Untersuchung der Wirkung von Astaxanthin in menschlichen Krebszellen
Effect of Astaxanthin in various human cancer cell lines

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Introduction: Cancer is a leading cause of death worldwide. Natural products have been widely used as medicine for various diseases. Many natural compounds have been at the early stages of drug discovery, while a variety of them has entered clinical evaluation for cancer treatment. Astaxanthin is a xanthophyll carotenoid with anti-inflammatory and oxidative stress-reducing properties. Potential anti-cancer effects of compounds include reduction in proliferation of cancer cells, induction of apoptosis, anti-oxidation, anti-inflammation, and prevention of metastasis. The present study aimed to evaluate the outcome of Astaxanthin extract on the proliferation of human cancer cell lines representing some of the most common cancer types.

Methods: MCF7 (breast adenocarcinoma-hormone sensitive), MDA-MB-231 (breast adenocarcinoma- triple negative), HCT-116 (colon carcinoma), COLO699N (lung cancer), PC3 (prostatic adenocarcinoma-hormone refractory) and LNCaP (prostatic adenocarcinoma-hormone sensitive) cell lines were then cultured with the substance in different concentrations for 24, 48 and 72h. Viability assays were performed by using WST-1 and statistical analysis followed (t-test). p-values < 0.05 were considered to indicate a statistically significant difference. All the reactions were performed in triplicates, while appropriate controls were used. The measurements from the proliferation assay were used to determine the IC50 values with Microsoft Excel 2016.

Cell Lines	Time		
	24h	48h	72h
MCF7	0.5 (p=0.003)	0.4 (p=0.001)	0.31 (p=0.003)
MDA-MB-231	1.16 (p=0.02)	0.57 (p=0.0001)	0.6 (p=0.0005)
HCT116	>1.5 (p=0.6)	1.1 (p=0.002)	>1.5 (p=0.06)
COLO699N	0.53 (p=0.002)	0.46 (p=0.07)	0.46 (p=0.007)
PC3	0.52 (p=0.0008)	0.77 (p=0.0002)	0.55 (p=0.04)
LNCaP	1.06 (p=0.1)	0.26 (p=0.002)	0.27 (p=0.01)

Table . IC50 values (mM) with WST-1 assay, p<0.05 (statistically significant result)

Results: All cell lines, except HCT116, exhibited IC50 value lower than 1 mM at 48h and 72h. The lowest values (0.26 mM at 48h and 0.27 mM at 72h) were observed at LNCaP cell line. MCF7, COLO699N and PC3 exhibited 0.5 mM IC50 values on average at all time points. IC50 value over 1 mM was observed at all time points for HCT116 and at 24h for MDA-MB-231 and LNCaP.

Conclusion: It has been demonstrated that Astaxanthin affects the proliferation of the above cancer cell lines. The exact mechanism of action is not yet elucidated, but it is likely that astaxanthin modulates signaling pathways involved in cancer growth and metastasis. All cell lines exhibited similar IC50 values apart from HCT116 and MDA-MB-231. Overall, LNCaP demonstrated the highest sensitivity to Astaxanthin, while HCT116 was the most resistant. Further studies to evaluate the anti-apoptotic, anti- inflammatory, antioxidant and anti-metastatic properties of astaxanthin are needed to support its use as a potential anticancer agent.

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Disclosure of Potential Conflicts of Interest

None of the authors of the above study has declared any conflict of interest

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