LETTER

RESEARCH LETTER

Rapid skin repigmentation on oral ruxolitinib in a patient with coexistent vitiligo and alopecia areata (AA)

To the Editor: Vitiligo and alopecia areata (AA) share a similar pathogenesis, as they are both interferon (IFN)-γ driven and dependent on $CD8^+$ T cells.[1,2] Here we report a case of rapid, but not durable, repigmentation and hair regrowth in a 35-year-old man with concurrent vitiligo and AA during treatment with oral ruxolitinib. His AA started at the age of 16 years as patchy hair loss on his arms, trunk, and scalp. Several years later, he reported macular depigmentation on his face, trunk, and extremities, and notable overlap with alopecic lesions. He initially participated in a randomized, placebo-controlled trial at the University of Massachusetts to test the efficacy of oral simvastatin in the treatment of vitiligo. During 6 months of follow-up while taking placebo he demonstrated no evidence of spontaneous repigmentation. Eighteen months later, he enrolled in a phase-II open-label clinical trial at Columbia University to evaluate the efficacy of ruxolitinib (Jakafi, Incyte, Wilmington, DE) in moderate to severe AA.

His baseline skin examination at that time revealed widespread, near-complete depigmentation of his face, along with lesions on his trunk and extremities. He also had patches of nonscarring alopecia on his scalp and extremities. He began treatment with ruxolitinib (20 mg) orally twice daily for a total of 20 weeks. Four weeks after initiating treatment, he experienced some hair regrowth on his frontoparietal scalp, and after 12 weeks he had significant improvement (85% scalp hair compared with 63% at baseline). At that time he also began to note the appearance of pigmented macules, and at week 20 he exhibited a large amount of repigmentation on his face and other areas (51% facial pigmentation compared with 0.8% at baseline). Twelve weeks after discontinuing ruxolitinib, while his hair regrowth was maintained, much of the regained pigment had regressed (Fig 1).

Ruxolitinib is a potent small-molecule Janus kinase (JAK) inhibitor approved by the US Food and Drug Administration (FDA) for the treatment of intermediate- or high-risk myelofibrosis and polycythemia vera. It interferes with IFN-γ signaling

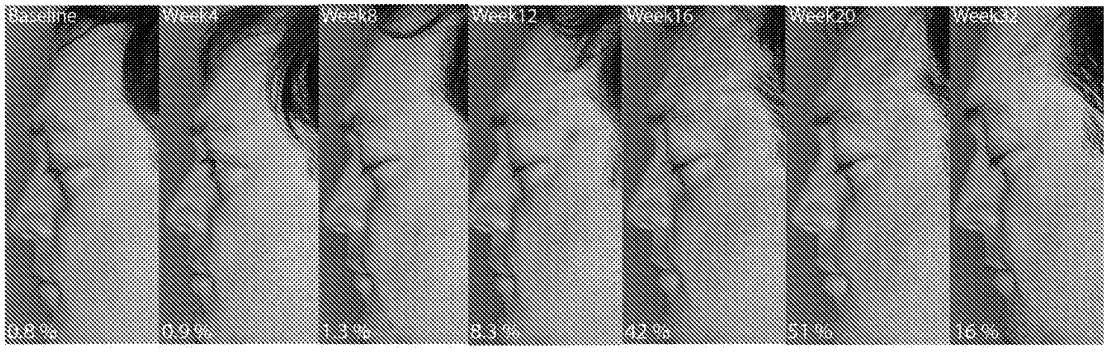

Fig 1. Vitiligo repigmentation during treatment with ruxolitinib. Screening skin examination reveals near-complete depigmentation of the patient's face at baseline. The first evidence of skin repigmentation appeared after 12 weeks of therapy, which continued until week 20, when ruxolitinib was discontinued. Follow-up visit 12 weeks after stopping the treatment shows recurrent depigmentation in the majority of previously repigmented areas. Pigmented areas of the face were outlined using the freehand selection tool followed by calculation of the percent selected area using ImageJ software (National Institutes of Health, Bethesda, MD).

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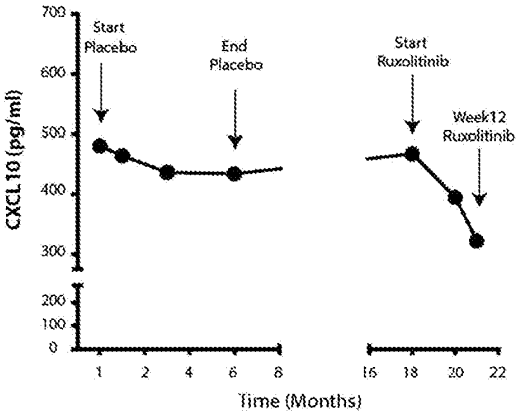

Fig 2. Decrease in serum CXCL10 after initiating treatment with ruxolitinib. Serum samples were analyzed by enzyme-linked immunosorbent assay. CXCL10 level was elevated and remained stable while the patient was taking placebo in the first trial, but decreased after initiating treatment with ruxolitinib.

by preferential inhibition of JAK 1 and JAK 2.[3,4] We previously demonstrated that ruxolitinib eliminated the IFN signature and effectively reversed hair loss in 3 patients and a mouse model of AA.[2] We also reported that Chemokine (C-X-C motif) ligand 10 (CXCL10), an IFN-γ-induced chemokine, is critical for autoreactive T-cell recruitment to the skin during the progression and maintenance of vitiligo, and hypothesized that targeting the IFN-γ-CXCL10 cytokine axis might be an effective treatment by reducing the production of CXCL10.[2] Interestingly, measuring the patient's serum CXCL10 level by enzyme-linked immunosorbent assay revealed that it was initially elevated and stable for over 1 year, but was reduced after treatment with ruxolitinib (Fig 2).

There are currently no FDA-approved treatments for vitiligo, and standard off-label treatments are limited in efficacy. Recently, significant repigmentation was reported in a patient with vitiligo after treatment with tofacitinib, an oral JAK 1/3 inhibitor.[5] Additional studies will be needed to determine whether ruxolitinib, or other JAK inhibitors, are safe and effective long-term treatments for vitiligo.

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Conflicts of interest: None declared.

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