

## Anticancer potential of antioxidant extract from spent coffee grounds.

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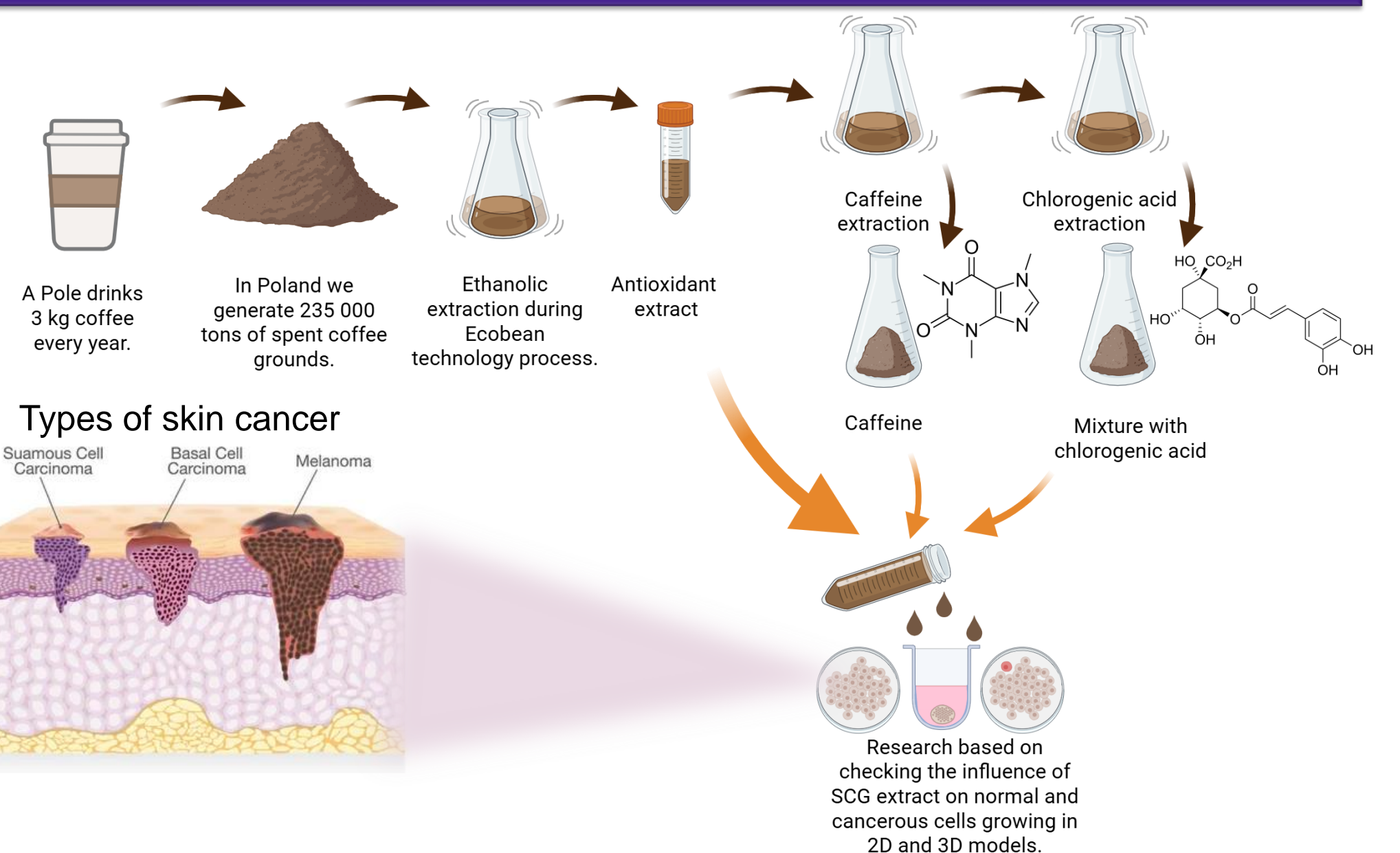
ecobean  
COFFEE WASTE REINVENTED

### RIDDLE

How much spent coffee grounds do we generate as Europeans every year?



### METHODS



### INTRODUCTION & AIM

Coffee is one of the most popular beverages in the world. Europe has the highest consumption of green coffee beans, which generates about 3.4 million tons of spent coffee grounds (SCG) every year. Despite the long and complex processing of coffee beans, SCG still contains numerous valuable compounds, including antioxidants. These compounds have a beneficial influence on various aspects of human health, even anticancer activity. Cancer is one of the leading causes of death worldwide. The skin, as the largest organ of our body, is exposed to dangerous external factors such as ultraviolet radiation, which has been defined as the main cause of skin cancers. This research aims to investigate the possible usage of a full antioxidant extract from SCG as well as single compounds like caffeine and chlorogenic acid in anti-cancer therapies.

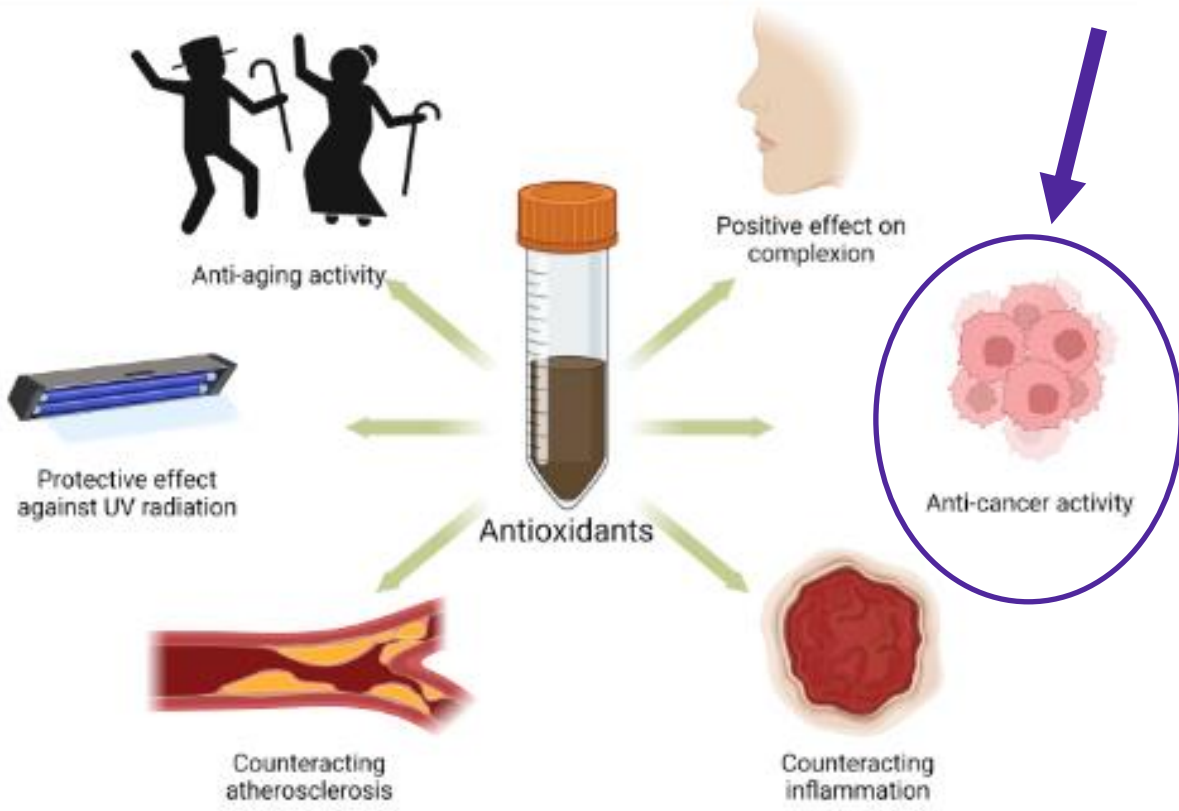


Figure 1. Beneficial properties of antioxidants in the human body [2,3].

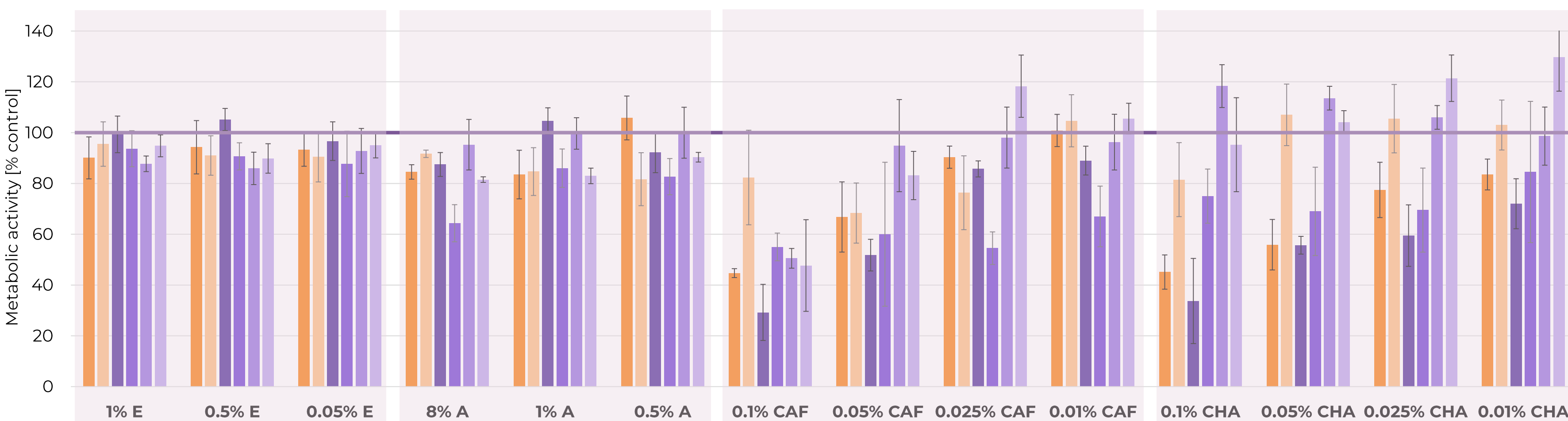
Figure 2. Schematic description of the used methods.

The antioxidant extract, caffeine and chlorogenic acid were obtained during the optimized extraction process. The influence of the obtained compounds and the entire extract on the normal and cancer skin cell lines was checked. The effect on melanoma cells at various metastatic stages and squamous cell carcinoma was tested. The impact of the tested compounds was assessed using cytotoxicity tests such as FDA/PI, MTT and resazurin staining.

### RESULTS & DISCUSSION

#### MTT

HaCaT HFF-1 SCC-15 A-431 WM115 WM266-4

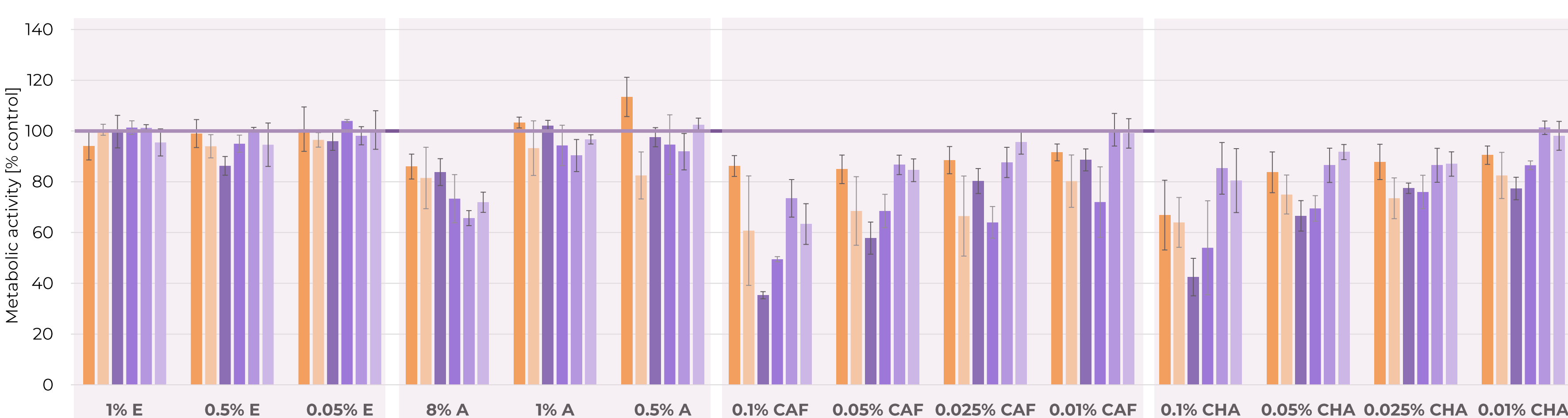


#### Cell lines:

- **HaCaT** - immortal keratinocyte cell line
- **HFF-1** - fibroblast cell line
- **WM115** - primary melanoma cell line
- **WM266-4** - metastatic melanoma cell line
- **SCC-15** - squamous cell carcinoma cell line
- **A-431** - epidermoid carcinoma

#### FDA

HaCaT HFF-1 SCC-15 A-431 WM115 WM266-4



- **E** - ethanolic extract of antioxidants from SCG
- **A** - aqueous extract of antioxidants from SCG
- **CAF** - caffeine from SCG extract
- **CHA** - a mixture with chlorogenic acid

Figure 3 and 4. Results of the MTT and the FDA test, all results were normalized to the corresponding amount and type of solvent.

### CONCLUSION

SCG are a remarkable source of various antioxidants with their possible application in various fields. The research allows us to gain unique knowledge about the impact of antioxidants contained in SCG on the normal and cancerous skin cells.

### FUTURE WORK / REFERENCES

1. Reports of the International Coffee Organization
2. Fusco, D., Colloca, G., Lo Monaco, M. R., & Cesari, M. (2007) Effects of antioxidant supplementation on the aging process
3. Masaki H. (2010) Role of antioxidants in the skin: Anti-aging effects

### ACKNOWLEDGMENTS

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Figure 1 and 2 were created by Biorender.com  
Type of skin cancer from Depositphotos