Letters to the Editor

On the roles of skin type and sun exposure in the risk of endometriosis and melanoma

From WILLIAM B GRANT

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The recent paper by Kvaskoff et al. reported observations of endometriosis risk in relation to naevi, freckles and skin sensitivity to sun exposure. The study found significantly increased risk for endometriosis for those highly sensitive to sun exposure and for those with naevi or freckles. Those with dark or very dark skin complexion or dark hair had non-significantly increased risk. Since the statistically significant characteristics are also important risk factors for melanoma, the authors suggested that endometriosis and melanoma may share some genetic features. However, the fact that those with darker skin had higher risk of endometriosis seems to run counter to that hypothesis. The same authors had previously reported that a history of endometriosis was significantly associated with a higher risk of melanoma (relative risk 1.62; 95% confidence interval 1.15–2.29).

In this letter, I argue that the link between risk of endometriosis and melanoma is due to skin type and history of solar ultraviolet (UV) irradiance, and not due to some unknown genetic factor.

First, I argue that low solar UVB irradiance and serum 25-hydroxyvitamin D [25(OH)D] levels are a risk factor for endometriosis. Endometriosis is a risk factor for subsequent ovarian cancer. Several ecological studies have found solar UVB inversely correlated with ovarian cancer. Solar UVB and vitamin D also reduce risk of endometrial cancer, but it is not clear that endometriosis is a risk factor for endometrial cancer. A cohort study found limited evidence that prediagnostic serum 25(OH)D was associated with reduced risk of ovarian cancer. The same group found an association with the Fok1 vitamin D receptor polymorphism, further supporting the role of the vitamin D pathway in ovarian carcinogenesis.

Secondly, the primary risk factors for melanoma are skin type, sunburns and naevi, and solar UV irradiance, especially UVA (320–400 nm). Darker skin is protective though reducing penetration of UVA to the basal layer of the epidermis where it could generate free radicals and increase the risk of melanoma. The melanocortin 1 receptor (MC1R) has different alleles that affect risk of melanoma and have different effects on how melanocortins enhance repair of DNA photoproducts, independently of pigmentation. An ecological study of cancer mortality rates in Spain found that mortality rates for non-melanoma skin cancer, largely related to UVB irradiance, were inversely correlated with mortality rates for melanoma. Non-melanoma skin cancer was more common in the interior provinces, whereas melanoma was more common along the coast.

With this background, one can evaluate the findings in Kvaskoff et al. in terms of solar UV irradiance and skin characteristics. First, those highly sensitive to sun exposure would tend to avoid sun exposure and hence have lower serum 25(OH)D levels. Because of lighter skin pigmentation and increased genetic risk for melanoma, they would also have an increased risk for melanoma. Secondly, those with freckles generally do not tan well and so tend to avoid the sun. They also have a greatly increased risk of melanoma. Thirdly, those with darker skin are less efficient at producing vitamin D from solar UVB irradiance and so have reduced risk of melanoma.

In summary, one can interpret the findings for endometriosis with respect to skin properties reported in Kvaskoff et al. in terms of lower solar UVB irradiance and skin characteristics. First, those highly sensitive to sun exposure would tend to avoid sun exposure and hence have lower serum 25(OH)D levels. Because of lighter skin pigmentation and increased genetic risk for melanoma, they would also have an increased risk for melanoma. Secondly, those with freckles generally do not tan well and so tend to avoid the sun. They also have a greatly increased risk of melanoma. Thirdly, those with darker skin are less efficient at producing vitamin D from solar UVB irradiance and so have reduced risk of melanoma.

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environment in light of skin characteristics that affects the risk of both endometriosis and melanoma, albeit for different reasons.

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References