Efek xylitol terhadap viabilitas dan profil protein sel-sel pulpa gigi (in vitro)

Bayu Rahadian, examiner

Abstrak

Latar belakang: xylitol adalah gula alkohol berantai karbon lima (polyol) yang banyak digunakan sebagai pemanis alami dalam bentuk permen karet untuk mencegah karies gigi. Xylitol memiliki efek antikaries karena dapat menghambat pertumbuhan S. mutans yang merupakan salah satu agen utama penyebab karies gigi, menurunkan pembentukan plak dan meningkatkan remineralisasi gigi. Pulpa gigi berperan penting bagi vitalitas gigi. Pada pulpa gigi yang terbuka, xylitol dapat berpenetrasi dan menimbulkan efek biologik pada sel.
Tujuan: untuk mendeteksi efek xylitol terhadap viabilitas dan profil protein sel-sel pulpa gigi (in vitro).
Metode: sel-sel pulpa gigi didapat dari gigi sehat yang baru diekstraksi, dan dikultur dalam medium kultur DMEM (37°C, 5% CO2) hingga confluent. Selanjutnya sel-sel tersebut disubkultur pada kondisi yang sama selama semalam di 24-wellplate. Setelah itu kelompok perlakuan dipaparkan xylitol dengan konsentrasi 2%, 4%, 8% dan 16%. Sedangkan pada kelompok kontrol tidak diberi xylitol. Viabilitas sel diukur dengan MTT assay. Sedangkan profil protein dianalisis dengan SDS PAGE.
Hasil: rerata optical density (OD) kelompok xylitol 2% (1,784 ± 0,052), 4% (2,465 ± 0,057), 8% (2,168 ± 0,162), dan 16% (1,912 ± 0,148) lebih tinggi dibandingkan dengan kelompok kontrol (1,566 ± 0,069). Uji statistik Oneway ANOVA menunjukkan bahwa seluruh kelompok perlakuan berbeda bermakna dengan kontrol ($p<0,05$). Persentase viabilitas sel diperoleh dari rerata optical density. Viabilitas sel kelompok xylitol 2% (113,92%), 4% (157,40%), 8% (138,44%), dan 16% (122,09%) lebih tinggi dibandingkan dengan kelompok kontrol (100%). Dari hasil SDS PAGE, tampak perubahan profil protein sel-sel pulpa gigi.
Simpulan: terdapat peningkatan viabilitas sel dan perubahan profil protein sel-sel pulpa gigi setelah pemaparan xylitol.
<hr><i>Background: xylitol is five carbon sugar alcohol (polyol) which is used as natural sweetener in chewing gum to prevent dental caries. Xylitol has anticaries effect as it can inhibit the growth of S. Mutans, one of the main etiology of dental caries, decrease plaque formation, and increase tooth remineralization. Dental pulp has an important role in dental vitality. In exposed dental pulp, xylitol can penetrate and induce biological response of the cells.
Objective: to detect the effects of xylitol to cell viability and protein profile of dental pulp cells (in vitro).
Method: dental pulp cells were obtained from healthy and freshly extracted teeth, and were cultured in DMEM (37°C, 5% CO2) until confluent. Subsequently, they were subcultured in same condition overnight on 24-well plate. Afterwards, the treatment groups were exposed by 2%, 4%, 8%, and 16% xylitol. Whilst, the control group was not exposed by xylitol. Cell viability was measured by MTT assay. Whereas, the protein profile was analized by SDS PAGE.
Results: the mean of optical density of treatment group with xylitol 2% (1,784 ± 0,052), 4% (2,465 ± 0,057), 8% (2,168 ± 0,162), and 16% (1,912 ± 0,148) were higher than control group (1,566 ± 0,069). Statistical test Oneway ANOVA showed that all the treatment groups were significantly different compared with the

control ($p<0,05$). The percentage of cell viability was obtained from the mean of optical density. The cell viability of xylitol 2% (113,92%), 4% (157,40%), 8% (138,44%), dan 16% (122,09%) were higher than control group (100%). From SDS PAGE, there was protein profile alteration.
Conclusion: there was an increased of cell viability and the alteration of protein profile of dental pulp cells after treated with xylitol.</i>