

INTISARI

LATAR BELAKANG Oligonukleotida p27Kip1 sense memiliki aktivitas hambatan pertumbuhan terhadap sel limfoma Burkitt yang belum optimum karena rentan terhadap degradasi nuklease, endosom/lisosom, dan waktu paruh yang relatif rendah untuk terapi sistemik. Penggunaan vektor *organically modified silica* berbasis ampas tebu yang kaya kandungan silika berpotensi dikembangkan untuk meningkatkan aktivitas terapi gen p27Kip1 sense. **TUJUAN** untuk menganalisis secara deskriptif potensi kombinasi oligonukleotida p27Kip1 sense dan vektor ORMOSIL berbasis ampas tebu terhadap hambatan pertumbuhan sel limfoma Burkitt oral. **METODE** Sumber literatur didapat dari PubMed, Cochrane, EBSCOhost, Google Scholar dan ISJD. Penelusuran literatur menggunakan kata kunci '*oligonucleotide*', 'p27Kip1', '*Burkitt lymphoma*', 'hambatan pertumbuhan sel', '*organically modified silica*', dan 'ampas tebu'. Literatur yang diperoleh ditapis berdasarkan relevansi dengan topik bahasan, kriteria inklusi, dan eksklusi. Literatur yang masuk kriteria inklusi dan eksklusi kemudian dianalisis dan disintesis sesuai topik bahasan. **HASIL** Injeksi oligonukleotida p27Kip1 sense meningkatkan ekspresi protein p27Kip1 dalam sel limfoma Burkitt oral. Protein p27Kip1 mengikat kompleks cyclin E/CDK2 dan meningkatkan ekspresi miR-223 sehingga siklus sel terhenti pada fase G₀-G₁. Vektor *organically modified silica* meningkatkan efikasi gen melalui perlindungan terhadap nuklease, endosom, dan lisosom karena keberadaan gugus amino, memberi efek *sustained release* sebesar 70% dalam 14 hari, dan biodistribusi sebesar 75% dalam 24 jam. Ekstraksi natrium silikat dengan kemurnian 95,4% sebagai bahan dasar *organically modified silica* dari ampas tebu dapat diperoleh dengan pembakaran pada suhu 700-800°C selama 1-2 jam dan *acid treatment* menggunakan asam sitrat, kemudian diekstraksi dengan natrium hidroksida. **KESIMPULAN** Kombinasi oligonukleotida p27Kip1 sense dan vektor *organically modified silica* berbasis ampas tebu berpotensi untuk meningkatkan hambatan pertumbuhan sel limfoma Burkitt oral.

Kata kunci: oligonukleotida, p27Kip1, limfoma Burkitt oral, hambatan pertumbuhan sel, *organically modified silica*, *Saccharum officinarum* L.

ABSTRACT

BACKGROUND The ability of p27Kip1 sense oligonucleotide to induce cell growth inhibition on oral Burkitt lymphoma has not been optimized yet due to its vulnerability from nuclease, endosome, and lysosomal degradations. It also has relatively low half-life period especially for systemic therapy. The use of sugarcane bagasse-based organically modified silica vector was potentially developed to increase the therapeutic activity of p27Kip1 sense oligonucleotide. **OBJECTIVE** To descriptively analyze the potential of p27Kip1 sense and sugarcane bagasse-based organically modified silica vector combination on oral Burkitt lymphoma cell's growth inhibition. **METHOD** Literature sources were obtained from PubMed, Cochrane, EBSCOhost, Google Scholar, and ISJD. 'Oligonucleotide', 'p27Kip1', 'Burkitt lymphoma', 'cell growth inhibition', 'organically modified silica', and 'sugarcane bagasse' were used as keywords. Literatures were filtered based on relevancy to the topic, inclusion, and exclusion criteria. Literatures were analyzed and synthesized based on topic of discussion. **RESULT** The p27Kip1 protein expression was increased in oral Burkitt lymphoma cells due to p27Kip1 sense injection. The oral Burkitt lymphoma cell's cycle was inhibited by p27Kip1 at the G₀-G₁ phase due to inactivation of cyclin E/CDK 2 complexes and increased miR-223 expression. The gene therapy efficacy was increased by organically modified silica due to its sustained release effect of 70% in 14 days and biodistribution of 75% within 24 hours. The gene was protected by organically modified silica from nucleases, endosomes, and lysosomes because the presence of amino groups. Sodium silicate with 95,4% purity can be obtained from sugarcane bagasse by incineration at 700-800°C for 1-2 hours and acid treatment using citric acid. **CONCLUSION** The combination of p27Kip1 sense oligonucleotide and bagasse-based organically modified silica vector has a potency to increase growth inhibition against oral Burkitt lymphoma cells.

Keywords: oligonucleotide, p27Kip1, oral Burkitt lymphoma, cell growth inhibition, organically modified silica, *Saccharum officinarum* L