

NAME _____ MAT _____

Please reply yes or no, more than one answer can be yes (+0.5 if correct, otherwise 0)

UV Radiation

| | yes | no |
|-----------------------------------|-----|----|
| UVC penetrates deeply in the skin | | |
| UVA is 95% absorbed by atmosphere | | |
| UVB is above 350 nm | | |
| UVC is 95% absorbed by atmosphere | | |

Atmosphere

| | yes | no |
|--|-----|----|
| Is transparent to the whole solar spectrum | | |
| Absorbs 50 % of the UVB | | |
| Absorbs 50 % of the UVA | | |
| UV intensity does not depend on the weather conditions | | |

Melanin

| | yes | no |
|----------------------------------|-----|----|
| Is not colored | | |
| Is obtained from atropine | | |
| Is produced in the keratinocytes | | |
| Derives from tyrosine | | |

UV Radiation

| | yes | no |
|--|-----|----|
| UV does not generate ROS | | |
| DNA damage involves AG pairs | | |
| UVC is below 200 nm | | |
| UVA and UVB have the same effect on the skin | | |

IR radiation

| | yes | no |
|--|-----|----|
| IR directly damage DNA | | |
| IR does not generate ROS | | |
| IR penetrates through the skin less than UV | | |
| Is absorbed by CO ₂ but not by H ₂ O | | |

Visible radiation

| | yes | no |
|--|-----|----|
| Vis generate ROS | | |
| Vis directly damages DNA | | |
| Has no effect on the skin | | |
| Is partially scattered by the atmosphere | | |

SPF

| | yes | no |
|--|-----|----|
| If high, a lot of light passes through | | |
| Cannot be 11 | | |
| Cannot be measured in-vivo | | |
| Can be measured with a spectrophotometer | | |

ITA

| | yes | no |
|---|-----|----|
| Is a measure of the individual response to light exposure | | |
| Does not depend on the content of melanin | | |
| Requires color coordinate a* | | |
| Is a measure of the individual response to light exposure | | |

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Tanning

| | yes | no |
|---|-----|----|
| Is always due to an increase in the melanin content | | |
| Can disappear in tens of minutes | | |
| Produces and increase of ITA | | |
| Can be of different types | | |

Antioxidants

| | yes | no |
|---|-----|----|
| Are useless for photoprotection | | |
| Are never present in products for photoprotection | | |
| Enhance the production of ROS | | |
| Are consumed by radicals | | |

MED

| | yes | no |
|------------------------------------|-----|----|
| Is detected from b* | | |
| Is high for fair skin | | |
| Is measured in minutes | | |
| Is indicative for skin cancer risk | | |

Fitzpatrick's scale

| | yes | no |
|---|-----|----|
| Type II present dark skin | | |
| Represents different levels of SPF | | |
| Is not associated to the content of melanin of the skin | | |
| Does not allow to predict cancer risk | | |

Exercise 1 (5 points)

During measurement of MED the following table is obtained

| Time (min) | x | Time (min) | X |
|------------|-----|------------|------|
| 0 | 8.2 | 6 | 9.8 |
| 2 | 8.4 | 8 | 10.5 |
| 4 | 9.2 | 10 | 11.5 |

What is x? After how many minutes MED is reached? If in one minute skin is exposed to 15 mJ/cm² what is the measured MED?

Exercise 2 (3 points)

A solar cream has an SPF=15, what is the percentage of UV light passing through the cream when spread on to the skin? Is SPF for UVA, UVB or UVC?