

Penentuan Saat Kematian Berdasarkan Pembentukan Cincin Darah dan Degradasi RNA

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INTISARI

Penentuan saat kematian merupakan hal yang krusial dari pengungkapan kasus tindak pidana. Metode yang digunakan untuk menentukan saat kematian sejauh ini hanya berdasarkan keadaan mayat yang ditemukan, sehingga dibutuhkan metode baru untuk meningkatkan estimasi ketepatan penentuan saat kematian. Penelitian ini bertujuan untuk menentukan saat kematian berdasarkan metode baru yaitu pembentukan cincin darah dan degradasi RNA. Darah umum ditemukan dalam Tempat Kejadian Perkara. Darah terdiri dari bagian cairan yaitu plasma dan bagian selular yang terdiri dari sel darah merah, sel darah putih, dan keping darah. penelitian ini menggunakan darah bertipe ABO yang diambil dari probandus yang memberikan *consent*. *Coffee ring effect* digunakan sebagai indikator waktu dengan cara melihat ketebalan cincin darah dari bagian tepi ke bagian tengah yang bertambah seiring dengan berjalannya waktu. Penelitian cincin darah dilakukan di Laboratorium Genetika dan Pemuliaan Fakultas Biologi UGM. Degradasi RNA dilihat menggunakan gen *Peptidylprolyl isomerase A* (*PPIA*). Gen *PPIA* terdapat di sel darah putih dan digunakan untuk melihat degradasi RNA per satuan waktu dengan metode RT-PCR dan qPCR. Degradasi dilihat dengan cara membandingkan nilai *cycle threshold* (*ct*) kurva standar dengan nilai *ct* sampel per satuan waktu. RT-PCR dan qPCR dilakukan di Laboratorium Rekayasa Genetika, Pusat Studi Bioteknologi UGM. Data hasil penelitian menunjukkan penentuan saat kematian bisa dilakukan menggunakan persentase ketebalan cincin darah hingga menit ke 120, dan penentuan saat kematian dengan cara mengamati degradasi RNA hingga menit ke 60 karena setelahnya RNA telah terdegradasi secara total.

Kata kunci : saat kematian, *coffee-ring effect*, gen *PPIA*, degradasi RNA, *RT-qPCR*

Determination of Time of Death Based on Blood Ring Formation and RNA Degradation

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ABSTRACT

Determination of the time of death is crucial to the disclosure of criminal cases. The method used to determine the time of death so far is only based on the state of the corpse found, therefore a new method is needed to improve the accuracy of the determination of the time of death. This study aims to determine the time of death based on a new method, namely the formation of blood rings and RNA degradation. Blood is commonly found in crime scenes. Blood consists of liquid part that is plasma and cellular part consisting of red blood cells, white blood cells, and platelets. The composition of blood as a liquid that contains dissolved solids makes the drops of dried blood forming coffee-ring effect, which is a ring-like that forms on the outside of the drops of blood. Coffee-ring effect is used as an indicator of time by looking at the thickness of the blood ring formed from the perimeter of the blood drop to the middle which increases with time. The blood ring research will be carried out in Laboratory of Genetics and Breeding, Faculty of Biology UGM. RNA degradation was observed using Peptidylprolyl isomerase A (PPIA) gene. The PPIA gene is found in white blood cells and is used to see the degradation of RNA per unit time using the RT-PCR and qPCR methods. Degradation is seen by comparing the cycle threshold (CT) value of the standard curve with the sample CT value per unit time. RT-PCR and qPCR were carried out at the Genetic Engineering Laboratory, UGM Center for Biotechnology Studies. The research data showed that the time of death could be determined by the percentage of the blood ring thickness up until 120th minutes, and time of death determination by observing the degradation of RNA until the 60th minute, after that the RNA had completely degraded.

Keywords: time of death, coffee-ring effect, PPIA gene, RNA degradation, RT-qPCR