

# Development of textile-based and planar sensors for continuous non-invasive real-time recording of the lactate value curve for diagnostics according to clinical requirements

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## INTRODUCTION

We hereby present the findings for a new technology to produce portable, flexible, long-term stable and high-resolution sensors and measuring systems for individual lactate value recording in body sweat for regenerative and sports.

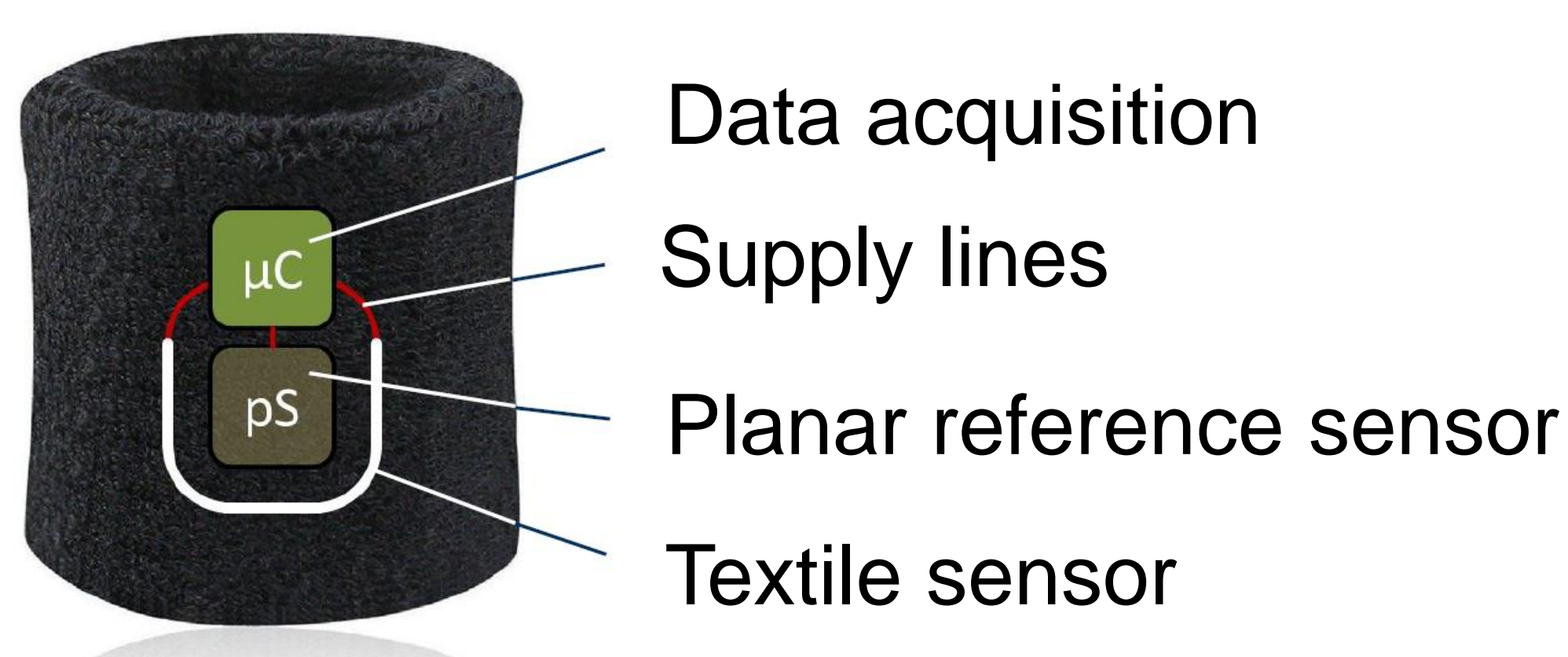
## INTENTION AND INVESTIGATIONS

A main goal of this study has been the identification of application sites according to body sweat quality and quantity, as well as easy accessibility and handling of the measurement site.

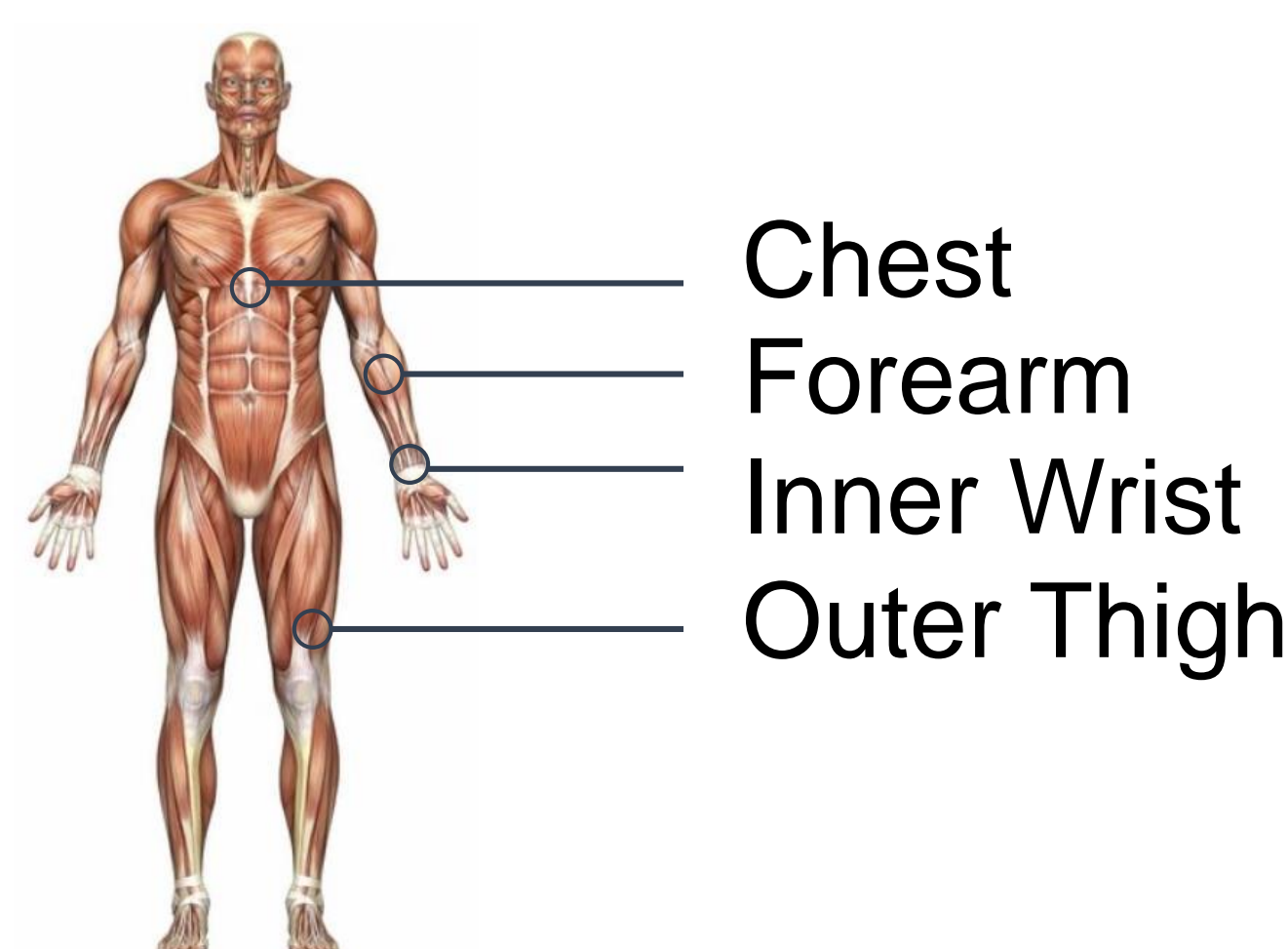
For the continuous recording of the lactate value curve with integrated temperature compensation, new types of multi-functional sensor constructions and evaluation algorithms have been developed that can detect and evaluate these parameters precisely and interference-free in real time in body sweat in order to establish a diagnostic correlation with the clinical, therapeutic and sports medicine performance-oriented application scenarios. For this purpose, suitable planar sensor principles have been investigated and a planar sensor

was developed. A textile-based sensor suitable for long-term use (several hours to several days of use) has been developed as a braided construction. In particular, a functionalized chitosan layer with a sensitive enzyme and several required electrodes wires have been purposefully used.

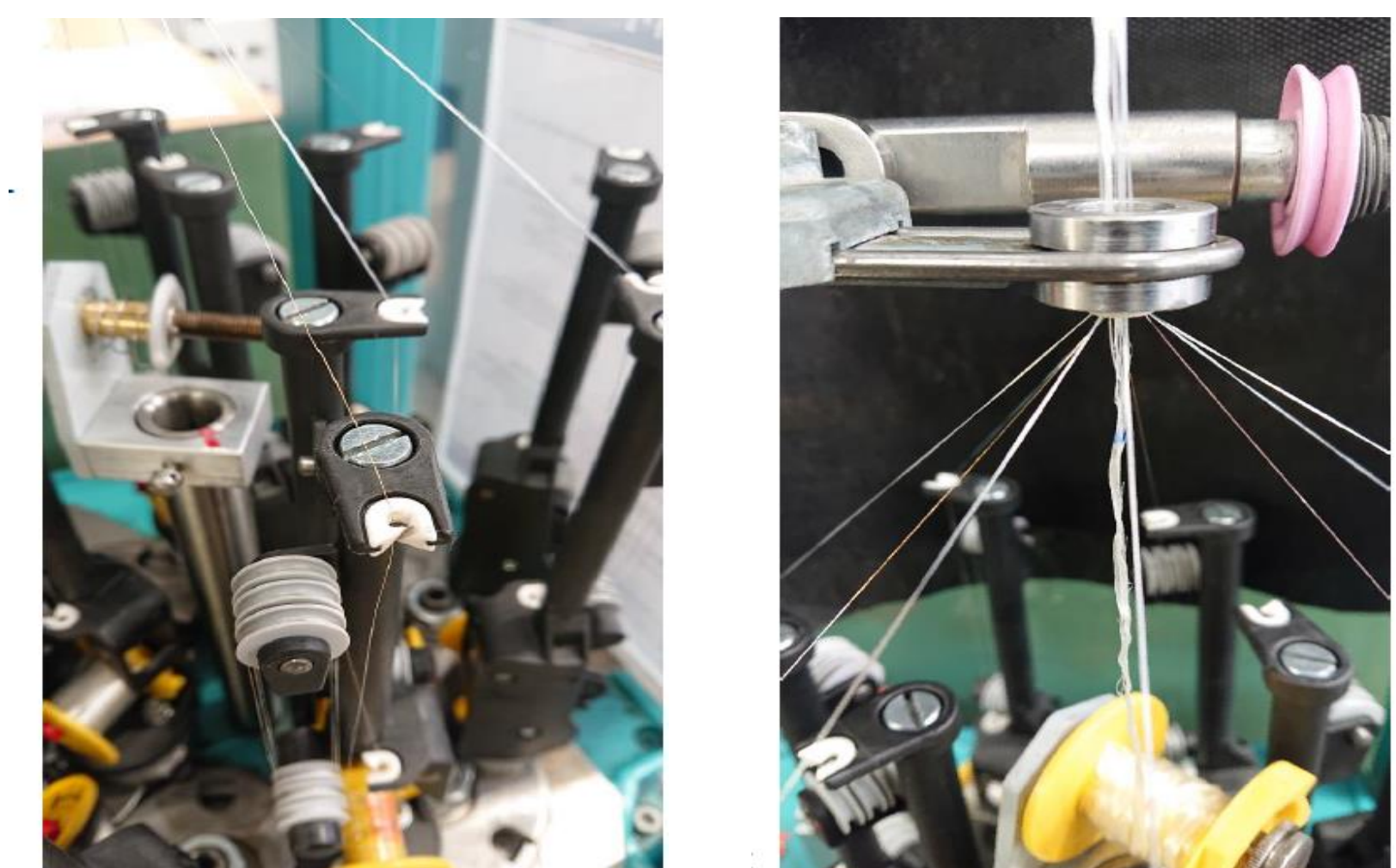
Due to a high selectivity, i.e. clear signal interpretation even in the presence of other substances in body sweat, enzymatic measuring systems in an amperometric measurement design were primarily investigated. The preferred solution of the developed planar sensor is to be used as a reference sensor for calibration and, together with the preferred solution of the textile sensor, is to be integrated into the demonstrators.



Schematic diagram of a demonstrator (sweatband for sports applications)



Location of suitable measuring points for the comparison of blood and sweat lactate



Braiding production of the textile-based sensors

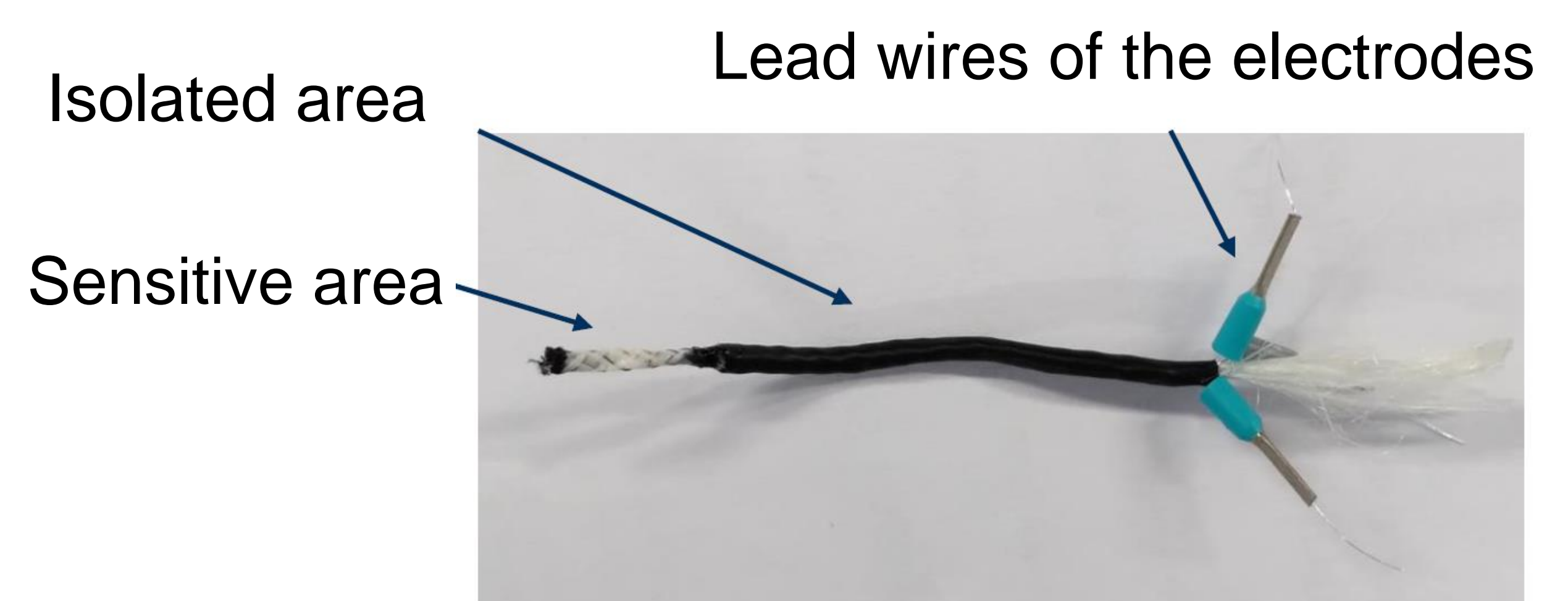
## OUTLOOK

From the intended project results, an immediate direct benefit can be derived for SMEs in the textile manufacturing, finishing and medical products sectors and for the measurement and sensor technology sector.

## PROJECT FUNDING

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Textile-based sensor

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