Letters

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The Risk of Melanoma in Pilots and Cabin Crew: UV Measurements in Flying Airplanes

Recently, a meta-analysis reported an increased incidence of melanoma in pilots and cabin crew, which was possibly due to occupational exposures.1 Cabin crews’ exposure to cosmic radiation was assessed in different studies and always found below the allowed dose limit.2 However, the cumulative

![Figure. Trends in Indoor Tanning Among US High School Students, National Youth Risk Behavior Survey, 2009-2013](image-url)

Results | Our measurements inside the airplane revealed that the windshields blocked UV-B but allowed UV-A transmission. The amount of UV-A at 30,000 feet measured in Las Vegas, Nevada, was approximately 242 μW/cm² (Table 1). The UV-A dose in a UV-A–only tanning bed was 706 μW/cm². The carcinogenic effective dose was calculated using the Skin Cancer Utrecht–Philadelphia human action spectrum,4 and the dose for a 20-minute tanning session was 2940 mJ/m². The carcinogenic effective doses of UV-A radiation in tanning beds and airplanes are compared in Table 2.

Discussion | The pathogenic role of UV-A in melanoma is well established. UV-A is capable of causing DNA damage in cell culture5 and in animal models.6 Pilots flying for 56.6 minutes at 30,000 feet receive the same amount of UV-A carcinogenic effective radiation as that from a 20-minute tanning session. These levels could be significantly higher when flying over thick cloud layers and snow fields, which could reflect up to 85% of UV radiation. Airplane windshields do not completely block UV-A radiation and therefore are not enough to protect pilots. UV-A transmission inside airplanes can play a role in pilots’ increased risk of melanoma.

We recommend further studies to establish recommendations for occupation-related UV radiation dose limits. These studies should include more precise measurement in several airplanes. We believe that better UV protection on aircraft windshields is necessary to offer cabin crew a hazard-free work environment. We strongly recommend the use of sunscreens and periodical skin checks for pilots and cabin crew.

Table 1. UV Measurements Performed at Pilot Seat Inside a Socata TBM850 at Different Altitudes

<table>
<thead>
<tr>
<th>Altitude, ft</th>
<th>San Jose, CA (49 ft)*</th>
<th>Las Vegas, NV (2030 ft)*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UV-A and UV-B, μW/cm²</td>
<td>UV-B only, μW/cm²</td>
</tr>
<tr>
<td>Ground level</td>
<td>137</td>
<td>0</td>
</tr>
<tr>
<td>2500</td>
<td>135</td>
<td>0</td>
</tr>
<tr>
<td>6000</td>
<td>138</td>
<td>0</td>
</tr>
<tr>
<td>10,000</td>
<td>189</td>
<td>0</td>
</tr>
<tr>
<td>15,000</td>
<td>228</td>
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<tr>
<td>20,000</td>
<td>234</td>
<td>0</td>
</tr>
<tr>
<td>25,000</td>
<td>250</td>
<td>0</td>
</tr>
<tr>
<td>30,000</td>
<td>NA</td>
<td>0</td>
</tr>
</tbody>
</table>

Abbreviation: NA, not available.

* Measurements in parentheses indicate height above sea level.
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**OBSERVATION**

**Homzygous Missense Mutation in IL36RN in Generalized Pustular Dermatosis With Intraoral Involvement Compatible With Both AGEP and Generalized Pustular Psoriasis**

Acute generalized exanthematous pustulosis (AGEP) and generalized pustular psoriasis (GPP) show multiple overlapping clinical features. Recently, mutations in the IL36RN gene encoding the interleukin (IL)-36 receptor antagonist (IL-36Ra) have been found to cause increased secretion of inflammatory cytokines in GPP and in a subset of AGEP. In both conditions, half of the patients with IL36RN variants had oral involvement.

**Report of a Case** Herein we report a man in his 40s who initially presented with fever, systemic inflammatory response syndrome, and generalized, sterile, nonfollicular pustules (Figure 1) accentuated in the major flexures and on the palatal mucosa 5 days after intake of amoxicillin, which he took as postoperative prophylaxis after surgery of the thumb. His family history was negative for psoriasis. Medical history and clinicopathologic findings (Figure 2) were consistent with AGEP due to amoxicillin. After obtaining a EuroSCAR AGEP valida- tion score of 10, we considered the diagnosis definite. Discontinuation of amoxicillin therapy and initiation of treatment with topical and systemic corticosteroids led to rapid resolution of this episode. A patch test with amoxicillin performed 6 weeks later showed a pustular skin reaction, further implicating amoxicillin as the trigger of this AGEP.

Nine months later, the patient again developed a generalized pustular reaction with systemic inflammatory response syndrome 3 days after a throat infection with β-hemo-