

## SHORT REPORT

## Secukinumab does not impair the immunogenic response to the influenza vaccine in patients

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**ABSTRACT**

**Objective** To evaluate whether immunological response to influenza vaccination is impaired in patients who are receiving secukinumab.

**Patients and methods** Subjects suffering from psoriatic arthritis or ankylosing spondylitis who were receiving treatment with secukinumab and healthy volunteers were included.

All participants received seasonal inactivated trivalent influenza vaccine recommended by the WHO in the 2017–2018 northern hemisphere influenza season, which contained an A/Michigan/45/2015 (H1N1)pdm09-like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus and a B/Brisbane/60/2008-like virus.

Haemagglutination inhibition was used to evaluate basal antibody (Ab) titres against the three influenza vaccine virus strains just before vaccination and at least 4 weeks after the vaccine administration. Response to vaccine was considered as >4-fold increases in Ab titre.

**Results** Thirty subjects, 17 patients and 13 healthy controls, with a follow-up duration of 33±8 days, were analysed. There were no demographic differences between groups. Patients and controls achieved a median of 4.6-fold and 4.0-fold increases, respectively, for anti H1N1 and almost 4.0 (3.7) for patients and 5.3 for controls for anti-B Ab. Both groups presented a poor response against H3N2, with <1.5-fold increase. Seroconversion rates were similar in both groups. Secukinumab did not influence the response to the influenza vaccine (relative risk: 1.09 (95% CI 0.58 to 2.07) for H1N1, RR: 1.53 (95% CI 0.15 to 15.0) for H3N2 and RR: 0.72 (95% CI 0.32 to 1.83) for B strain).

**Conclusion** In our study, secukinumab has no effect on the immunogenic response to the influenza vaccine.

We present a pilot study designed in order to ascertain if secukinumab impairs the immunogenic response to the influenza vaccine in patients with inflammatory arthropathies.

Secukinumab is a fully human anti-interleukin-17A IgG1κ monoclonal antibody (Ab) approved for the treatment of psoriasis, psoriatic arthritis (PsA) and ankylosing spondylitis (AS).

**Key messages****What is already known about this subject?**

- ▶ Seasonal influenza vaccination is recommended for patients who undergo biological therapy.
- ▶ Secukinumab does not affect the immune response to the influenza vaccine in healthy volunteers.

**What does this study add?**

- ▶ Secukinumab does not impair the immune response to the influenza vaccine in patients.

**How might this impact on clinical practice?**

- ▶ Physicians should be concerned about their patients on secukinumab seasonal influenza immunisation.

Secukinumab has a good safety profile, with infection rates similar to etanercept and consisting mainly of non-serious nasopharyngitis and upper respiratory tract infections.<sup>1</sup>

Patients with autoimmune inflammatory rheumatic disease (AIIRD) have a higher risk of infections than healthy people. There are no specific immunisation recommendations for patients on secukinumab, but taking into account they suffer an AIIRD, we follow the vaccination guidelines established for this population that includes annual influenza vaccination.<sup>2</sup> We designed a pilot study in order to assess the efficacy of influenza vaccine in patients with arthropathies who were on treatment with secukinumab.

After the approval of the local ethics committees, we enrolled 17 patients suffering from PsA or AS and 13 controls, each of whom provided a signed written informed consent. There were no demographic differences between groups. Patients had been receiving secukinumab during 8.9±5.8 months. Ten patients (58.82%) were also receiving concomitant treatment with synthetic disease-modifying antirheumatic drugs, five

**Table 1** Geometric means HI titres against each of the three virus strains before vaccination and at least 4 weeks later

	H1N1 baseline	H1N1 final	H3N2 baseline	H3N2 final	B baseline	B final
Patients on secukinumab, n=17	60	276	65	91	20	74
Healthy controls, n=13	107	428	85	86	32	171

of them were on leflunomide, four on methotrexate and one on sulfasalazine.

All participants received seasonal inactivated trivalent influenza vaccine recommended by the WHO in the 2017–2018 Northern hemisphere influenza season, which contained an A/Michigan/45/2015 (H1N1) pdm09-like virus, an A/Hong Kong/4801/2014 (H3N2)-like virus and a B/Brisbane/60/2008-like virus. Blood samples were taken just before vaccination and 33±8 days afterwards, and the haemagglutination inhibition test was used to evaluate Ab titres against the three vaccine virus strains. Participants with >4-fold increases in the Ab titre were considered responders.

Patients and controls achieved a median of 4.6-fold and 4.0-fold increases, respectively, for anti-H1N1 and almost 4.0 (3.7) for patients and 5.3 for controls for anti-B Ab. Both groups presented a poor response against H3N2, with a <1.5-fold increase. Geometric median titres against each of the three virus strains are shown in [table 1](#).

We found no significant differences in the proportion of patients who responded to the vaccine. ([table 2](#)).

Although not significant, there was a higher proportion of healthy controls that achieved seroconversion against the influenza B virus. Thus, we calculated the sample size needed to identify possible significant differences between both cohorts. We found that it would be possible to identify differences, with better results in the control group, if a sample of 312 participants were enrolled (statistical power 80%, 95% CI). To include such a number of subjects, a multicenter study should be conducted that would confirm or not the different responses to the influenza B virus in healthy people and in patients on secukinumab.

In our study, secukinumab did not influence the response to the influenza vaccine (RR: 1.09 (95% CI 0.58 to 2.07) for H1N1, RR: 1.53 (95% CI 0.15 to 15.0) for H3N2 and RR: 0.72 (95% CI 0.32 to 1.83) for B strain).

As far as we know, this is the first study published that investigates if secukinumab impairs the immunogenic response to the influenza vaccination in patients. Seroconversion rates were low but in line with the vaccine

effectiveness rates reported for the 2017–2018 season.<sup>3</sup> Our results corroborate those communicated by Elkayam *et al* (available as abstract), who, during the 2017 season, found similar rates of seroprotection after the vaccine in patients with PsA treated with secukinumab and in healthy controls.<sup>4</sup> Chioato *et al* described an immunogenic response of around 90% 4 weeks after the influenza vaccination in healthy volunteers treated with secukinumab.<sup>5</sup> Although seroconversion rates were lower in our series, neither study found worse responses in subjects taking secukinumab.

In summary, in our pilot study, we found that secukinumab has no effect on the immunogenic response to the influenza vaccine. Larger studies are needed to ratify this finding.

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**Collaborators** Jesús Llorente. Beatriz Paredes.

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**Competing interests** SM-F declares he has received grants for conference attendance and educational programmes, as well as consultancy payments from Novartis, during the conduct of the study.

**Patient consent for publication** Not required.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** The data that support the findings of this study are available on request from the corresponding author, PR.

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**Table 2** Responders against each of the three virus strains

	Patients on secukinumab, n=17 (%)	Healthy controls, n=13 (%)	P value
H1N1	10 (58.82)	7 (53.85)	0.999
H3N2	2 (11.69)	1 (7.69)	1.011
B	6 (35.29)	6 (46.15)	0.821

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