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A comparative study of glycoproteomes in androgen-sensitive and -independent prostate cancer cell lines

Anna Drabik · Dorota Ciołczyk-Wierzbicka · Joanna Dulińska-Litewka · Anna Bodzoń-Kułakowska · Piotr Suder · Jerzy Silberring · Piotr Laidler

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Abstract Prostate cancer is one of the most common malignancies in men and is predicted to be the second leading cause of cancer-related deaths. After 6–18 months, hormone ablation treatment results in androgen-independent growth of cancer cells, metastasis and progression. The mechanism of androgen-independent growth of prostatic carcinoma cells is still unknown. Identification of factors that facilitate the transition from androgen-dependent to independent states is crucial in designing future diagnostics and medication strategies. To understand the biochemical meaning of hormone dependency deprivation, glycoproteins enriched profiles were compared between DU145 (hormone non-responding) and LNCaP (hormone responding) prostate cancer cells. These results allow for anticipation on the important role of glycosylation in malignant transformation. Both Tn antigen and complex antennary *N*-oligosaccharides were recognized. Their occurrence might be involved in the development and progression of tumor, and failure of hormone ablation therapy. Among identified proteins in androgen-sensitive cells nucleolin (P19338) was found that is widely described as apoptosis inhibitor, and also transporter of molecules from the membrane to the cytoplasm or nucleus. In addition, 14-3-3 protein family (P27348, P31946, P61981, P63104, P62258, Q04917, and P31947) was investigated across available databases as it forms stable complexes with glycoproteins. Our studies indicate that isoforms: sigma and eta were found in androgen-dependent prostate cancer cells, while other isoforms were present in androgen non-responding cells. 14-3-3 binding partners are involved in cancer pathogenesis. These findings may contribute to a better understanding of prostate cancer tumorigenesis and to a more efficient prognosis and individual therapy in a future. However, it still remains to be revealed how important those changes are for androgen dependency loss in prostate cancer patients carried out on clinically relevant populations.

Keywords Proteome · Lectin affinity chromatography · Prostate cancer · Cell lines · DU145 · LNCaP

Abbreviations

BME	Beta mercaptoethanol
CBB	Coomassie Brilliant Blue
EDTA	Ethylenediaminetetraacetic acid
FDA	Food and drug administration
HEPES	4(2-hydroxyethyl)-1-piperazineethanesulfonic acid
LAC	Lectin affinity chromatography
nanoLC-MS/MS	Capillary liquid chromatography combined with tandem mass spectrometry
PBS	Phosphate buffered saline
PHA-L	*Phaseolus vulgaris* leucoagglutinin
PTM's	Posttranslational modifications
SDS	Sodium dodecyl sulfate
SDS-PAGE	Sodium dodecyl sulfate polyacrylamide gel electrophoresis

A. Drabik (✉) · A. Bodzoń-Kułakowska · P. Suder · J. Silberring
Department of Biochemistry and Neurobiology, AGH University of Science and Technology, Mickiewicza 30 Ave, 30-059 Krakow, Poland
e-mail: drabik@agh.edu.pl

D. Ciołczyk-Wierzbicka · J. Dulińska-Litewka · P. Laidler
Chair of Medical Biochemistry, Jagiellonian University Medical College, Kopernika 7 Str, 31-034 Krakow, Poland

J. Silberring
Center of Polymer and Carbon Materials, Polish Academy of Sciences, Sowinskiego 5 Str, 44-121 Gliwice, Poland

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