A Novel Method for Melanoma Skin Cancer Diagnosis at an Early Stage Using ANN and DNA Analysis

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Melanoma has an incidence rate of more than 75000 per year with mortality rate of 10000 approximately per year, so early detection highly increases the chance of treatment. A new method proposed for melanoma diagnosis at an early stage. After sequencing two DNA samples from normal and suspicious cells. A Matlab program calculates the numbers of nucleotides(Adenine,Thymine,Cytosine,Guanine) and lengths of both samples then the software calculates the difference between numbers of nucleotides and sequences lengths. It applies natural logarithms for these values and multiplies them by a calculated number which is ln(3x10^9) in order to get the inputs of artificial neural network based on sigmoid function that can diagnose melanoma at an early stage. The output is even malignant (1) or benign (0) melanoma. I worked on an algorithm that makes an approximation of malignancy in case of inconclusive result in order to improve the efficiency of the project. These results depends on samples database used for training. The network achieved 100% predictive success rate in training. Results indicated that DNA analysis and artificial neural network can be used to diagnose melanoma at an early stage and thus to decrease the rate of mortality with an accurate,sensitive,harmless and timely method.

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