

SELINA – cancer risk after optimization of selenium and arsenic blood levels in females with inherited predispositions to breast cancer

SELINA is a clinical study on influence of selenium blood levels optimization on cancer occurrence in females from families with increased risk of hereditary breast cancers.

7456 women at the age of at least 40 years have been recruited from centers in Poland. According to planned protocol, 60 months after recruitment, decoding was performed. Compliance rate was 84%. Intervention did not cause undesired effects in any arm.

The strongest positive effects were noted in subgroups of BRCA1(-) (without occurrence of Polish founder constitutional mutations): Selenium deficiency (blood level $<98\mu\text{g/l}$) on supplement Sel-BRCA1[®] (ethanol solution of sodium selenite), placebo or diet and selenium excess (blood level $>108\mu\text{g/l}$) on diet. In all above subgroups combined, cancer risk was decreased ~5 times provided both Arsenic and Selenium levels were analysed. The index risk of cancer (IRC) was created of Se level ($\mu\text{g/l}$) plus As level multiplied by 50. Optimal IRC was 135-145. IRC 134-145 correlated with almost 5-fold decreased risk of cancers – HR 4.95; CI 1.8-13.8; $p=0.002$.

Summary:

1. Diet/supplement optimization of Se deficiency and/or excess in females with hereditary predisposition to breast cancer are safe.
2. Lowering of cancer risk in females can be achieved basing on combined analyses of blood levels of Se and As.

Authors: Lubinski J^{1,2}, Marciniak W², Derkacz R², Huzarski T^{1,2,3}, Gronwald J^{1,2}, Cybulski C^{1,2}, Dębniak T¹, Matuszczak M¹, Kiljanczyk A¹, Stachowski A¹, Piesik P¹, Krauze W¹, Lubinski K¹, Ashuryk O¹, Tołoczko-Grabarek A¹, Stachowska E⁴, Lubinski W⁵, Godlewski D⁶, Tomczak A⁶, Posmyk R⁷, Kilar E⁸, Czajka D⁶, Dach K⁹, Janowska M¹⁰, Jasiewicz A¹⁰, Kozak-Klonowska B¹¹, Kluz T¹⁰, Kluza K¹⁰, Leśniewicz R⁷, Siótek M¹¹, Szwiec M¹², Tomiczek-Szwiec J¹², Wiśniowski R¹³

1 International Hereditary Cancer Center, Department of Genetics and Pathology, Pomeranian Medical University in Szczecin, Szczecin, Poland

2 Read-Gene SA, Grzeczynica, Poland

3 Department of Clinical Genetics and Pathology, University of Zielona Góra, Zielona Góra, Poland

4 Department of Human Nutrition and Metabolomics, Pomeranian Medical University in Szczecin, Szczecin, Poland

5 II Department of Ophthalmology, Pomeranian Medical University, Szczecin, Poland

6 Center of Cancer Prevention and Epidemiology OPEN, Poznań, Poland

7 Podlasie Medical Center "Genetics", Genetic Clinic, Białystok, Poland

8 Independent Public Health Care Center, Oncology Clinic, "Kite" Hospital, Świdnica, Poland

9 Voivodship Hospital in Łomża, Department of Pathology and Oncological Prevention, Łomża, Poland.

10 Podkarpackie Oncology Center, Rzeszów, Poland

11 Holly Cross Cancer Center, Kielce, Poland

12 Opole Oncology Center, Opole, Poland

13 Beskid Oncology Center, Bielsko-Biała, Poland

Acknowledgements: Putresza E, Gibaszek R

Grant: INNOMED/I/16/NCBR/2014