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5th International Conference on
Tissue Engineering & Regenerative Medicine
September 12-14, 2016 Berlin, Germany

Analysis of regeneration pathways in tissue engineered urinary bladder: Microarray data

Marta Pokrywczynska[1], **Arkadiusz Jundzill**[1], **Karolina Warda**[1], **Marta Rasmus**[1], **Lukasz Buchholz**[1] and **Tomasz Drewa**[1,2]
[1]Nicolaus Copernicus University, Poland
[2]Nicolaus Copernicus Hospital, Poland

Background: Development of an effective method of urinary bladder regeneration is associated with identifying the pathways that play a key role in the regeneration process. Until now, the regeneration pathways in tissue engineered urinary bladder have not been determined.

Aim: The aim of this study was to analyze regeneration pathways in the tissue engineered urinary bladder.

Method: The study was performed on 40 Wistar rats. Adipose tissue was harvested from 20 rats and adipose derived stem cells (ADSCs) were isolated. After hemicystectomy, bladders were augmented with bladder acellular matrix (BAM) (n=20) or BAM seeded with ADSCs (n=20). 10 rats were sacrificed in each group after three and six months. The total RNA was isolated from reconstructed bladder wall and then quantity, purity and integrity of RNA were evaluated. Gene expression was evaluated using microarray and GeneSpring software.

Results: Isolated RNA revealed good purity, concentration and RNA integrity number above seven in all samples. Gene expression analysis indicated 711 differentially expressed transcripts in bladders reconstructed with BAM seeded with ADSCs compared to bladders reconstructed with unseeded BAM, six months after the reconstruction and 8 241 differentially expressed genes, three months after the reconstruction. A large number of differentially expressed genes were involved in a lot of pathways, including: B and T cell receptor signaling pathway, IL-3, IL-6, IL-2 and IL-5 signaling pathways, inflammatory response pathway, GPCR signaling pathway and Wnt signaling pathway.

Conclusion: Microarray gene expression analysis allows to create a regeneration patterns in tissue engineered urinary bladder.

The research was supported by a grant from the National Science Center, decision no. DEC-2012/07/D/NZ1/00854

Biography

Marta Pokrywczynska is the Head of the Department of Regenerative Medicine at Nicolaus Copernicus University (NCU) (Bydgoszcz, Poland). She has completed her MSc and PhD in Medical Biotechnology from the NCU. Her research area focuses on “development of new tissue engineering and regenerative medicine technologies”.

marta.pokrywczynska@interia.pl

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