

THE USE AND IMPLICATIONS OF MULTICELLULAR TUMOR SPHEROIDS IN RADIATION RESEARCH

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ABSTRACT The system of Multicellular Tumor Spheroids (MTS) as an additional in vitro model, has been broadly used in cancer research since the 70's to study the characteristics of solid tumors and the effects of anti-cancer agents, particularly of radiation. This paper reviews and evaluates the method according to the authors' experience in using MTS in experiments. MTS simulates conditions found in those solid tumors which have similar histological structures, such as the existence of hypoxic and/or necrotic areas and the manifestation of a decrease of growth fraction as they increase in size.

Various assays with samples in detail have been developed and adopted in MTS experiments including many of the techniques used in tumor biology to determine the dose response of tumors to radiation such as volume change, cell survival, cell viability, histology, cell loss, and cell cycle kinetics. Cells in MTS grown in close contact had an enhanced capability to accumulate and repair the damages induced by treatment, representing a higher resistance to treatment than monolayer cells. To certain extent the MTS system, being biologically somewhere between in vivo and conventional in vitro monolayer cells, is an attractive model due to its low expense high turnover speed and convenience for use.

KEY WORDS Multicellular tumor spheroid; Growth fraction; surviving fraction; cell viability; cell Loss; "contact inhibition"; cell kinetics.

会议简讯

中国科学院辐射技术研究与开发工作讨论会在苏州召开

1985年3月26日至30日,中国科学院数学部和化学学部在苏州西山联合召开了《中国科学院辐射技术研究与开发工作讨论会》。参加会议的有该院数学部、化学部和生物学部所属17个有关单位的代表50多名,核工业部北京原子能研究所也应邀参加了会议,检阅了中科院近几年来有关辐射技术研究与开发工作的情况。

会议收到论文和工作报告五十余篇。有关专家在会上提出了七个综合性报告,《辐射研究与工艺、辐射装置与剂量测量、辐射技术在交叉学科方面的应用等方面,综合评述了国内外的发展趋势。十五个工作报告介绍了各单位开展辐射技术研究与开发工作的情况。会议期间还分三个专题组着重深入讨论了食品的辐照保藏,新材料研究和辐射装置与剂量测量等问题。

与会代表高度评价了中科院二十多年来,特别是1980年以来在辐射技术应用和基础研究工作中所取得的成就,指出该院已初步形成了一此辐射研究基地,成长了一支专业基本配套的科技队伍,并为科学研究、军工任务和国民经济各部门提供了许多重要的研究成果。近年来,在中央关于科学技术要面向经济建设的方针指导下,该院积极创造条件、有选择地加强了开发工作。在辐射杀虫灭菌、食品的辐射保鲜贮藏,材料的辐射改性以及辐射

(下接第24页)

REACTIVITY RATIOS IN THE RADIATION COPOLYMERIZATION OF ACRYLAMIDE AND SODIUM ACRYLATE IN AQUEOUS SOLUTION

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ABSTRACT The reactivity ratios of radiation copolymerization of the system of acrylamide (AM) and sodium acrylate (AANA) were studied in aqueous solution at room temperature and pH range from 7.4 to 12.1. The copolymerization carried out with high conversion and the monomer reactivity ratios r_1 (AM) and r_2 (AANA) were calculated using the Mayo-Lewis integration equation. There are no evident differences since r_1 varies from 0.9 to 1.18 and r_2 from 0.32 to 0.48 respectively.

KEY WORDS Acrylamide; Sodium acrylate; Radiation copolymerization; Reactivity ratio.

(上接第 43 页)

合成新材料等方面,把研究成果从实验室逐步过渡,最终转化为生产力,并已取得了明显的经济效益和社会效益,受到了社会各界的欢迎和重视。目前中科院在辐射技术研究面向国民经济建设采取四种重要形式,一是直接以新产品进入商品流通领域;二是技术成果转让;三是技术咨询和服务;四是承担国家重点攻关任务。代表们对于上海原子核研究所,长春应用化学研究所和中国科技大学等在辐射基础应用和开发研究中所取得的成绩表示极大的兴趣,认为他们在辐射技术研究的许多方面都做出了重要的工作,希望院部今后给予重点支持,以充分发挥他们的优势和潜力,起骨干和示范作用。

会议期间着重讨论了该院今后开展辐射技术与开发的重点领域、重点开展地区以及如何促进辐射技术发展的基本要求和条件。与会代表指出,目前中科院辐射技术研究成果以及由此而获得社会效益和经济效益是过去二十多年来长期工作积累的结果。今后在加强开发科研的同时,仍应继续重视基础研究,以保证这项高技术源远流长,稳定持续地发展。同时应抓好院内外的横向联系,大力提倡学科间的相互渗透,开展协作研究,有重点地解决若干带普通性基础问题。为此,与会代表建议充分利用院内的有利条件,筹建以微微秒级的电子脉冲加速器为主体的脉冲辐解国家实验室。

代表们希望在全国呈现应用辐射技术的热潮中,院部应冷静地进行科学分析,作出有预见性的决策,采取有力的措施,以适应形势发展的需要,同时建议院部今后能定期组织这类跨学部、多学科的学术工作讨论会,并决定出版《中国科学院辐射技术与开发工作讨论会》论文集。该论文集反映中科院有关单位最近几年中在辐射基础,应用和开发研究工作的最新成果,可望于今年年底出版。需要此文集者可写信给上海市 8204 信箱《辐射研究与辐射工艺学报》编辑部预订。

(张加山)