ences in the number of breaks in cellular DNA.

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JOHANSEN AND BOYE REPLY—We believe Srivastava's conclusions[1] are based on misinterpretations of circumstantial evidence. First, it has long been known that when bacteriophages are irradiated extracellularly the survival of their plaque-forming ability is identical in oxygen and in nitrogen. When irradiated in the presence of sulphydryls, however, the survival in nitrogen is increased, and becomes higher than in the presence of oxygen[2]. This suggests the importance of sulphydryl compounds in anoxic protection. The finding that the yield of DNA strand breaks is similar in oxic and anoxic conditions when phage λ is irradiated extracellularly in the absence of sulphydryls[3] is as expected, and within the framework of classical radiation biology.

Second, when irradiated intracellularly, in normal physiological conditions, a higher yield of strand breaks is generally found in oxic than in anoxic conditions, both for chromosomal and phage DNA. This is true even when the experiments are performed so fast that the ligase could rejoin, at the most, one of a hundred DNA strand breaks formed[4,5]. We are aware of four types of experiment where the anoxic yield of DNA strand breaks is increased to—or nearly to—the oxic yield: (1) bacteria treated with the sulphydryl-binding agent *N*-ethyl-maleimide (NEM) before irradiation[6]. This sensitisation is reversed by strict anoxia[7] and is believed to be caused by increased sensitivity to small contaminating amounts of oxygen in cells with low levels of endogenous sulphydryls[5]; (2) bacteria heat shocked before irradiation[6]; (3) bacteria kept at *p*H 8.6 (ref. 8). During these treatments, the cells become leaky and considerable amounts of sulphydryls are lost into the suspending medium[5]; (4) Srivastava's own experiment with intracellular phage λ (ref. 3). We noticed that in this experiment the bacteria were suspended in 0.01 M $MgSO_4$ before irradiation, and wondered whether this hypotonic treatment had any effect on the level of endogenous sulphydryls in the bacteria. As can be seen from Table 1, suspending bacteria in 0.01 M $MgSO_4$ leads to a loss of a considerable amount of sulphydryls from the cells. Small contaminating amounts of oxygen —if present—will increase the 'anoxic' yield of radiation-induced DNA strand breaks in these cells.

Third, experiments in which phage λ is irradiated extracellularly in oxygen or in nitrogen in the absence of sulphydryls, and the DNA analysed 10 min after infection of a repair-proficient strain are very complex, and interpretation is not unambiguous. In conclusion, recent experiments[4,5] tend to support the view that the oxygen effect in radiation-induced DNA strand breakage is due to radiochemical reactions, rather than to preferential enzymic repair.

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Table 1 Effect of hypotonic treatment on cellular sulphydryls

Treatment*	Sulphydryls in cell-free supernatant (mM)	Sulphydryls in TCA extract (mM)
Phosphate buffer, *p*H 6.8	<0.05	2.04
0.01 M $MgSO_4$	1.15	1.12

*Cells of *E. coli* K12, strain AB 1157, from a 100-ml log-phase suspension were collected by centrifugation and washed in phosphate buffer[4] at *p*H 6.8. The cells were resuspended in 0.3 ml of the same buffer or in 0.3 ml 0.01 M $MgSO_4$, kept for 10 min at room temperature and the concentration of sulphydryls measured in the cell-free supernatant[5]. The bacteria were suspended in 0.3 ml trichloroacetic acid (TCA) at 0.3 M, kept at room temperature for 10 min and the concentration of acid soluble sulphydryls measured in the cell-free extract.

Scrotal asymmetry in man and in ancient sculpture

MITTWOCH and Kirk[1] have claimed that "Right and left mammalian gonads do not usually differ noticeably either in size or development . .". Chang *et al.*[2] investigated the well-known asymmetry of the scrotum in man and showed that in right-handed subjects the right testis tended to be higher, whereas the converse applied in left-handed subjects. To investigate whether this was simply due to the greater weight of the left testis in right-handed subjects they measured the weight and volume of the testes in (presumably mainly right-handed) cadavers and found, paradoxically, that the right (that is, the higher) testicle was also the heavier and of greater volume, a result in accord with Mittwoch and Kirk's foetal data[1].

Interest in testicular asymmetry may however be traced back much further. Winckelmann[3] in 1764 commented that: "Even the private parts have their appropriate beauty. The left testicle is always the larger, as it is in nature;". He went on, however, " so likewise it has been observed that the sight of the left eye is keener than the right", an observation which, to my knowledge, has not been confirmed.

To test Winckelmann's claim, I observed the scrotal asymmetry of 107 sculptures, either of antique origin or Renaissance copies, in a number of Italian museums and galleries. Table 1 shows that although the ancient artists were correct in tending to place the right testicle higher, they were wrong in so far as they also tended to make the lower testicle the larger: we may postulate that they were also using the common-sense view that the heavier ought to be lower. Although Winckelmann's observations of antique sculpture were correct, his observations of nature are clearly in error.

The reason for the artists placing the right testicle higher than the left is not clear. It may reflect the true observed state of things, but it may also be a function of Greek left/right symbolism. in which right and male, and left and female were regarded as equivalent, and thus for instance, the male child was presumed to come from the right (and thus higher?) testis, and vice versa for the female child[4].

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Table 1 Analysis of the scrotal asymmetry of 107 ancient sculptures

		Side of higher testicle			
		Left	Equal	Right	Total
Side of larger testicle	Left	2	7	32	41
	Equal	8	19	17	44
	Right	17	1	4	22
	Total	27	27	53	107