

# Fragmentasi Nimotuzumab untuk preparasi $^{125}\text{I-F(ab')}_2$ -Nimotuzumab sebagai radiofarmaka terapi kanker = Fragmentation Nimotuzumab for preparation $^{125}\text{I-F(ab')}_2$ -Nimotuzumab as radiopharmaceutical cancer therapy / Ratna Dini Haryuni

Ratna Dini Haryuni, author

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## Abstrak

Nimotuzumab merupakan agen antikanker yang termasuk dalam kelompok inhibitor Epidermal Growth Factor Receptor (EGFR). Monoklonal antibodi ini memiliki berat molekul yang relatif besar sehingga tidak baik digunakan pada pencitraan kinetika, penetrasi pada sel tumor cenderung lemah dan berpotensi memunculkan respon antibodi. Oleh karena itu pada penelitian ini dilakukan fragmentasi terhadap nimotuzumab menjadi bentuk antibodi bivalen  $\text{F(ab')}_2$ . Fragmen ini kemudian ditandai dengan  $^{125}\text{I}$  menjadi  $^{125}\text{I-F(ab')}_2$ -nimotuzumab yang diharapkan potensial digunakan sebagai radioimunoterapi. Tujuan penelitian ini adalah memperoleh data karakteristik dari  $^{125}\text{I-F(ab')}_2$ -nimotuzumab dengan menggunakan pembandingan nimotuzumab utuh bertanda  $^{125}\text{I}$  ( $^{125}\text{I-nimotuzumab}$ ). Tahap awal pada penelitian ini adalah memurnikan sampel nimotuzumab dengan cara dialisis. Nimotuzumab yang telah dimurnikan kemudian difragmentasi menggunakan pepsin menjadi  $\text{F(ab')}_2$ -nimotuzumab.  $\text{F(ab')}_2$  yang diperoleh dimurnikan dari hasil samping proses fragmentasi dengan menggunakan kolom PD-10 Sephadex G25. Nimotuzumab utuh dan fragmen  $\text{F(ab')}_2$  kemudian ditandai dengan  $^{125}\text{I}$ . Radiolabeling nimotuzumab utuh dan fragmen menghasilkan kemurnian radiokimia  $^{125}\text{I-nimotuzumab}$  dan  $^{125}\text{I-F(ab')}_2$ -nimotuzumab masing-masing adalah 98,27% dan 93,24 %.

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Nimotuzumab is an anticancer agent which belongs to the inhibitor group of Epidermal Growth Factor Receptor (EGFR). This monoclonal antibody has a relatively high molecular weight which makes slow penetration on tumor cell, as consequence, it is less attractive in imaging kinetics, and potentially elicits antibodies respons. Therefore in this study nimotuzumab was fragmented to form bivalent antibody [ $\text{F(ab')}_2$ ] and then labeled with  $^{125}\text{I}$  to form  $^{125}\text{I-F(ab')}_2$ -nimotuzumab which was expected to be potential for radioimmunotherapy. The aims of this study were to obtain a characteristic of  $^{125}\text{I-F(ab')}_2$ -nimotuzumab by comparing with the  $^{125}\text{I}$  labeled-intact nimotuzumab ( $^{125}\text{I-nimotuzumab}$ ). This study was initiated by purifying nimotuzumab by mean of dialysis. The purified nimotuzumab was then fragmented by using pepsin. The  $\text{F(ab')}_2$ -nimotuzumab formed was then purified from its by-products which formed in fragmentation process by using a PD-10 column (consisted Sephadex G25). The intact nimotuzumab and its  $\text{F(ab')}_2$  fragment were then labeled with the  $^{125}\text{I}$  to form  $^{125}\text{I-nimotuzumab}$  and  $^{125}\text{I-F(ab')}_2$ -nimotuzumab. Radiolabeling of intact nimotuzumab and its  $\text{F(ab')}_2$ -nimotuzumab resulted in  $^{125}\text{I-nimotuzumab}$  and  $^{125}\text{I-F(ab')}_2$ -nimotuzumab with radiochemical purity of 98,27 % and 93,24 % respectively.