# COMPARISON OF METHODS TO MEASURE THE PO2

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## Introduction:

Different methods can be used to measure oxygen in the subcutaneous tissue. EPR oximetry using implantable carbon materials has been used both in animals and in pioneer human studies carried out in Dartmouth Medical School. Surprisingly, these EPR studies indicate an apparent low $pO_2$ (10 mm Hg) in the SC tissue. These results are in contradiction with those values obtained so far with invasive methods such as oxygen electrodes used in several studies .Considering these opposite results, we tried to clarify this point using sequential monitoring of $pO_2$ using EPR oximetry and OxyLite probes.

## Materials and Methods:

Sensors were injected intradermically (5*10µl) or in the subcutaneous tissues (50µl) of the leg (NMRI mice). The $pO_2$ was measured by two techniques: EPR oximetry and OxyLite system. $pO_2$ were measured by EPR just before and just after OxyLite (Fig 2).

## Results:

Initial $pO_2$ measurements by EPR oximetry show very low values in subcutaneous area (10 mm Hg). After the insertion of the OxyLite probes, the $pO_2$ recorded using this system indicate significant larger values (around 40 mm Hg). Immediately after the OxyLite measurements, EPR oximetry was again used. The second EPR measurements indicate systematically $pO_2$ increased compared to the first measurement (Fig1) .

## Discussion:

A provocative explanation of this set of experiments is that the use of invasive methods could not be suitable for measurement of $pO_2$ in SC tissue. All EPR results obtained so far are consistent with a very low vascularization of this tissue, with a $pO_2$ dramatically lower than in the well vascularized derma. When inserting a probe in a tissue which is very closed to the aerated surface of the skin, the $pO_2$ measured could be influenced by the track made with the needle. This may explain the high $pO_2$ values recorded after this insertion using both methods.

## Conclusion:

While comparison of oximetry methods is generally valuable in deep tissues, the use of invasive methods near the skin potentially disturb the local pO2.