

## INTISARI

### **POLIMORFISME GEN *UNCOUPLING PROTEIN 2* (UCP2) PADA ORANG OBESE DI YOGYAKARTA**

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**Latar belakang:** Obesitas merupakan permasalahan dunia yang prevalensinya selalu meningkat dari tahun ke tahun. Pada tahun 2014, 1,9 milyar (39%) mengalami *overweight* dan 600 juta diantaranya positif obesitas. Obesitas merupakan penyakit multifaktorial yang disebabkan oleh banyak gen dengan lingkungan. UCP2 merupakan salah satu gen yang terkait dengan obesitas terutama dalam pengaturan termogenesis tubuh. Polimorfisme gen UCP2 Ala55Val dan insersi/delesi 45-*bp* dapat menyebabkan menurunnya pengeluaran energi saat istirahat (REE-24h) dan penurunan oksidasi asam lemak sehingga dapat meningkatkan risiko obesitas. Dengan demikian, individu dengan alel T dan alel I cenderung mengalami risiko obesitas lebih tinggi dibanding alel C dan D (*wild type*).

**Tujuan:** Studi ini bertujuan untuk mengkaji frekuensi genotip dan alel polimorfisme gen UCP2 Ala55Val dan insersi/delesi 45-*bp* serta mengkaji faktor risikonya terhadap obesitas.

**Metode:** Studi ini menggunakan subjek sehat etnis Jawa berjumlah 200 diklasifikasikan sebagai kelompok obese (n=100) dan nonobese (n=100). Pemeriksaan genotip gen UCP2 Ala55Val menggunakan metode PCR-RFLP, sedangkan genotip insersi/delesi 45-*bp* menggunakan metode PCR.

**Hasil:** Polimorfisme Ala55Val pada kelompok laki-laki menunjukkan bahwa genotip TT dan alel T menurunkan risiko obesitas secara signifikan (OR 0.39; 95% CI 0.18-0.86; p=0.02 untuk genotip TT dan OR 0.55; 95% CI 0.32-0.95; p=0.03 untuk alel T) sedangkan pada perempuan tidak signifikan. Polimorfisme insersi/delesi 45-*bp* pada kelompok laki-laki menunjukkan bahwa genotip II dan alel I meningkatkan risiko obesitas secara signifikan (OR 9.76; 95% CI 1.14-83.14; p=0.01 untuk genotip II dan OR 3.04; 95% CI 1.46-6.33; p=0.002 untuk alel I), sedangkan pada perempuan menunjukkan bahwa genotip DI dan alel I menurunkan risiko obesitas secara signifikan (OR 0.33; 95% CI 0.13-0.84; p=0.02 untuk genotip DI dan OR 0.34; 95% CI 0.15-0.77; p=0.008 untuk alel I).

**Kesimpulan:** Hasil studi ini menunjukkan bahwa individu dengan polimorfisme gen UCP2 Ala55Val dan insersi/delesi 45-*bp* memiliki asosiasi terhadap obesitas pada etnis Jawa di Yogyakarta setelah dilakukan stratifikasi gender.

**Kata Kunci:** Gen UCP2, Ala55Val. Insersi/delesi 45-*bp*, obesitas, etnis Jawa

## ABSTRACT

### **GENETIC POLYMORPHISMS OF UNCOUPLING PROTEIN 2 (UCP2) AMONG INDIVIDUALS WITH OBESITY IN YOGYAKARTA**

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**Background:** Obesity is a worldwide problem that its prevalence is increasing from year to year. In 2014, almost 1,9 billion individuals (39%) were overweight and 600 million of them were obese. Obesity is a complex premorbid condition that is affected by the multiple genes, the environment and their interaction. Uncoupling Protein 2 is one of genes that is associated with obesity especially in thermogenesis regulatory. Polymorphisms of the Ala55Val and 45-bp insertion/deletion of UCP2 gene can decrease resting energy expenditure (REE-24h) and decrease fatty acid oxidation, thereby increasing the risk of obesity. Thus, individuals with T and I alleles tend to have higher risk of obesity than C and D (wild type) alleles.

**Objectives:** This study was aimed to investigate the frequency of the genetic polymorphisms of Ala55Val and 45-bp insertion/deletion of UCP2 gene and to analyze risk factor of these genetic variants in obesity.

**Methods:** This study was involved 200 subjects of Javanese Ethnic, in which 100 subjects with and 100 subjects without obesity. Genotyping of Ala55Val of UCP2 gene was detected using PCR-RFLP, while genotyping of 45-bp insertion/deletion of UCP2 gene was detected using PCR. A chi-square test was used to analyze data with  $p < 0.05$  considered as significant.

**Results:** Polymorphism of Ala55Val of male group showed that TT genotype and T allele significantly decreased the risk of obesity (OR 0.39; 95% CI 0.18-0.86;  $p=0.02$  for TT genotype and OR 0.55; 95% CI 0.32-0.95;  $p=0.03$  for T allele) while in the female, there was not significant. Polymorphism of insertion/deletion of 45 bp of male group showed that II genotype and I allele significantly increased the risk of obesity (OR 9.76; 95% CI 1.14-83.14;  $p=0.01$  for II genotype and OR 3.04; 95% CI 1.46-6.33;  $p=0.002$  for I allele), while in the female showed that DI genotype and I allele significantly decreased the risk of obesity (OR 0.33; 95% CI 0.13-0.84;  $p=0.02$  for DI genotype and OR 0.34; 95% CI 0.15-0.77;  $p=0.008$  for I allele).

**Conclusion:** In conclusion, our results suggest that UCP2 gene polymorphisms of Ala55Val and 45-bp insertion/deletion are associated with the risk of obesity in Javanese Ethnic of Yogyakarta after gender stratification.

**Keywords:** UCP2 gene, Ala55Val. 45-bp insertion/deletion, obesity, Javanese ethnic