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Extragonadal sperm reserves, sperm-depletion rates, numbers of sperm per mating, and fertility with successive matings by intact or unilaterally vasectomized rats

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Because of the high rates of sperm production and large extragonadal sperm reserves of sexually rested male rats, mating trials are insensitive for detecting test-induced alterations in sperm production rates. Mating trials might be more sensitive if, independently of any experimental treatments under study, the number of sperm per mating was closer to the minimum requirements for normal fertility. The present study was undertaken to assess the impact of unilateral vasectomy and/or matings with up to three females in succession, for 1 hour each, on the number of sperm per mating and fertility, in comparison to corresponding values for males allowed unlimited matings with a receptive female overnight. Unilateral vasectomy did not affect sperm production, extragonadal sperm reserves, or removal of contralateral sperm during ejaculation ($P > 0.05$) but caused a 50% decrease in sperm numbers per mating. Sperm output, judged from numbers of residual extragonadal sperm in unmated and mated males, was excessive (290×10^6) during conventional overnight mating with intact males and during the first and second hours of restricted mating (105 and 184×10^6) respectively, for intact males; one-half of these amounts for unilaterally vasectomized males). In contrast, sperm output during the third successive mating was minimal (nonmeasurable) but adequate, since pregnancy rates were similar for females mated first, second, or third in succession ($P > 0.05$). Since successive matings reduce the number of sperm per mating by natural methods, this approach may enhance the sensitivity of mating tests when applied for assessing the potential effects of experimental treatments on sperm production.

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