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Prostaglandin and thromboxane production by rat macrophages

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Macrophages derived from peritoneal inflammatory exudates have been shown to release substantial amounts of prostaglandin E (PGE) like activity during short term *in vitro* culture as measured by bioassay and radioimmunoassay (Bray, Gordon & Morley, 1974). In addition murine macrophages have been reported to release thromboxane B_2 (TxB_2), as determined by radioimmunoassay (Weidemann, Peskar, Wrogemann, Rietschel, Staudinger & Fischer, 1978), and 6-keto prostaglandin $F_{1\alpha}$ tentatively identified by thin layer chromatography (Humes, Bonney, Pelus, Dahlgren, Sadowski, Kuehl & Davies, 1977). In the present work we have used a more specific gas chromatography-mass spectrometry technique to examine the release of prostaglandins and thromboxanes from a pure population of rat peritoneal macrophages.

A mixed white cell population was collected by peritoneal lavage. The adherent cells were aged for 72 h prior to use, producing a pure macrophage population. These cells were then cultured for a further 48 h in fresh medium from which the prostaglandins were obtained by acidic extraction into diethyl ether. The prostaglandins and thromboxanes present in the sample were derivatized to form their methyl ester, methoxime, tertiarybutyldimethylsilyl ethers. These were chromatographed using a 5% OV 101 column interfaced to a VG Micromass 16B mass spectrometer.

In supernatants obtained from cultures of rat macrophages, containing 4×10^7 cells, there were consistently found nanogram amounts of PGE_2, $PGF_{2\alpha}$, 6-keto-$PGF_{1\alpha}$ and TXB_2, characteristic mass spectra being obtained for all these compounds. The release of these compounds along with β-glucuronidase was increased when the macrophages were exposed to opsonised zymosan. This work shows that 'resting' rat peritoneal macrophages synthesize prostaglandins and thromboxanes from endogenous arachidonic acid as shown by the presence of PGE_2, $PGF_{2\alpha}$, 6-keto-$PGF_{1\alpha}$ and TXB_2 in the supernatant. The work is being extended to provide quantitative data for the relative amounts of prostaglandins and thromboxanes produced in this system.

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