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COMMENTARY

Expanding electrophysiology research tasks using resected human tissues

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In this issue of *Pflügers Archiv* European Journal of Physiology, Kuijsters et al. introduce an innovate approach to examine the human non-pregnant uterus [4]. They used freshly resected human non-pregnant uteri, which were removed due to heavy or painful menstruations, for electrophysiological studies. Two arrays of recording electrodes were used simultaneously, a two-dimensional 8 × 8 electrode grid located on the external surface and an 8-channel catheter inserted in the uterine cavity. After positioning the electrodes, the organs were wrapped in an aluminium foil to avoid evaporation and to conserve the organ at room temperature in its own humid environment. With this approach, the authors showed that stable electrophysiological signals could be recorded during the first 2 h after hysterectomy. Although most of the specimens were obtained from females in the non-menstruating phase, in one case, the uterus was obtained during the menstrual period and showed a different pattern of electrical activity to those obtained during the non-menstruating period, namely, bursts of planar propagation on the external surface, a comparable activity to that seen during contractions in labour [1].

This study shows the significant value of using uteri that are resected for various reasons from patients and may provide a fertile source of material for further study of the physiology and possibly pathophysiology of the human uterus. This, as the authors state in their summary, is only a first step, and further studies, using larger sample size, obtained during various phases of the menstrual cycle, would advance our knowledge of the human uterus to unprecedented levels. Another further refinement of their approach would be to submerge the excised uterus in an organ-bath filled with Tyrode or similar fluid. This would greatly expand the experimental possibilities, such as recording from larger or other parts of the uterus. Furthermore, all data would then be obtained at 37 °C, which would facilitate comparison with other studies. This approach would also make it possible to study the effect of various pharmacological agents on uterine physiology, thereby further increasing our knowledge on the physiology and pathophysiology of the human uterus.

In fact, this approach need not to be limited to the non-pregnant uterus but could also include other abdominal organs such as (parts of) the stomach (i.e. bariatric surgeries), small and/or large intestines, organs from the urological system, such as the bladder [3] or the ureters [2], etc. In short, using resected human organs and tissues obtained from the operating room for further study in an adjacent laboratory, as described in this issue by Kuijsters [4], would provide us with an enormous wealth of material that would greatly enhance our medical knowledge that ultimately benefit those that we care for, our patients.

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