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**Pediatric Urology**  
**Moving into the new millenium**  
**New trends and future direction**  
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In one of his best known poems the eminent Greek poet Konstantinos Kavafis, quoting Philostratos, the sophist of the 3rd century AD, states that "...gods can perceive the future while common folk can only understand present things; but the wise among the mortals are capable of perceiving things that are about to happen. Thus, by means of their wisdom, they are able to predict forthcoming changes...".

If we assume that we, as scientists and in particular physicians, are regarded and quite rightly so, as the "wise" of society, then we should be able to perceive, at least within our own specialty, the changes that are about to happen. In the lines that follow an attempt is made to outline how pediatric urologists perceive the changes which are likely to be expected in our field as we enter the new century and milenium.

There are four areas of major interest the evolution of which should be kept in focus and carefully monitored during the coming years: fetal surgery, laparoendoscopic and microvascular surgery, tissue engineering and gene therapy.

Open fetal surgery has attracted a lot of publicity but its true benefits so far are difficult to assess. The number of cases reported is very small, and there are no data from randomised controlled trials to lead to firm conclusions regarding its long-term effect on obstructive uropathies.<sup>1</sup> It seems that the future lies with the fetal endoscopic techniques to be developed for the treatment of posterior urethral valves or ectopic ureterocele.<sup>2</sup>

The main question which we should now be asking is no longer "what can we do?" but "what ought we to do?", and in order to move forward into the phase of evidence based management, randomised, controlled studies are needed; this will inevitably mean multicen-

ter collaboration, and this is going to be the challenge for Fetal Urology in the next decade.<sup>3</sup>

Laparoendoscopic and microsurgical techniques also appear to be areas for exploitation by pediatric urologists. Expanding interest in pediatric urological laparoscopic techniques is being manifested and it is characteristic that while 20 years ago, at the annual meeting of the Urology Section of the American Academy of Pediatrics, there was not a single paper on laparoscopy,<sup>4</sup> during its most recent meeting in October 1999, one whole session with free papers plus one video forum were dedicated to laparoscopy. Laparoscopic exploration for the removal of small dysplastic kidneys, renal biopsy and pyeloplasty are but a few of the future applications of pediatric laparoscopy<sup>5,6</sup> which in view of the expected technological improvements will be in ever increasing demand as a truly minimally invasive approach (tabl. 1).

A special mention should be made of microsurgical/microvascular orchidopexy which in the future must be offered by competent specialist personnel, in certain pediatric urological centers at least.<sup>7</sup> The availability of microvascular services in other specialities including plastic surgery and neurosurgery, renders the inability to undertake such surgery for a high lying testicle no longer acceptable.<sup>7</sup>

During the last two decades a large part of the surgical craft of urology has been dedicated to reconstruction of the lower urinary tract. Bladder reconstruction has attracted particular attention, leading to the evolution of a great number of reconstructive techniques.<sup>8</sup> However, children born with severe congenital malformations affecting the bladder, such as bladder-cloacal exstrophy, posterior urethral valves and myelomeningocele, as they grow up continue to face serious problems which compromise the functional status of their kidneys, their social image and their general well being.<sup>9</sup>

The number of operative revisions many of these unlucky patients may have to undergo in order to achieve a barely satisfactory quality of life is unacceptably high. This must change in the future<sup>10,11</sup> and a possible means to achieve this is promised by tissue engineering.<sup>12</sup> If the efforts for the construction of neobladders through

**Table 1.** Future perspectives of laparoendoscopic surgery in Pediatric Urology.

<i>Clinical applications</i>
Removal of hypoplastic/dysplastic kidneys
Renal biopsy
Pyeloplasty
<i>Technical improvements</i>
Voice controlled optical system
Artificial hand → inside assistance, tactile feedback

**Table 2.** Potential for gene therapy in Pediatric Urology.

<i>Nephroblastoma with genetic predisposition</i>
WAGR syndrome
Aniridia
Hemihypertrophy
Denys-Drash syndrome
Familial
<i>Hypercalciuria</i>
<i>Hyperoxaluria</i>

such techniques become successful, the life of children with compromised bladders will dramatically change.<sup>13</sup> Instead of being submitted to a series of reconstructive procedures a newborn baby born for example with bladder exstrophy might, in the future, be directly transplanted with a bioengineered bladder which could solve, hopefully once and for ever, the anatomic and functional problems.

Last but not least our aspirations for new therapeutic modalities inevitably touch upon the novel concept that human disease might be treated by the transfer of genetic material into specific cells of a patient rather than by conventional drug therapy.<sup>14,15</sup> The application of gene therapy in clinical practice is no longer remote, and according to the pioneers of human genetic engineering a gene therapy will be possible for most diseases within 30 years.<sup>16</sup>

Pediatric Urology, dealing mainly with congenital developmental anomalies, does not appear a very likely prospective client for the application of gene therapies but there are a few acquired conditions for which new therapeutic horizons might be opened by gene therapy (tabl. 2). Genetic predisposition to nephroblastoma could be eliminated, and hypercalciuria and hyperoxaluria, the two most common metabolic causes of familial childhood urolithiasis, may be prevented in the future.

Imagination and vision are privilege of the scientist. They provide the necessary impetus and creative drive for exploring the secrets of the unknown and achieving

new discoveries. However, if progress is to become a fruitful reality and not just remain a mere theoretical potential, the necessary financial, organisational and ethical framework must be defined, within which research and its successful applications can be diffused.<sup>17</sup>

In this context scientific societies, national and international, can play a major and productive role if suitably motivated. Large and prestigious scientific bodies such as the American Urological Association and the European Association of Urology should protect and support the urologic subspecialties, defining and setting the standards of their practice. This would enable us, the pediatric urologists, to stand upon more solid ground and work even more productively in the future for the benefit of our patients.

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