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IMMUUNLIGGAAMPIES BY KANKER

Daar heers geruime tyd al die mening dat 'n spesifieke antigeniese toets vir kanker van groot hulp met vroeë diagnose kan wees, en dit moontlik mag maak om met die behandeling te begin terwyl die kans op sukses groter is. Die toets kan ook gebruik word om vas te stel hoe geslaagd die behandeling is en om aan te dui of verdere chirurgiese of geneeskundige behandeling nodig is. Die verskil tussen kankerselle en normale weefsel is gering, en so ook is die verskil in hul metabolisme gering. Die toets moet fyn genoeg ingestel wees om hierdie verskil op te neem, en om van diagnostiese waarde te wees, moet sy spesifisiteit aan taamlik strenge eise voldoen. Dunn en Greenhouse (1950)¹ het die maatstawwe as volg bepaal, t.w., '90% akkuraat by gevalle van kanker en ten minste 95% akkuraat by pasiënte wat nie kanker het nie.'

Mann en Welker (1943)² het bevind dat 'n karsinoom in enige deel van die liggaam sekere stowwe in die bloedsomloop uitstort waarteen teenliggaampies gevorm word. Hulle het tot die gevolgtrekking gekom dat hierdie stowwe deel uitmaak van die molekule van die kankerweefsel en dat hierdie fraksies nie by normale mense voorkom nie. Die vroeër bevindings van Makari en Huck (1955)³ (hulle het die Schultz-Dale-badtegniek gebruik—een van die fynste metodes om teenliggaampies op te spoor) is onlangs deur Burrows⁴ bevestig en verder gevoer. Volgens hierdie metode word die baarmoeder van 'n geïmmuniseerde marmotjie in 'n soutoplossing gehang, die serum wat getoets moet word, word by dié soutoplossing gevoeg nadat die baarmoeder ongevoelig gemaak is vir normale serum (d.w.s. nie-kankeragtige serum) deurdat dit vooraf blootgestel is aan en deurweek is met normale serum. Sametrekking van die geïmmuniseerde baarmoeder dui 'n positiewe reaksie aan.

'n Opvallende aspek van Burrows se bevindings is dat sulke uiteenlopende gewasse soos epiteliom van die lip, seminom van die testis, karsinoom van die bors en kwaadaardige melanom almal dieselfde teenliggaampie voortbring. Hierdie feit suggereer 'n holistiese opvatting van karsinoom in die algemeen—veral in die lig van Burrows se ontdekking dat sarkome en leukemies nie 'n ooreenstemmende antigeniese beeld toon nie—en dit raak aan die werklike kern van die oorsprong van neoplasie. 'n Kwantitatiewe berekening van die hoeveelheid teenstof wat gevorm is, bewys dat daar geen verband tussen die grootte van die gewas en die hoeveelheid teenstof bestaan nie as die gewas eers die kritieke omvang van 1 cm. deursnee bereik het. Die toets self is akkuraat genoeg: 'Uit die 301 karsinoom-pasiënte wat getoets is, was 291 positief; 'n korrekte opgawe

EDITORIAL

IMMUNE BODIES IN CANCER

It has long been felt that a specific antigenic test for cancer would be of great assistance in early diagnosis and might enable treatment to be instituted while it had a better chance of being effective. The test might also be used to estimate the success attained in treatment and to indicate whether further treatment, surgical or medical was necessary. As the difference between cancerous cells and normal tissue is narrow, so the difference in their metabolism is small. To this difference the test would need to be sensitive, and to be of use in diagnosis the specificity of the test would need to satisfy somewhat rigid criteria. Dunn and Greenhouse (1950)¹ laid down such criteria, viz., '90% accurate in cases of cancer and at least 95% accurate in non-cancerous patients'.

Mann and Welker (1943)² found that carcinoma in any part of the body releases into the blood stream certain substances against which antibodies develop. They concluded that these substances are part of the molecule of the carcinomatous tissue and that these fractions are not present in normal individuals. Earlier findings concerning cancer antibodies obtained by Makari and Huck (1955),³ utilizing the Schultz-Dale bath technique, which is one of the most sensitive methods of detecting antibodies, have recently been confirmed and elaborated by Burrows.⁴ In this method the uterus of an immunized guinea-pig is suspended in a bath of saline, to which the serum to be tested is added after the uterus has been desensitized to normal (i.e. non-carcinomatous) serum by previous exposure to and saturation by normal serum. A positive result is indicated by a contraction of the immunized uterus.

A striking feature of Burrows' findings is that such diverse tumours as epithelioma of the lip, seminoma of the testis, carcinoma of the breast and malignant melanoma all produce the same antibodies. This suggests a holistic view of carcinoma in general—particularly as Burrows finds that sarcomata and leukaemias do not show the same antigenic picture—and touches upon the very essence of the genesis of neoplasia. A quantitative estimation of the amount of antibody developed shows that there is no relation between the size of the tumour and the amount of antibody once the critical size of 1 cm. in diameter has been attained by

van 96·7%.' En uit die 207 karsinoomvrye pasiënte wat die toets ondergaan het, was 200 negatief, d.w.s. die toets was korrek by 96·6%. Slegs by 10 gevalle is die antigeen-toets toegepas ná sowel as vòòr die karsinoom verwyder is. Oor die algemeen blyk dit dat dit verskeie maande duur voordat die antigeen verdwyn. Dit is duidelik dat verdere navorsing in hierdie verband nodig is.

As finale *tour de force* het Burrows en Neill (1958)⁵ voortgegaan om die aktiewe bestanddeel van die immuunliggaampie, wat by kankerpatiënte teenwoordig is, uit te ken. Hierdie navorsing is by wyse van elektroforetiese metodes uitgevoer en die uitslae toon dat dit 'n polipeptiede is, spesifiek 'n muco-polipeptied. Dit is bewys dat hierdie polipeptied verwant is aan, of dieselfde is, as die polipeptied wat by nefrose voorkom.

Hierdie verslae gryp die verbeelding aan. Is die aanleg wat verantwoordelik is vir die oorsprong en groei van karsinoom basies immunologies? As daar 'n gemeenskaplike antigeen, en 'n ooreenstemmende immuunliggaampie by die verskillende soorte karsinoom voorkom, hoe kan hierdie ontdekking op die voorkoming of die behandeling toegepas word? Kan die liggaam gehelp word om die teenstof teen karsinoom te ontwikkel? Hoewel dit gerade is om ons bespiegeling in toom te hou, kan ons die uitslae van verdere navorsing op die gebied, wat deur hierdie ontdekkings oopgestel is, met afgemete optimisme afwag. Ons kan hoop dat die donker sluier van onwetenskap binnekort verder oopgetrek sal word, en dat ons op die drumpel van groot gebeurtenisse in die kliniek staan.

1. Dunn, J. E. en Greenhouse, S. W. (1950): *Cancer Diagnostic Tests*. U.S. Publ. Hlth Service Publications No. 9 Federal Security Agency.
2. Mann, L. S. en Welker, W. H. (1943): *Cancer Res.*, 3, 193.
3. Makari, J. G. en Huck, M. G. (1955): *Brit. Med. J.*, 2, 1291.
4. Burrows, D. (1958): *Ibid.*, 1, 368.
5. Burrows, D. en Neill, D. W. (1958): *Ibid.*, 1, 370.

the tumour. The test itself is accurate enough: 'Of the 301 patients with carcinoma tested, 291 were positive, an accuracy of 96·7%. And 'of the 207 without carcinoma tested, 200 were negative, an accuracy of 96·6%'. In only 10 cases has the test been performed after removal of the carcinoma as well as before. In general, it appears to take several months for the antigen to disappear. Further study in this direction is clearly necessary.

As a final *tour de force* Burrows and Neill (1958)⁵ next proceeded to identify the active constituent of the immune body present in carcinomatous patients. This work was done by electrophoretic methods and the results indicate that the substance is a polypeptide, specifically a muco-polypeptide. This polypeptide has been shown to be allied to or identical with the polypeptide found in nephrosis.

These reports are exciting to the imagination. Is the diathesis which is responsible for the origin and growth of carcinoma fundamentally immunological? If there is a common antigen in the various forms of carcinoma, and a corresponding immune body, in what way can this discovery be used in prevention or therapy? Can the body be assisted to develop the antibody against carcinoma? Although it is well to pause in our speculation, we may with measured optimism await the results of further research along the way opened up by these discoveries. We may hope that this breach in the dark walls of ignorance will soon be further widened, and that we may be on the threshold of great events in the clinical field.

1. Dunn, J. E. and Greenhouse, S. W. (1950): *Cancer Diagnostic Tests*. U.S. Publ. Hlth Service Publications No. 9. Federal Security Agency.
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NOTES ON THE CARE OF LEADWORKERS*

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The rapidly developing industrialization of the Union of South Africa not only brings with it increased risks to life and limb by machinery, but it is also accompanied by the appearance of diseases peculiar to industry. Some of these diseases are new to the industrial scene; others have a long, if not an honourable, history behind them.

For the greater part, it is into this latter category that poisoning by lead and its inorganic compounds falls. Legge and Goadby (1912) in their historical survey of the use of lead refer to the description by Pliny of lead colic and mention that Hippocrates was apparently familiar with the condition among lead smelters. Throughout history writers have connected the well-known toxic symptoms of colic and palsy with the ingestion of lead.

Owing to its valuable properties of malleability and relatively high resistance to corrosion, in addition to the innumerable and varied applications of its compounds, lead has found a widespread usage in industry. Its consumption in this country

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is rising rapidly, many recently established industrial processes requiring large amounts of the metal or its compounds. Thus it can be expected that with every year more workers will be exposed to the dangers of lead poisoning.

Occupational Environment. A knowledge of the occupational environment is considered a prerequisite in the supervision of the health of industrial workers. The doctor who is familiar with the working conditions of his patients is at a great advantage in diagnosing and treating their ailments. The care of workers subject to a toxic hazard calls for a two-pronged approach—one, the investigation and control of the working environment; the other, the periodic examination of the individual workers for evidence of adverse effects. The results of the latter, in turn, serve as pointers to hazardous operations or areas.

Plant Inspection. It is important, therefore, that the doctor should from time to time study the working environment of his patients. On these occasions he should be accompanied by a representative of management. It has been stressed by many workers in this field that without the cooperation of