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A new regulating protein of the ubiquitylation of human PCNA

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Stalled replication machinery on the DNA is a critical threat to the cell, since it can collapse, leading to the accumulation of genetic changes or cell death. Stalling can occur when the replicative polymerase is unable to process beyond a particular point for any reason, such as when DNA damage is encountered through which the polymerase cannot replicate. Upon stalling of the replication fork cell will die if there is no resolution to this problem. However, there are several strategies that the cell may employ to rescue the replication fork. These are often collectively called damage tolerance pathways, since the lesion is not repaired, but "tolerated" as the cell finds a way to overcome the defect of replication stalling. These mechanisms include DNA damage bypass, homologous recombination (HR)-dependent repair and non-homologous end-joining (NHEJ)-dependent repair to deal with fork collapse. Although replication stalls frequently a delicate balance of damage bypass, homologous recombination and non-homologous end-joining could ensure survival and at the same time effectively prevent increased mutagenesis, gross chromosomal rearrangement, and carcinogenesis.

Genomic instability has been documented as a preceding step for multiple inactivations of tumor suppressor genes and activations of proto-oncogenes that can lead to cancer. In our study we are focusing on the regulation of the ubiquitylation of PCNA to give more insight into the regulation of DNA damage tolerance pathways. We identified a new player which has role in regulation of PCNA ubiquitylation.

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Changes in birth weight and developmental status of newborns in 20 years in Szeged

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The developmental status of a newborn baby depends on several factors, but mostly on the physical status of the mother and her lifestyle, and living circumstances.

Therefore the monitoring of the changes of birth data is necessary to understand better the changes of the health status of a nation. Both high and low birth weight means risk factor for the neonate and the mother also. Several studies pointed out that there is an acceleration of birthweight parallel with the growing rate of obesity, and the two can have connections. Studying the changes of the developmental status of newborns offers us a special view of the health status of Hungary. Socio-economical changes of Hungary since the change of the system in 1989 have an indirect impact on the health status of Hungary – which can be measured by health and developmental status of newborns.

Data of newbornes born in 1989, 1999, 2004 and 2009 were collected at the Obstetrics and Gynaecology Department, University of Szeged. Body sizes were measured by clinical staff. Data of mothers and pregnancy were collected while admission to the hospital. We studied the singleton birth in three categories according to birth weight. Birth weight categories were set the followings: 0-2499g: small birth weight, 2500-3999g: normal birth weight, and 4000-6000g: macrosom babies. Statistical analysis was carried out with Microsoft Excel and SPSS 14.0. We assigned the level of significance at 0.05.

In the four studied year 8430 babies were born. Among 8142 singleton birth 6784 babies (83.31%) were born with normal birth weight, and 626 babies (7.68%) were macrosoms. In 20 years the mean average of maternal age, birth weight of babies are rising, and are significantly different in the four years when counting all newborns. The maternal age rose with 3.58 yr, the average bodyweight rose with 77.72g in the normal bodyweight group, the difference is significant among the 4 years averages. Numbers of birth, and cesarean section rose too. Birth weight rose significantly both by boys and girls of 20 yrs perspective. In both gender there is a significant change of bodyweight, bodylength, and maternal age. In the macrosom group we found significant difference in the mean of maternal age in both gender, but in bodylength just in the boy group, and in length of gravidity in the girl group.

We found a rising rate in birth weight and maternal age in our sample collected at the Department of Obstetrics and Gynaecology, University of Szeged. The changing rate is typical in almost all western countries, and suggests it is worth to pay attention to in Hungary as well. Change of lifestyle since the change of the system is visible in our sample also by the growing rate in almost all of our factors. The growing frequency of overweight and obesity in Hungary too may have showed its impact on birth weight also.

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