination therap . No signi cant di erences ere seen among the gro ps in the incidence of serio s ad erse e ents (infectio s and noninfectio s) [22].

In s mmar , etanercept as bene t for patients ith RA. B t the combination of etanercept ith MTX is s perior to a montherap ith each dr g. e combination regimen can red ce disease acti it , slo radiographic progression and impro e f nction. F rthermore, the treatment ith etanercept pl s MTX as ell-tolerated and did not increase serio s ad erse e ents.

Adalim mab is a monoclonal antibod of recombinant imm noglob lin (IgG1) containing onl h man seq ences of peptides. It is an antagonist of TNF, hich pre ent the binding of TNF- to its receptors [6]. It has a half-life of 10 20 da s and can be sed as monotherap or in combination ith se eral other DMARDs, preferabl MTX [30,31]. e recommended dose of adalim mab is 25 mg s. c t ice a eek.

Treatment ith adalim mab pl s MTX as fo nd to be statisticall s perior to placebo pl s MTX according to the ACR20/50/70 response rates at eek 26 (Table 3) [32]. If patients recei ed

First author		Disease	ACR20	ACR50	ACR70	
St.Clair EW et al. [16]			62.4 66.2 53.6	45.6 50.4 32.1	32.5 37.2 21.2	0.4 ± 5.8 0.5 ± 5.6 3.7 ± 9.6
al. [17]			42 40 48 40 16	21 30 36 20 6	10 21 20 10 1	1.02 ± 7.13 1.03 ± 11.65 1.14 ± 4.92 -0.42 ± 6.10 12.59 ± 20.05
et al. [18]			75.8 78.8 82.7	60.6 58.7 66.3	37.4 42.3 43.3	

Table1:

First author		Disease Duration	ACR20	ACR50	ACR70	DAS28 <2.6(%)	TTS (mean)
et al. [22]	ETN		86 75 71	71 54 42	49 27 21	42.4 22.4 18.9	-0.56 1.10 3.34
et al. [23]	ETN ETN		 81,0 70.8 62.2	 83.8 88.5 50.0	 82.6 66.7 63.2		-1.35 -0.19 2.82
et al. [24]	ETN		90.4 63.8	64.4 47.8	38.4 26.1	27.4 10.1	

Table 2:

adalim mab+MTX in earl RA, the o ld achie e rapid clinical and f nctional impro ements [32]. Adalim mab regimens decreased risk of radiographic disease progression [33]. In an open-label e tension st d of 5 ears, the addition of adalim mab led to greater inhibition of str ct ral damage compared ith patients ho contin ed ith MTX monotherap (Table 3) [34]. e PREMIESR st d con rmed that treatment ith adalim mab pl s MTX is initiated earl , it contrib te to higher impro ements in clinical, f nctional, and radiographic responses as compared ith the treatment ith MTX alone or adalim mab alone [35].

In addition, adlim mab pl s MTX ameliorated ph sical f nction for patients ith RA [33,36].

Adalim mab had good tolerance generall . e research demonstrated that the rate of ad erse e ents (both serio s and nonserio s) as similar in the adalim mab and placebo gro ps, altho gh the proportion of patients reporting serio s infections as higher in patients recei ing adalim mab (3.8%) than that in placebo (0.5%) (P<0.02), and as the highest in the patients adopted 40mg e er other eek [33]. e common ad erse e ents ere injection site reactions, serio s infections s ch as militar t berc losis, cell litis [35]. Ho e er, adalim mab ere safe and ell tolerated. ese ad erse e ents ere not serio s and se ere side e ects ere relati el seldom.

Golim mab is a h man anti-TNF- monoclonal antibod that as generated and a nit mat red in an in- i o s stem [37]. Golim mab has a high a nit and speci cit for h man TNF- and e ecti el ne trali es TNF- bioacti it in itro [38].

e e cac of golim mab had been testi ed in se eral di erent gro ps (Table 4) [37,39,40]. e combination of golim mab and MTX as signi cantl better at impro ing the signs and s mptoms of RA and ph sical f ncion [37]. e di erece eren't obser ed in the e cac of the t o golim mab dose gro p (50 mg and 100 mg) [37]. o gh compared indi id all ith the pacebo gro p, the golim mab in combination ith MTX in patients ith RA sho ed greater clinical response , the response rates did not displa ed a clear dose-response pattern among the gro p of golim mab pl s MTX (Table 4) [39].

In the m lticenter, randomi ed, placebo-controlled GO-FORWARD st d , mean impro ement from baseline in HAQ-DI as signi cantl greater for golim mab 50mg+MTX and 100mg+MTX ers s placebo+MTX [41]. On the other hand, golim mab+MTX also elicited a signi cant better response than placeo+MTX in other e cac parameters, incl ding disease acti it score (DAS28) response. And the combination of golim mab and MTX limit radiographic progression [42].

e safet of golim mab has been demonstrated in di erent trials. Ho e er, ad erse e ents ere reported in the process of treatment. e most freq ent ad erse e ents in the combined golim mab gro ps ere na sea, headache, and injection sit reaction. Most e ents ere mild or moderate in se erit [43].

In general, golim mab, in combination ith MTX, can alle iate the signs and s mptoms of RA and impro e ph sical f nction.

Certoli mab pegol is a h mani ed anti-TNF- antibod ith high a nit to TNF [44]. In managing patients ith RA, the recommended dose of certoli mab pegol is 400 mg (gi en as t o s bc taneo s injections of 200 mg) initiall and at eek 2 and 4, follo ed b 200 mg e er other eek.

An international, m lticentre, phase 3, randomi ed, do ble-blind, placebo-controlled st d has assessed the e cac of certoli mab pegol in MTX non-responders [45]. Compared to placebo treatment, certoli mab pegol pl s MTX e ecti el red ced the signs and s mptoms of RA, and inhibited progression of joint damage (Table 5) [45-46] . ere ere no ob io s di erences in clinical e cac

idea of the therap on RA. Biological agents can q ickl relie e clinical s mptoms and dela the bone destr ction. When the TNF- inhibitors appl to clinical practice, the combinations ith DMARDs are cond ci e to ease the s mptoms and pre ent the bone str ct ral damage and ele ate ph sical f nction. Besides, the con ersion bet een di erent agents BesComs ele ate c agents BesComs ele r

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28.

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30.

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