SAMPLING DEVICE AND METHOD

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Filed: Dec. 4, 1972

Appl. No.: 311,817

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ABSTRACT

A device for obtaining cell and tissue samples, for example for screening for cervical cancer, which comprises a generally conical brush with bristles soluble in a liquid that does not damage the tissues, and a method of using the device.

3 Claims, 1 Drawing Figure
SAMPLING DEVICE AND METHOD

This invention relates to a process and device for collecting specimens for diagnostic purposes.

While there has been as yet little progress in developing a cure for various forms of cancer, in the sense of providing pharmaceutical treatment, advances have been made in surgical treatments which rely to a large extent for success on early diagnosis. One example is in uterine cervical cancer where progress has been made by instituting tests of the section of the population at most risk. It is hoped that in future all women will be examined at regular intervals in an attempt to attain early detection of presence of abnormal cells.

At present, between 3 percent and 5 percent of women initially subjected to cytological examination appear to have abnormal cells and have to be examined by histological methods before a firm diagnosis can be made. Many of those so examined are found not to show symptoms of cancer. Apart from the expense and labor involved, the apprehension naturally felt by those called back makes it desirable to avoid a second examination. The presently used methods of obtaining samples normally do not remove tissue, or sufficient tissue, from the cervix to enable a histological test to be carried out using the original sample. Further, the area of the cervix from which the sample is collected does not usually extend sufficiently to ensure that abnormal material is collected if it is indeed present.

It is an object of the present invention to provide a device and method whereby sufficient material can be collected at one time to enable both cytological and histological examination to be carried out if necessary.

Accordingly, the present invention provides a device for obtaining cell and tissue samples which comprises a generally conical brush, the bristles of which are soluble in a liquid that does not cause morphological damage to the samples.

Further, the present invention provides a method of obtaining a sample suitable for both cytological and histological examination comprising contacting such a brush with a hollow viscus, for example the uterine cervix, to obtain the sample on the bristles. The bristles may then be contacted with such a liquid, and the liquid containing the sample treated to prepare the sample in a form suitable for at least one of the examinations.

The precise shape and size of the brush will, of course, be determined by the degree of penetration and extent of contact required in a particular case. By the use of a conical brush, of the order of 2.5 to 4 cm height and 2 to 3 cm diameter at base, a large surface area can be contacted at the desired regions.

It will be apparent that the bristles should normally be made of a material that can be sterilized by generally used techniques, as should any support needed for the bristles. It will also be apparent that the brush should be made of materials that are not harmful to the person being examined or to the samples themselves.

Suitable materials include cellulose-based materials, for example Courtauld "Dicel Cefafibre," which are spun cellulose acetate fibres. Such a brush is of soft but firm texture and is readily soluble in acetone.

The brush is preferably attached to a sterilizable handle from which it may be readily detached. Conveniently, the handle is a straight rod or shaft of length about 12 to 18 cm, having at the end to which the brush is to be attached a gripper mechanism for detachably retaining the brush. At this end there is also preferably provided a generally disk-shaped support member of approximately the same diameter as the base of the brush and slightly concave toward the brush.

Any suitable gripper mechanism may be used, for example a spring-loaded chuck. This can be operated from the other end of the handle whereby contamination is prevented. Alternatively, the brush may be a force fit in or on the handle.

The invention will now be described by way of example only with reference to the accompanying drawing.

Referring to the drawing:

A metal wire 1, comprising a pair of strands twisted together, acts as a support to bristles (indicated generally by the reference numeral 2), the construction being akin to that of a pipecleaner; the bristles 2 comprise a region 3 of approximately constant diameter extending from one end of the wire 1 to a point about a third of the way along its length, the second region of bristles 4 extends from this point to the other end and is flared outwardly from this point to form, a frustocone the maximum diameter of which is about 5 times that of the bristles in the region 3. Attached to the end of the wire carrying the widest bristles is a rod 5 which serves as a handle. The rod 5 has at the attached end a gripper 6 in the form of a chuck which is operated by a plunger 7 at the other end of the rod. A generallyucker-like support 8 is positioned on the attached end of the rod with its concave side facing the bristles.

In use, the device comprising the brush and the handle is sterilized, the plunger 7 is depressed to open the gripper 6 over the wire 1 and the plunger 7 is then released. The brush is then inserted into the cervix and rotated to obtain the sample. The brush is then released from the gripper into a fixative solution. The fixative solution is then shaken to cause enough cells to be shed from the bristles to enable cytologic preparations to be made for cytological diagnosis. If necessary or desired, the remaining tissue and any remaining cells can be removed from the brush by dissolving it in a suitable solvent to prepare samples for histological diagnosis.

Suitable dimensions for the various parts are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>wire 1</td>
<td>3 cm in length;</td>
</tr>
<tr>
<td>bristle region 3</td>
<td>1 cm in length and 0.5 cm diameter;</td>
</tr>
<tr>
<td>bristle region 4</td>
<td>2 cm in length increasing in diameter from 0.5 to 2.5 cm;</td>
</tr>
<tr>
<td>support 8</td>
<td>2.5 cm diameter;</td>
</tr>
<tr>
<td>rod 5</td>
<td>15 cm in length;</td>
</tr>
</tbody>
</table>

I claim:

1. A method of obtaining from the uterine cervix a sample that is suitable for both cytological and histological examination, which comprises the steps of obtaining from the uterine cervix a sample which contains both tissue and cellular material by contacting said cervix with a generally conical brush having radially projecting bristles made of soft fibres having the firm sample-retaining texture of cellulose acetate, which bristles are soluble in a solvent that does not cause morphological damage to the sample when said bristles and sample are immersed in said solvent, but are insoluble in conventional fixatives for said cells and tissues, immersing the brush having the sample thereon in a fixative for said sample, causing relative agitation between said
brush and fixative to remove cellular material therefrom for cytological examination, and subsequently dissolving said bristles in said solvent to prepare a sample suitable for histological examination.

2. A method as claimed in claim 1 in which said fibres are made of cellulose acetate.

3. A device for obtaining cell and tissue samples which comprises a generally frusto-conical brush having a coaxial handle projecting from its larger end and soft radially projecting bristles of cellulose acetate which are soluble in a liquid that does not cause morphological damage to the sample when said bristles and sample are immersed in said liquid, the narrower end of said brush being surmounted by a portion of substantially constant diameter.

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