its lower toxicity and partial reversibility of its antimitotic action. Further research could explain the mechanism of action of these antimitotic drugs and suggest the possibility of a chemotherapeutic application.

Riassunto. Studi sulle alterazioni citologiche prodotte dalla pederina e da alcuni suoi derivati su culture di cellule in vitro normali (cellule embrionali di topo, cellule di rene di cane) e tumorali (ceppi HeLa e KB). Queste sostanze determinano, a bassissime concentrazioni, inibizione della crescita delle culture, riduzione fino alla completa scomparsa delle cellule in mitosi e gravi alterazioni citologiche con precoci alterazioni della cromatina nucleare (frammentazione in blocchi o in granuli più o meno fini) e del citoplasma (scoppio, vacuolizzazione, sfrangiamento).

M. SOLDATI, A. FIORETTI, and M. GHIONE

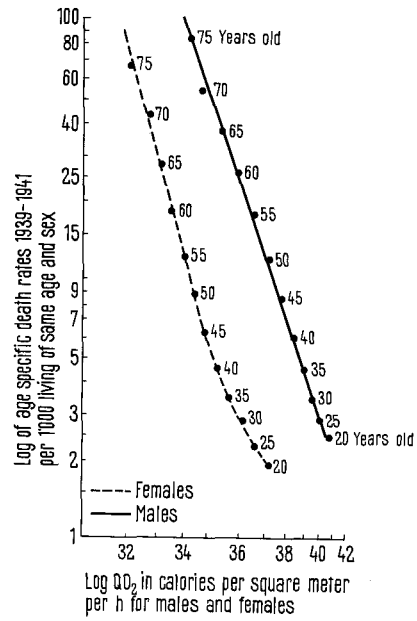
Farmitalia SA, Istituto Ricerche, Milano (Italy), November 10, 1965.

Sex, Lifespan and Smoking

The highly significant correlation between lifespan and body size in mammals[1] implies a relationship to metabolic rate[2] which can be expressed with the dimensional constant ($t_L/kg^{3/4}$), where t_L equals lifespan and $kg^{3/4}$ denotes metabolically active body size[3]. It would follow then that differences in longevity between men and women may be related to their respective metabolic rates. Indeed this already has been illustrated by plotting age-specific death rates of the general population against rate of oxygen consumption – QO_2 per h in calories per m^2 of body surface – separately for men and women at all adult age levels[4]. The two parallel running curves of the plot also reveal that women, in contrast to men, burn at a rate 9–10% lower than their fire of life, a sex difference in metabolic rate corresponding in magnitude to the approximately 9% lower brain weight of women. SACHER has shown that brain weight is an even better predictor of lifespan than body weight, brain weight being correlated about 0.9 with body weight[5]. Another corollary of the relation between metabolic rate and lifespan would be that inherited low metabolic rate favors longer life expectancy. For rats this has been demonstrated by WEISS[6].

The metabolic-rate-dependent difference in lifespan between men and women can be obscured or even reversed by cultural, geographic, economic and other factors. The now excess male mortality – steadily increasing over the last thirty years, as noted by DAVIS[7], ALTMAN and DITTMER[8] and others – was reversed prior to the era of LISTER and SEMMELWEISS. ENTERLINE[9] suggests two kinds of forces at work to account for today's excess male mortality: social, medical, and public health advances have caused rates for certain female diseases, or diseases with low sex mortality ratios (such as tuberculosis, diseases associated with high blood pressure, etc.) to decline, while other factors have brought about increases in male death rates from motor vehicle accidents, lung cancer, and coronary heart diseases. We assert that a constant proportion of the difference is based on the body mass-energy expenditure relation, while deviations due to environmental factors should lend themselves to analysis. An example can be given by replotting on a log-log scale (Figure) the already-mentioned data, depicting the relation between age-specific death rates against oxygen consumption, which were published as a semi-log plot[4]. Only now can it be seen that while the plot illustrating the energy-lifespan relation for females is still a *curved* one, especially for the age group between twenty-five and forty-five, the relation for *males* has become a *straight* line.

Could this log difference be the result of excess male smoking and be related to the steadily increasing excess male mortality? Smoking habits, except for recent years, i.e., since the publishing of official Government reports on a relation between smoking and lung cancer, tend to be



Relation between male and female metabolic rates and death rates (replotted from L. DANZIGER, Dis. nerv. Syst. *10*, 35 (1949) with the permission of the author).

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fairly constant. Specifically, *males*, in the United States[10] as well as in Britain[11], smoke consistently over the years *at least twice* as many cigarettes as females. This difference holds true for the general population for the period 1920–1958 in Britain and especially for the age group 25–45 for the years 1955 and 1960[12] in the United States. In that age group in 1955[10] 65% of the females and only 22% of the males are non-smokers. Moreover, in the same age group five years later[13] 50.1% of the females and again only 19.7% of the males are non-smokers. In addition in 1960 the percent of males in the age group 30–39 who inhale deeply when smoking cigarettes is 35.9 compared to 17.9 for females[14].

According to the report of the Royal College of Physicians[11], the chances of dying between 35 and 55 for heavy cigarette smokers are 3–4 times those of non-smokers. The excess of deaths are mostly from cancer of the lung, coronary heart-disease, and bronchitis, all of which are much commoner in men than women. Interestingly, when rates of cardio-vascular diseases are plotted against age on log-log scales, remarkably straight lines are obtained over the greater part of adult life[15], resembling the straight line of our Figure.

Independently, PLATT concludes that most, if not the whole, of the excess of male deaths could be accounted for by cigarette smoking[16]. We believe, therefore, that there is substantial evidence to favour an affirmative answer to the question: Could the log difference in our Figure be the result of excess male smoking, contributing to the excess male mortality. It appears that the significant sex difference in smoking habits results in a log difference in death rates which obscures the metabolic-rate-dependent difference in lifespan between the sexes.

Zusammenfassung. Es wird der Nachweis geführt, dass die durch höheren Stoffwechsel bedingte kürzere Lebensdauer der Männer durch Rauchen besonders in der Altersgruppe zwischen 25 und 55 zusätzlich verkürzt wird.

R. FISCHER

Division of Behavioral Sciences, Department of Psychiatry, College of Medicine, The Ohio State University, Columbus (Ohio USA), November 15, 1965.

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The Effect of *o,p*-DDD in the Chicken

A single i.v. injection of 1,1-dichloro-2-(*o*-chlorophenyl)-2-(*p*-chlorophenyl) ethane (*o,p'*DDD) into a dog will inhibit adrenal corticosteroid production and glucose-6-phosphate dehydrogenase activity of the adrenal gland[1]. Attempts to inactivate the adrenal cortex by exposing embryos to *o,p'*DDD or by i.v. injection of chicks with this drug will be discussed in this paper. Also, the influence of *o,p'*DDD on antibody response of chicks will be presented.

*o,p'*DDD was dissolved in ethyl alcohol (EA) or a 1:2 dilution of EA and propylene glycol (PG). To the *o,p'*DDD-EA solution was added sufficient sesame oil to make final concentrations of 2.0, 8.0, 32.0, and 64.0 mg *o,p'*DDD/ml. A 5.3% stock solution of *o,p'*DDD was prepared for intravenous injection (i.v.) by adding the chemical to a 1:2 dilution of EA and PG[2]. The stock solution was diluted with lipomul, an oil-in-water emulsion, to yield 10 mg of *o,p'*DDD/ml.

At 12 h intervals, 12 3-week-old New Hampshire chickens received 3 i.v. injections of 10 mg *o,p'*DDD per injection while a different group of 12 birds received 3 i.v. injections of lipomul. 1 h after the last i.v. injection, 6 birds in each group received an i.m. injection of 8 IU ACTH per 100 g body weight and the remaining 6 received saline. A second group of birds received 2 i.v. injections of *o,p'*DDD or lipomul prior to an i.m. injection of ACTH. The right adrenals were removed 12 h after the i.m. injection of ACTH and analyzed for cholesterol[3]. The left adrenals were placed in Orth's fixative and then stained with Masson tri stain[4].

At 6 weeks of age normal birds received an i.v. injection of 10 mg *o,p'*DDD. Approximately 18 h after *o,p'*DDD administration, each bird received 40 mg of bovine serum albumin (BSA) per kg body weight. Birds were bled 7 days later and the serum antibody level to BSA determined[5].

Hatchability was significantly depressed by egg injections of *o,p'*DDD (Table I). Preliminary data suggested

Table I. Percentage hatchability of eggs injected with 0.1 ml of sesame oil containing varying amounts of *o,p*-DDD

No. eggs per group	No injection	Sesame oil	*o,p*-DDD, mg			
			0.2	0.8	3.2	6.4
50[a]	84	70	58[c]	54[c]	57[c]	
50[b]	78	63[c]				47[c]

[a] Injected in 1st day of incubation. [b] Injected on 8th day of incubation. [c] Significantly different ($P < 0.05$) from non-injected eggs.

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