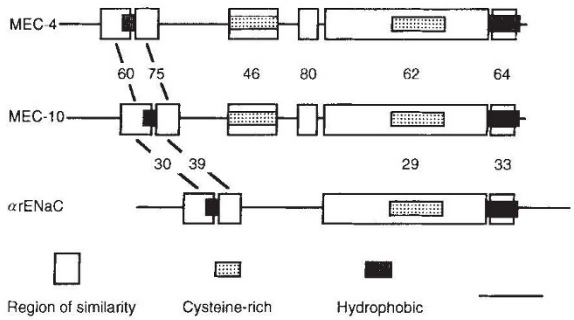
Degenerin similarities

SIR — We were delighted to hear, before publication on 4 February, that Canessa *et al.*[1] had identified a gene whose product, αrENaC, conveys amiloride sensitivity on *Xenopus* oocytes and exhibits extensive similarity to two *Caenorhabditis elegans* genes, *deg-1* (ref. 2) and *mec-4* (ref. 3), that can mutate to produce neuronal degeneration. We have called the products of these *C. elegans* genes degeneris[3]. Here we would like to point out that the similarity extends further than what is evident from our previously published sequences, demonstrating that the mammalian and *C. elegans* genes are members of the same gene family.

We have been able to obtain full-length coding sequences of the *mec-4* gene and of a new member of the degenerin family, *mec-10* (see figure). The sequences predict proteins of 768 and 724 amino acids, respectively. The *mec-10* protein has the two cysteine-rich domains and carboxy-terminal hydrophobic domain previously noted in the *mec-4* protein sequence[3]. In addition, the *mec-4* and *mec-10* proteins have a second hydrophobic domain approximately 100 amino acids from the amino-terminus and regions of similarity both before and after this putative membrane-spanning region. This more amino-terminal hydrophobic region and the associated conserved sequences are also found in the rat αrENaC protein[1]. Thus, all three proteins have a similar structure and exhibit regions of similarity over their entire lengths, indicating that they are members of the same gene family (although the rat protein does not have the more amino-terminal cysteine-rich region).

The finding that αrENaC can convey amiloride-sensitivity to *Xenopus* oocytes raises the intriguing possibility that *mec-4*, *mec-10* and, presumably, *deg-1* also encode subunits of a similar sodium-channel complex. This is particularly exciting because *mec-4* and *mec-10* were first identified by virtue of mutations that caused *C. elegans* to be touch-insensitive[4,5] and because these genes have been hypothesized to be part of the mechanosensory transduction machinery[3,5]. These genes (and the *mec-6* gene, which is needed for touch sensitivity[4,5] and for the *mec-4*- and *deg-1*-dependent degenerations[2]) may be part of a mechanotransducing channel.



Comparison of the predicted protein sequences of MEC-4, MEC-10, and αrENaC. Regions of similarity have at least 25% sequence identity compared to MEC-10; exact values are indicated in the figure. MEC-4 and αrENaC share the same four regions of similarity that MEC-10 and αrENaC do (the corresponding percentages of identity, starting at the amino termini, are 30, 36, 23 and 31). The αrENaC sequence was generously provided by B. Rossier before publication[1]. Scale bar, 100 amino acids.

It is likely, given the fact that several members of this family are found in *C. elegans*, that families of these genes will be found in other organisms. Since several mechanosensory hair cells (for example, in the lateral line organ of *Necturus*[6] and in the vestibular organ of chick[7]) as well as a mechanosensitive channel in *Xenopus* oocytes[8] are sensitive to amiloride, mechanosensory channels in other organisms may use degenerin-like genes. It will be interesting to see whether these new proteins are channel components, are involved in mechanosensory transduction, or cause cell degeneration, either naturally or through mutation.

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Sex surveys and drug users

SIR — The British national survey of sexual attitudes[1] and the French national telephone survey[2] provide general population norms for sexual behaviour, giving a control group "against which research in more focused populations at high risk (of HIV) . . . can be assessed"[1]. One such population is injecting drug users, who are recognized as a source of heterosexual spread of HIV infection. While it is widely believed that drug users who take depressants (for example, opiates and tranquillizers) practise less sexual intercourse than the norm[3], such assertions have been at best speculative because it has been difficult to relate such behaviour to general population norms.

Between May 1990 and December 1991 (fortuitously identical to the time period of the British survey), 919 of Glasgow's estimated 9,400 injecting drug users were investigated[4]. A multicentre and community-wide sampling strategy was implemented to provide as representative a sample as possible of injecting drug users in Glasgow. Respondents, of whom 88% injected daily and 99%

NUMBER OF HETEROSEXUAL PARTNERS BY AGE AND GENDER

	Men				Women			
	16–24		25–34		16–24		25–34	
	Glasgow	Ref. 1	Glasgow	Ref. 1	Glasgow	Ref. 1	Glasgow	Ref. 1
None	16.1%*	26.9%	17.6%*	8.6%	19.6%	23.9%	27.6%*	6.7%
One	46.1%	46.2%	52.7%*	76.9%	62.7%	60.5%	58.6%*	86.8%
Two	12.7%	14.3%	10.1%	8.6%	8.9%	10.0%	8.0%	4.9%
3–4	16.4%*	9.1%	10.5%*	4.1%	7.6%	4.5%	3.4%	1.3%
5+	8.6%*	3.5%	9.1%*	1.9%	1.3%	1.0%	2.3%	0.3%
99th centile	12	10	20	5	5	7	5	3
Mean	1.9*	1.4	2.0*	1.2	1.1	1.0	0.9	1.0
Variance	4.7	5.2	13.3	8.9	0.9	1.8	0.7	0.3
N	347	1,984	296	2,167	158	2,246	87	2,899

The table is a comparison between the study reported here (Glasgow) and the British survey (ref. 1). Number of partners are in the past 6 months for the Glasgow study and the past year for ref. 1. Sexual activity resulting from prostitution was excluded from the Glasgow study.
* Significant difference between the Glasgow study and ref. 1 ($P < 0.05$)